

**INFORMATION FOR BIDDERS
PROPOSAL - SPECIFICATIONS
FOR
REPLACEMENT OF JOHN STREET BRIDGE
OVER EAST BRANCH BYRAM RIVER BRIDGE 056055
PROJECT NO. 06-15 JANUARY 2013**

**TOWN OF GREENWICH
CONNECTICUT**

**ENGINEERING DIVISION
DEPARTMENT OF PUBLIC WORKS**

INVITATION TO BID

Sealed bids, one (1) original and two (2) copies, will be received in the Office of the Purchasing Department and shall be opened and read aloud in the Engineering Conference Room, Town Hall, 101 Field Point Road, Greenwich, Connecticut at 10 o'clock a.m. (prevailing time) on Monday, February 25, 2013 for the following work:

Replacement of John Street Bridge
Over East Branch Byram River
Bridge No. 056055
Town Project No. 06-15

A Bid Bond for Three Hundred and Sixty Thousand Dollars (\$360,000) must accompany each bid.

Bidders may be required to submit data covering financial resources, equipment and ability to perform the work rapidly and in a satisfactory manner.

The right is expressly reserved to reject any or all bids, to waive any informalities in the bids, or to accept such bids as appear to be in the best interest of the Town.

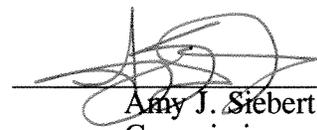
Specifications may be obtained on the Town's website, www.greenwichct.org. **It is the responsibility of the prospective bidder to check the website for any addenda issued up to 48 hours prior to the bid opening.**

Drawings and specifications will be posted to the Town's website and may be downloaded at no cost. Drawings taken from the Town's website and printed on the bidder's equipment may not be to scale.

Full size hard copies of the drawings and bid book may be purchased from Design of the Times, 101 Mill Street, Greenwich, CT, telephone (203) 531-0053 for a non-refundable prepaid fee of \$17.50 and \$33.00 respectively.

Bidders shall complete the Vendor Information & Signatory Form for all Contracts equal to or in excess of \$250,000.00. Failure to complete the Vendor Information & Signatory Form, located in Section 2, will cause the contractors bid to be disqualified.

Attention of bidders is particularly called to the requirements as to conditions of employment to be observed, insurance coverage requirements, minimum wage rates to be paid under the contract and construction safety and health course requirements.



Amy J. Siebert, P.E.
Commissioner of Public Works

Date: February 4, 2013

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SECTION 1
INFORMATION FOR BIDDERS

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INFORMATION FOR BIDDERS

1.1 RECEIPT AND OPENING OF BIDS.

Sealed bids, one (1) original and two (2) copies, will be received in the Office of the Purchasing Department and shall be opened and read aloud in the Engineering Conference Room, Town Hall, 101 Field Point Road, Greenwich, Connecticut at 10 o'clock a.m. (prevailing time) on Monday, February 25, 2013 for the following work:

Replacement of John Street Bridge
Over East Branch Byram River
Bridge No. 056055
Town Project No. 06-15

1.2 LOCATION AND DESCRIPTION OF WORK TO BE DONE.

The work herein specified to be done consists of the replacement of the John Street Bridge over the East Brach of the Byram River in Greenwich Connecticut, all as more particularly indicated, shown or described in the drawings, specifications and other contract documents and as described by the Engineer.

The Contractor shall furnish all labor, services, materials, equipment, plant, machinery, apparatus, appliances, tools, supplies and all other things necessary to do all work required for the completion of each item of the work and as herein specified.

The location, general characteristics and principal details of the work are indicated on drawings which are listed as follows:

SHEET NUMBER	TITLE
1	Title Sheet
2	Typical Sections
3-8	Miscellaneous Details
9	Sedimentation and Erosion Control Plan
10	Roadway Plan
11	Roadway Profile
12	Grading Plan
13	Maintenance and Protection of Traffic
14-19	Roadway Cross Sections-Structure Sheets 20-29 (Bridge #056055)
20	General Plan 1
21	General Plan 2
22	Boring Logs
23	Footing Plan
24	Wingwall Details
25	Framing Plan and Details
26	Precast Concrete Frames
27	Bridge Details
28	Guiderail Attachment
29	Pavement Limits

The above drawings are the contract drawings, sometimes referred to herein as the "Drawings". Additional drawings showing details in accordance with which the work is to be done will be furnished from time to time by the Engineer, if found necessary, and shall then become a part of the contract drawings.

1.3 CONTRACT DOCUMENTS.

The 'Drawings', 'Invitation to Bid', 'Information for Bidders', Forms for 'Bid', 'Agreement' and 'Bonds', 'General Conditions' and 'Technical and Materials Specifications' become the contract documents and may be obtained on the Town's website, www.greenwichct.org.

Drawings and specifications will be posted to the Town's website and may be downloaded at no cost. Drawings taken from the Town's website and printed on the bidder's equipment may not be to scale.

1.4 NON-REFUNDABLE FEE FOR DRAWINGS AND DOCUMENTS.

Full size hard copies of the drawings and bid book may be purchased from Design of the Times, 101 Mill Street, Greenwich, CT, telephone (203) 531-0053 for a non-refundable prepaid fee of \$17.50 and \$33.00 respectively.

1.5 QUESTIONS REGARDING DRAWINGS AND DOCUMENTS.

In general, no answer will be given to prospective bidders in reply to an oral question if the question involves an interpretation of the intent or meaning of the drawings or other contract documents or the equality or use of products or methods other than those designated or described on the drawings or in the specifications. Any information given to bidders other than by means of the drawings and other contract documents, including addenda, as described below, is given informally, for information and the convenience of the bidder only, and is not guaranteed. The bidder agrees that such information shall not be used as the basis of nor shall the giving of any such information entitle the bidder to assess any claim or demand against the Town or the Engineer on account thereof.

To receive consideration, such questions shall be submitted in writing to the Project Engineer, Frank Petise, Senior Civil Engineer, Engineering Division, 101 Field Point Road, Greenwich, CT 06830 or by email to frank.petise@greenwichct.org at least five (5) before the established date for receipt of Bids. If the questions involve the acceptability or use of any unspecified products or methods, it must be accompanied by drawings, specifications or other data in sufficient detail to enable the Engineer to determine the acceptability, equality and suitability of the unspecified product or method. In general, the Engineer will neither approve nor disapprove particular products prior to the opening of Bids; such products will be considered when offered by the Contractor for incorporation into the work.

The Engineer will set forth as addenda, which shall become a part of the contract documents, such questions received as above provided as in their sole judgment are appropriate or necessary and their decision regarding each. **It is the responsibility of the prospective bidder to check the Town's website (www.greenwichct.org) for any addenda issued up to 48 hours prior to the bid opening.**

The Contractor agrees to use the products and methods designated or described in the specifications as amended by the addenda. Any addenda issued shall take precedence over drawings or specifications.

Where there is a conflict between specifications and drawings, the higher standard shall prevail.

1.6 BIDDERS TO INVESTIGATE.

Bidders are required to submit their bids upon the following express conditions which shall apply to and be deemed a part of every bid received.

Bidders must satisfy themselves by personal examination of the site of the work and by such

other means as they may wish, as to the actual conditions there existing, the character and requirements of the work, the difficulties attendant upon its execution, and the accuracy of all estimated quantities stated in the Bid.

Any subsurface information furnished is based on an interpretation made at specific locations as indicated and no assurance is given that these conditions are necessarily typical of other locations or that they have remained unchanged since the field data were obtained. Further, no assurance is given that the presence or absence of water and other subsurface conditions at the time of these explorations will be representative of actual conditions at the time of construction. The Contractor shall be solely responsible for any assumptions, deductions, or conclusions they may make or which may be derived from their examination of any available subsurface information.

1.7 INFORMATION NOT GUARANTEED.

All information given on the drawings or in the other contract documents relating to subsurface and other conditions, natural phenomena, existing pipes and other structures is furnished only for the information and convenience of bidders and is not guaranteed.

It is agreed and understood that the Town does not warrant guarantee that the subsurface or other conditions, natural phenomena, existing pipes or other structures encountered during construction will be the same as those indicated on the drawings or in the other contract documents and the bidder or Contractor shall assume all risk with respect to such conditions.

It is agreed further and understood that no bidder or Contractor shall use or be entitled to use any of the information made available to them or obtained in any examination made by them in any manner as a basis of or ground for, any claim or demand against the Town or the Engineer, arising from or by reason of any variance which may exist between the information made available and the actual subsurface or other conditions, natural phenomena, existing pipes or other structures actually encountered during the construction work.

The Contractor shall dig test pits, contact appropriate parties, or do any other necessary work, and at their own expense, to locate subsurface and other structures both shown and not shown on the drawings, in advance to performing work near the structure.

1.8 BLANK FORM FOR BID.

All bids must be upon the blank form for "Bid Sheet", which is given in Section 2, and must state the proposed price of each item of the work, both in words and in figures, and be signed by the bidder with their business address and place of residence.

1.9 TIME LIMITS AND TIME CHARGE.

The Contractors shall commence with the work within ten (10) days after receipt of 'Notice to Proceed' from the Town.

Time is of the essence of this contract and as prosecution of the work will inconvenience property owners, vehicular traffic, and pedestrians and adversely affect business in the area, it is essential that the work be pressed vigorously to completion. Also, the cost to the Town of administration of the contract, including engineering, inspection and supervision of construction, will be increased or decreased as the time occupied in the work is lengthened or shortened and the deprivation to the residents of the Town of the needed improvement herein contracted for will cause damages to the Town, the exact amount of which will be difficult to ascertain. Therefore, in order to avoid the uncertainties and time consuming effort involved, it is hereby estimated that the reasonably probable, foreseeable damages which will arise in the event of the Contractor's delay are hereby expressed in terms of a time charge which will be made against the Contractor, and dates for

completion, suspension and/or commencement of work will be established in accordance with the following provisions.

A time charge of two thousand dollars (\$2,000) per day will be made against the Contractor for each and every day (Saturdays, Sundays and legal holidays excluded) that the work is in progress beyond sixty (60) calendar days (no days excluded) after the Contractor has been notified to commence with the work. The amount of time charge will be deducted from the monthly and final payments due the Contractor as these are made. This time charge will continue, except as provided below, until the work is completed and accepted, but not including retainer, maintenance or repair period, if any. The Engineer's decision concerning whether the work has been completed shall be final, as provided in Article 4.4 of this contract.

Each bidder should include in their estimate of the cost of the work, a sum equal to the amount derived by multiplying said time charge by the number of days which they estimates the time charge will apply. This sum shall not appear as a separate item of the bid, but shall be distributed among the various items on which prices are asked on the bid sheet. The time charge will be suspended during the period of any delay that may be caused by the Town, either through change of plan or through ordering suspension of the work for any reason other than failure on the part of the Contractor to comply with the specifications, said suspension must be certified by engineer.

If any delay is caused to the Contractor by specific orders of the Engineer to stop the work (for reasons other than failure on the part of the Contractor to comply with the requirements of the contract documents), such delay will entitle the Contractor to an equivalent extension of time, and the suspension of the time charge only during such an extension of time. When extra or additional work is ordered by the Engineer, the Contractor will be allowed a suspension of the time charge expressed in days and derived by dividing the cost of such additional work by the time charge factor.

The time charge factor is that number derived by dividing the total amount of the contract on which the award is made by the number of days between date work is started and date of completion and acceptance of the repair and alteration, etc., deducting Saturdays, Sundays and legal holidays.

1.10 WITHDRAWAL OF BID.

Except as hereinafter in this article otherwise expressly provided, once their bid is submitted and received by the Town for consideration and comparison with other bids similarly submitted, the Bidder agrees that they may not and will not withdraw it within forty-five (45) consecutive calendar days after the actual date of opening of Bids.

Upon proper written request and identification, Bids may be withdrawn only as follows

1. At any time prior to the designated time for the opening of bids
2. Provided the bid has not theretofore been accepted by the Town, at any time subsequent to the expiration if the period during which the bidder has agreed not to withdraw their bid.

Unless a bid is withdrawn as provided above, the Bidder agrees that it shall be deemed open for acceptance until the 'agreement' has been executed by both parties thereto or until Town notifies a Bidder in writing that their bid is rejected or that the Town does not intend to accept it, or returns their bid deposit. Notice of acceptance of a bid shall not constitute rejection of any other bid.

1.11 CONTRACT BONDS.

The Bidder whose bid is accepted agrees to furnish the 'contract bonds' in the forms which follow in Section 5, entitled 'Contract Bonds', each in the sum of the full amount of the bid, including allowance for contingencies and extra work, and/or contract price as determined by the Engineer, and

duly executed and acknowledged by the said Bidder as principle and by a surety company qualified to do business under the laws of the State of Connecticut and satisfactory to the Town, as surety, for the faithful performance of the contract and payment for labor and materials. The premiums for such bonds shall be paid by the Contractor. The 'Contract Bond' is only required for contracts exceeding \$100,000.

The Bidder must provide a letter from the bonding company stating that their company is able to receive performance bonding within one weeks' time after receipt of award on the Town of Greenwich Performance, Maintenance and Payment Bond Form (enclosed herein) for this project in the total amount of the bid. The letter must be on the bonding company's letterhead with their name address and telephone number and must be submitted with the bid.

1.12 ABILITY AND EXPERIENCE OF BIDDER.

No award will be made to any Bidder who cannot satisfy the Town that they have sufficient ability and experience in this class of work and sufficient capital and plant to enable them to prosecute and complete the work successfully within the time named, or, where such time is not named, within reasonable period of time as is determined by the Engineer. The Town's decision or judgment on these matters shall be final, conclusive and binding.

The Town may make such investigations as it deems necessary, and the Bidder shall furnish to the Town, under oath if so required, all such information and data for this purpose as the Town may request.

The ability of any Bidder to obtain a performance bond will not be regarded as the sole test of such Bidder's competency or responsibility.

1.13 BIDS.

The Town may reject bids which in its sole judgment are either incomplete, conditional, obscure or not responsive or which contain additions not called for, erasures not properly initialed, alterations or similar irregularities, or the Town may waive such omissions, conditions or irregularities.

1.14 RIGHT TO REJECT OR ACCEPT BIDS.

The Town reserves the right to reject any or all bids with or without reason, or to accept any bid even if it is not the low bid, should the Town deem it to be in the public interest or the interest of the Town to do so. The Town's decision on the qualifications of any bid and/or its decision to accept any bid, or reject any or all bids shall be final, conclusive and binding on all Bidders.

1.15 RIGHT TO ALTER FORM, QUANTITY, OF WORK.

The Town further reserves the right to make alterations in the lines, grade, plan, form and quantity of the work herein contemplated, either before award of contract to the successful Bidder and/or before or after the commencement of the work because of priority restrictions, insufficient funds in appropriations, or other cause. If such alterations diminish the quantity of the work to be done, they shall not constitute a claim for damage or for anticipated profits on the work dispensed with, or affect the prices bid for the various classes of work remaining. If they increase the amount of work, such increase shall be paid for according to the quantity actually done and at the price or prices bid for the various classes of work, or if not susceptible of classification, the price or prices shall be agreed upon in writing in advance, and in case of failure to so agree, the Contractor shall do the work as aforesaid as extra work.

1.16 EXECUTION OF AGREEMENT.

The Bidder whose bid is accepted will be required and agrees to duly execute the 'agreement' and furnish the required contract bonds and insurance certificates within ten (10) days after award of the contract.

1.17 INSURANCE CERTIFICATES.

The Bidder is required to submit with their bid a signed 'Insurance Procedure Form', enclosed herein. By signing this form, the Bidder acknowledges that they will provide the insurance coverage required for the contemplated work at no additional charge to the Town of Greenwich.

The Contractor will not be permitted to start any construction work until they have submitted certificates covering all insurance and in such form called for under that article of the 'agreement', titled 'Insurance', and has obtained approval in writing of such certificates from the Town.

1.18 COMPARISON OF BIDS.

Bids will be compared on the basis of the sum of the quantities multiplied by respective unit prices, added to lump-sum prices, all as stated in the 'Bid Sheet'.

In the event that there is a discrepancy in the Bid Sheet between the Lump-Sum or unit prices written in words and figures, the prices written in words shall govern.

The Town agrees to examine and consider each bid submitted in consideration of the Bidder's agreements, as hereinabove set forth in the Bid Sheet.

1.19 BID SECURITY.

Each bid must be accompanied by a bid bond prepared on the form of bid bond attached hereto duly executed and acknowledged by the Bidders, as principal, and by a surety company qualified to do business in the State of Connecticut and satisfactory to the Town, as surety.

The bid bond shall be in the sum of Three Hundred and Sixty Thousand Dollars (\$360,000) and shall be enclosed in the sealed envelope containing the Bid. Each bid bond may be held by the Town as security for the fulfillment of the Bidder's 'agreement' as hereinabove set forth and as set forth in the Bid Sheet. Should the Bidder fail to fulfill such agreements, the Bid Bond shall become payable to the Town, as liquidated damages, otherwise, the Bid Bond shall become null and void.

1.20 ITEMS.

The work to be done under this contract has been divided into parts or items to enable each Bidder to bid on the different portions of the work in accordance with their estimate of their cost and so that the actual quantity of work executed under each item may be paid for at the price bid for that particular item.

1.21 MINIMUM PREVAILING WAGES.

The minimum prevailing wages paid on this project, when applicable, shall be as shown on the State of Connecticut Labor Department, Wage and Workplace Standards Division, 'Schedule of Prevailing Rates' a copy of which is attached to these specifications or, if not attached, shall be issued by addendum. See Section 4.48 of these specifications.

1.22 CONSTRUCTION SAFETY AND HEALTH COURSE

Pursuant to Connecticut General Statutes Section 31-53b the Bidder awarded a Contract for new

construction of \$400,000 or more or rehabilitation, repair or the like of \$100,000 or more must furnish proof with the weekly certified payroll for the first week each employee begins work that any person performing the work of a mechanic, laborer or worker has completed a course of at least ten (10) hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration in accordance with regulations adopted by the State of Connecticut Labor Commissioner. See Section 4.48 of these specifications.

1.23 NON-CONNECTICUT CONTRACTORS

Pursuant to Connecticut General Statutes § 12-430(7), as amended by Connecticut Public Act #11-61, Sec.66, a nonresident contractor shall comply with the State of Connecticut's bonding requirements.

1.24 SUPPLIERS AND SUBCONTRACTORS

The Town would appreciate it if all bidders would include Greenwich suppliers and subcontractors in solicitation of prices for the proposed work.

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SECTION 2

BID

To the Town of Greenwich, Connecticut, herein called the Town, acting by and through its Department of Public Works, the Replacement of John Street Bridge over East Branch Byram River, Bridge No. 056055, Town Project No. 06-15, Greenwich, Connecticut.

The undersigned, as Bidder, herein referred to as singular and masculine, declares as follows

- (1) The only parties interested in this bid as principals are named herein
- (2) This bid is made without collusion with any other person, firm or corporation
- (3) No officer, agent or employee of the owner is directly or indirectly interested in this bid
- (4) They have carefully examined the site of the proposed work and fully informed and satisfied themselves as to the conditions there existing, the character and requirements of the proposed work, the difficulties attendant upon its execution and the accuracy of all estimated quantities stated in this bid, and they have carefully read and examined the drawings, the annexed proposed 'agreement' and the specifications and other contract documents therein referred to and knows and understands the terms and provisions thereof
- (5) And they understand that the quantities of work tabulated in this bid or indicated on the drawings or in the specifications or other contract documents are only approximate and are subject to increase or decrease as deemed necessary by the Engineer

And they agree that, if this bid is accepted they will contract with the Town, as provided in the copy of the contract documents deposited in the office of the Engineering Division of the Department of Public Works, this bid form being part of said contract documents and that they will perform all the work and furnish all the materials and equipment, and provide all labor, services, plant, machinery, apparatus, tools, appliances, supplies and all within the time therein prescribed and according to the requirements of the contract documents and of the Engineer as therein set forth, and that they will take in full payment therefore the Lump-Sum or unit price applicable to each item of the work as stated in the following Bid Sheets.

Bidders must bid on each item. All entries in the entire bid must be made clearly and in ink. Prices bid must be written in both words and figures. Bidders should insert extended item prices obtained from quantities and unit prices and insert the total price and applicable addenda numbers where indicated.

Materials and supplies purchased for this Contract which are to be physically incorporated in and become a permanent installation in the work will be exempt from the Connecticut Sales and Use Tax under the Connecticut Education, Welfare and Public Health Tax Act. Each bidder shall take this exemption into account in calculating their Bid for the Work.

The undersigned understands that information relative to subsurface and other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) has been furnished only for their information and convenience without any warranty or guarantee, express or implied, that the subsurface and/or other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) actually encountered will be the same as those shown on the drawings or in any of the other contract documents and they agree that they shall not use or be entitled to use any such information made available to them through the contract documents or otherwise or obtained by them in their own examination of the site, as a basis of or ground for any claim against the Town, arising from or by reason of any variance which may exist between the aforesaid information made available to or

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acquired by them and the subsurface and/or other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) actually encountered during the construction work, and they have made due allowance therefore in this bid.

The undersigned agrees that for extra work, if any, performed in accordance with the terms and provisions of the annexed form of Agreement, they will accept compensation as stipulated therein in full payment for such Extra Work.

If this bid is accepted by the Town, the undersigned agrees to complete the entire work provided to be done under the contract within the time stipulated in the Information for Bidders, Article 1.9 headed "Time Limits and Time Charge."

As provided in the Information for Bidders, the bidder hereby agrees that they will not withdraw this bid within forty-five (45) consecutive calendar days after the actual date of the opening of bids, and that, if the Town shall accept this bid, the bidder will duly execute and acknowledge the Agreement and furnish, duly executed and acknowledged, the required Contract Bonds and Insurance Certificates within ten (10) days after date of the award of the contract.

Should the bidder fail to fulfill any of their agreements as hereinabove set forth, the Town shall have the right to retain as liquidated damages, the amount of the bid check which shall become the Town's property. If a Bid Bond was given, it is agreed that the amount thereof shall be paid as liquidated damages to the Town by surety.

The undersigned has read and agrees to provide the types and required insurance coverage limits, as defined by Article 4.6 "Insurance". The submitted bid includes the cost relating to the insurance requirements for the contract work.

The bidder, by submittal of this bid, agrees with the Town that the amount of the bid security deposited with this bid fairly and reasonably represents the amount of damages the Town will suffer due to the failure of the bidder to fulfill their agreements as above provided.

(Name of Bidder)

(Signature and Title of Authorized Representative)

(Business Address)

(Type or Print Name of Authorized Representative)

(City and State)

(Affix Corporate Seal)

(Federal Tax Identification Number)

(Date)

(Telephone Number)

(Fax Number)

(E-Mail Address)

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**BIDDING SHEETS
FOR
REPLACEMENT OF JOHN STREET BRIDGE
OVER EAST BRANCH BYRAM RIVER
BRIDGE NO. 056055
TOWN PROJECT NO. 06-15**

TO: Amy J. Siebert, P.E.
Commissioner of Public Works
Town Hall
101 Field Point Road
Greenwich, CT 06836-2540

Date: _____, 2013

From: _____

Telephone: _____

Dear Madam:

_____ shall install and/or furnish all materials and perform all work as required by and as called for by the drawings and specifications for Town Project No. 06-15 Replacement of John Street Bridge over East Branch Byram River in Greenwich, Connecticut.

Item No.	Estimated Quantity	Brief Description of Item and Bid in Writing and Figures	Total in Figures
0201001	1	L.S. Clearing and Grubbing, per Lump Sum of _____ Dollars and _____ Cents (\$_____)	\$_____
0202001	279	C.Y. Earth Excavation, per Cubic Yard of _____ Dollars and _____ Cents (\$_____)	\$_____
0202529	55	L.F. Cut Bituminous Type Pavement, per Linear Foot of _____ Dollars and _____ Cents (\$_____)	\$_____
0203202	275	C.Y. Structure Excavation - Earth (Complete) per Cubic Yard of _____ Dollars and _____ Cents (\$_____)	\$_____
0203302	33	C.Y. Structure Excavation - Rock (Complete) per Cubic Yard of _____ Dollars and _____ Cents (\$_____)	\$_____

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**BIDDING SHEETS
FOR
TOWN PROJECT NO. 06-15**

Item No.	Estimated Quantity	Brief Description of Item and Bid In Writing and Figures	Total in Figures
0205001	83	C.Y. Trench Excavation (0 - 4'), per Cubic Yard of _____ Dollars and _____ Cents (\$ _____)	\$ _____
0205003	94	C.Y. Trench Excavation (0 - 10'), per Cubic Yard of _____ Dollars and _____ Cents (\$ _____)	\$ _____
0207002	395	C.Y. Borrow, per Cubic Yard of _____ Dollars and _____ Cents (\$ _____)	\$ _____
0209001	1,708	S.Y. Formation of Subgrade, per Square Yard of _____ Dollars and _____ Cents (\$ _____)	\$ _____
0210306A	35	L.F. Turbidity Control Curtains, per Linear Foot of _____ Dollars and _____ Cents (\$ _____)	\$ _____
0210820	1	Est. Water Pollution Control, per Estimate of Twenty Nine Thousand One Hundred Dollars and _____ Cents (\$ 29,100)	\$ 29,100
0214020	32	C.Y. Compacted Granular Fill, per Cubic Yard of _____ Dollars and _____ Cents (\$ _____)	\$ _____

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**BIDDING SHEETS
FOR
TOWN PROJECT NO. 06-15**

Item No.	Estimated Quantity	Brief Description of Item and Bid In Writing and Figures	Total in Figures
0216002	135	C.Y. Pervious Structure Backfill, per Cubic Yard of _____ Dollars and _____ Cents (\$_____)	\$_____
0216012	1	C.Y. Controlled Low Strength Material, per Cubic Yard of _____ Dollars and _____ Cents (\$_____)	\$_____
0219001	1,000	L.F. Sedimentation Control System, per Linear Foot of _____ Dollars and _____ Cents (\$_____)	\$_____
0304002	363	C.Y. Processed Aggregate Base, per Cubic Yard of _____ Dollars and _____ Cents (\$_____)	\$_____
0406171	220	Ton HMA S0.5 per Ton of _____ Dollars and _____ Cents (\$_____)	\$_____
0406172	157	Ton HMA S0.375 per Ton of _____ Dollars and _____ Cents (\$_____)	\$_____
0406236	183	Gal Material for Tack Coat, per Gallon of _____ Dollars and _____ Cents (\$_____)	\$_____

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**BIDDING SHEETS
FOR
TOWN PROJECT NO. 06-15**

Item No.	Estimated Quantity	Brief Description of Item and Bid In Writing and Figures	Total in Figures
0503001A	1	L.S. Removal of Superstructure, per Lump Sum of _____ Dollars and _____ Cents (\$_____)	\$_____
0507019A	4	Ea. Type "C-1" Catch Basin, All Depths per Each of _____ Dollars and _____ Cents (\$_____)	\$_____
0507771	4	Ea. Reset Catch Basin per Each of _____ Dollars and _____ Cents (\$_____)	\$_____
0513007	8	L.F. 4" Polyvinyl Chloride Plastic Pipe, per Linear Foot of _____ Dollars and _____ Cents (\$_____)	\$_____
0514716A	1	L.S. Precast Concrete Frames, per Lump Sum of _____ Dollars and _____ Cents (\$_____)	\$_____
0520036	34	C.F. Asphaltic Plug Expansion Joint System, per Cubic Feet of _____ Dollars and _____ Cents (\$_____)	\$_____
0601002	108	C.Y. Class "A" Concrete, per Cubic Yard of _____ Dollars and _____ Cents (\$_____)	\$_____

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**BIDDING SHEETS
FOR
TOWN PROJECT NO. 06-15**

Item No.	Estimated Quantity	Brief Description of Item and Bid In Writing and Figures	Total in Figures
0601201	90	C.Y. Class "F" Concrete, per Cubic Yard of _____ Dollars and _____ Cents (\$_____)	\$_____
0601502	68	S.F. ½" Preformed Expansion Joint Filler for Bridges, per Square Feet of _____ Dollars and _____ Cents (\$_____)	\$_____
0601504	180	S.F. 1" Preformed Expansion Joint Filler for Bridges, per Square Feet of _____ Dollars and _____ Cents (\$_____)	\$_____
0602001	9,750	Lbs. Deformed Steel Bars, per Pound of _____ Dollars and _____ Cents (\$_____)	\$_____
0602006	13,150	Lbs. Deformed Steel Bars - Epoxy Coated, per Pound of _____ Dollars and _____ Cents (\$_____)	\$_____
0603253A	1	Bbl. Disposal of Lead Debris, per Barrel of _____ Dollars and _____ Cents (\$_____)	\$_____
0603444A	1	L.S. Lead Health Protection Program (LHPP), per Lump Sum of _____ Dollars and _____ Cents (\$_____)	\$_____

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**BIDDING SHEETS
FOR
TOWN PROJECT NO. 06-15**

Item No.	Estimated Quantity	Brief Description of Item and Bid In Writing and Figures		Total in Figures
0605100A	1,300 S.F.	Ashlar Stone Masonry, per Square Feet of	_____ Dollars and _____ Cents (\$_____)	\$ _____
0612994	1 Ea.	Concrete Cylinder Curing Box, per Each of	_____ Dollars and _____ Cents (\$_____)	\$ _____
0651001	15 C.Y.	Bedding Material, per Cubic Yard of	_____ Dollars and _____ Cents (\$_____)	\$ _____
0651012	216 L.F.	15" R.C. Pipe, per Linear Foot of	_____ Dollars and _____ Cents (\$_____)	\$ _____
0651013	42 L.F.	18" R.C. Pipe, per Linear Foot of	_____ Dollars and _____ Cents (\$_____)	\$ _____
0651656	20 L.F.	12" Corrugated PE Pipe (Smooth Interior), per Linear Foot of	_____ Dollars and _____ Cents (\$_____)	\$ _____
0652011	1 Ea.	18" R.C. Culvert End, per Each of	_____ Dollars and _____ Cents (\$_____)	\$ _____

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**BIDDING SHEETS
FOR
TOWN PROJECT NO. 06-15**

Item No.	Estimated Quantity	Brief Description of Item and Bid In Writing and Figures	Total in Figures
0703008A	20	C.Y. Heavy Riprap, per Cubic Yard of _____ Dollars and _____ Cents (\$_____)	\$_____
0703030A	20	Ea. Placement of Channel Boulder, per Each of _____ Dollars and _____ Cents (\$_____)	\$_____
0707001	218	S.Y. Membrane Waterproofing (Woven Glass Fabric), per Square Yard of _____ Dollars and _____ Cents (\$_____)	\$_____
0708001	87	S.Y. Dampproofing, per Square Yard of _____ Dollars and _____ Cents (\$_____)	\$_____
0714020	1,350	S.F. Temporary Sheet Piling, per Square Feet of _____ Dollars and _____ Cents (\$_____)	\$_____
0715020	1,500	S.F. Sheet Piling Material Left In Place, per Square Feet of _____ Dollars and _____ Cents (\$_____)	\$_____
0725002	80	C.F. Bagged Stone, per Cubic Feet of _____ Dollars and _____ Cents (\$_____)	\$_____

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**BIDDING SHEETS
FOR
TOWN PROJECT NO. 06-15**

Item No.	Estimated Quantity	Brief Description of Item and Bid In Writing and Figures	Total in Figures
0815001	1,039	L.F. Bituminous Concrete Lip Curbing, per Linear Foot of _____ Dollars and _____ Cents (\$_____)	\$_____
0822001	80	L.F. Temporary Precast Concrete Barrier Curb, per Linear Foot of _____ Dollars and _____ Cents (\$_____)	\$_____
0905002A	120	L.F. Rebuild Stone Wall, per Linear Foot of _____ Dollars and _____ Cents (\$_____)	\$_____
0910170	163	L.F. Metal Beam Rail (Type R-B 350), per Linear Foot of _____ Dollars and _____ Cents (\$_____)	\$_____
0910174	4	Ea. R-B 350 Bridge Attachment – Jersey Shaped Parapet, per Each of _____ Dollars and _____ Cents (\$_____)	\$_____
0911923	3	Ea. R-B End Anchorage – Type I, per Each of _____ Dollars and _____ Cents (\$_____)	\$_____
0922502	10	S.Y. Processed Aggregate Base Driveway, per Square Yard of _____ Dollars and _____ Cents (\$_____)	\$_____

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**BIDDING SHEETS
FOR
TOWN PROJECT NO. 06-15**

Item No.	Estimated Quantity	Brief Description of Item and Bid In Writing and Figures	Total in Figures
0925201	110	S.Y. Pavement for Railing, per Square Yard of _____ Dollars and _____ Cents (\$_____)	\$_____
0939001	5	Hour Sweeping for Dust Control, per Hour of _____ Dollars and _____ Cents (\$_____)	\$_____
0942001	2	Ton Calcium Chloride for Dust Control, per Ton of _____ Dollars and _____ Cents (\$_____)	\$_____
0943001	125	m.gal Water for Dust Control, per Million Gallons of _____ Dollars and _____ Cents (\$_____)	\$_____
0944001	460	S.Y. Furnishing and Placing Topsoil, per Square Yard of _____ Dollars and _____ Cents (\$_____)	\$_____
0946001	1	Ton Liming, per Ton of _____ Dollars and _____ Cents (\$_____)	\$_____
0950005A	460	S.Y. Turf Establishment, per Square Yard of _____ Dollars and _____ Cents (\$_____)	\$_____

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**BIDDING SHEETS
FOR
TOWN PROJECT NO. 06-15**

Item No.	Estimated Quantity	Brief Description of Item and Bid In Writing and Figures	Total in Figures
0969060A	9	Mo. Construction Field Office (Small), per Month of _____ Dollars and _____ Cents (\$_____)	\$_____
0971001A	1	L.S. Maintenance and Protection of Traffic, per Lump Sum of _____ Dollars and _____ Cents (\$_____)	\$_____
0974001A	29	C.Y. Removal of Existing Masonry, per Cubic Yard of _____ Dollars and _____ Cents (\$_____)	\$_____
0975002	1	L.S. Mobilization, per Lump Sum of _____ Dollars and _____ Cents (\$_____)	\$_____
0976002	7,200	Days Barricade Warning Light - High Intensity, per Day of _____ Dollars and _____ Cents (\$_____)	\$_____
0979003	20	Ea. Construction Barricade Type III, per Each of _____ Dollars and _____ Cents (\$_____)	\$_____
0980001	1	L.S. Construction Staking, per Lump Sum of _____ Dollars and _____ Cents (\$_____)	\$_____

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**BIDDING SHEETS
FOR
TOWN PROJECT NO. 06-15**

Item No.	Estimated Quantity		Brief Description of Item and Bid In Writing and Figures	Total in Figures
1208928	13	S.F.	Sign Face – Sheet Aluminum (Type III Reflective Sheeting), per Square Feet of _____ Dollars and _____ Cents (\$_____)	\$_____
1210102	1,100	L.F.	4” Yellow Epoxy Resin Pavement Markings, per Linear Foot of _____ Dollars and _____ Cents (\$_____)	\$_____
1220011A	150	S.F.	Construction Signs – Type III Reflective Sheeting, per Square Foot of _____ Dollars and _____ Cents (\$_____)	\$_____
1803071A	1	Ea.	Type B Impact Attenuation System (Tangential), per Each of _____ Dollars and _____ Cents (\$_____)	\$_____

For informal comparison only and not to be considered as part of this bid, the total price as described in the Information for Bidders, Article headed Comparison of Bids is for Project No. 06-15..... \$_____

The Bid(s) include Addenda Number \$_____

Notes:

1. Include “Time Charge” in the bid prices (see Article 1.9 of “Information for Bidders”). For “Minimum Wage Schedule”, see Section 9 of these Contract Documents.
2. The contract will be awarded based on the BASE BID submitted by the lowest responsible bidder, as determined by Section 1.18 COMPARISON OF BIDS, of these Contract Documents.

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The Bidder is - a corporation incorporated in the State of _____
 - A partnership - An Individual. (Bidder must add and delete as necessary to make the foregoing sentence read correctly.

If the Bidder is a corporation, Affix corporate seal and give below the names of its President, Treasurer and General Manager. If a partnership, give full names and residential addresses of all general partners and if an individual, give residential address if different from business address.

The required names and addresses of all persons interested in the foregoing bid, as principals, are as follows

PRINCIPAL NAME & TITLE	ADDRESS

_____ Affix Corporate Seal

The Bidder is requested to list below five (5) references for similar work of equal size to that included in the proposed contract that they have done within the last three years which will enable the Town to judge their experience, skill and business standing. Please include project date, contact person and phone number.

COMPANY NAME	PROJECT DATE	CONTACT PERSON	PHONE NUMBER

(ADD SUPPLEMENTARY PAGE IF NECESSARY.)

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CERTIFICATE AS TO MINIMUM PREVAILING WAGES

The undersigned, being duly sworn, deposed and says

1. That they are the _____ of the Contractor,
(Title)

In the project hereinafter referred to, and is authorized to execute this certification on behalf of the Contractor,

2. In connection with the Replacement of John Street Bridge over East Branch Byram River, Bridge No. 056055, Town Project No. 06-15, in Greenwich, Connecticut, it is hereby certified that the Contractor has read and understands the provisions of Section 4.48, Prevailing Wages, of these specifications and has included in their bid price the cost of compliance with their requirements.

3. This certification is made at the request of the Town of Greenwich for the purpose of inducing the Town to enter into a contract for the project work and knowing that the Town will rely upon the truth of the representation herein made.

Subscribed and sworn to

Before me this _____ day of _____ 20__.

(SIGNATURE OF PERSON
AUTHORIZED TO SIGN)

(TYPE OR PRINT NAME OF PERSON
AUTHORIZED TO SIGN)

NOTARY PUBLIC

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Vendor Information & Signatory Form
For all Contracts equal to or in excess of \$250,000

Vendor Name: _____

Business Address: _____

Telephone: _____ Fax: _____

Email: _____ Web Site: _____

Type of Entity: Corporation: _____ Type of Corp.: _____ LLC: _____
Partnership: _____ Joint Venture: _____ Sole Proprietorship: _____
Other (please describe): _____

1. CT State Business License Number (if applicable): _____
State Agency issuing license: _____
2. Number of years in business under entity name: _____
3. Full names of entity's owners (> 20% ownership), officers and managers. (use a separate sheet of paper if necessary)
4. Has the entity changed its name within the past 3 years?
a YES NO
5. If yes, provide former name(s): _____
6. Have there been any recent (within the last three years) changes in control/ownership, > 20% of the entity?
a YES NO
7. If yes, explain. (use a separate sheet of paper if necessary)
8. Have officers or principals of the entity ever had any license suspended or revoked (other than Driver's License) for any reason?
a YES NO
9. If yes, please explain. (use a separate sheet of paper if necessary)
10. Is the entity or has the entity, or any of its principals, officers, members or owners ever been a party to or involved in any US civil, criminal, or regulatory action or settlements, lawsuit or other legal action >\$25,000 involving the Town of Greenwich or any other municipality in the States of CT or NY related to the vendor's business activities?
a YES NO
11. If yes, please explain. (use a separate sheet of paper if necessary)
12. Has any principal, officer, member or owner of the undersigned entity within the last three years been a principal, officer, member or owner of any entity that has filed for bankruptcy or been voluntarily or involuntarily dissolved?
a YES NO
13. Name and title of person completing / responsible for submission of this RFP or contract and the responses to this questionnaire: _____
14. Telephone number and email address for person identified in questions #13:
Phone NO.: _____ Email Address: _____
15. If requested by the Town during the solicitation process, the vendor hereby agrees to provide the Town with copies of the most recent three (3) years of Loss History Reports for all lines of insurance coverage from its insurance carrier (as named herein) for all contracts and RFPs/RFQs/RFBs equal to or in excess of \$250,000.
a YES NO

Name of Insurance Carrier: _____

The loss history reports shall include claims data for all fifty US states; detail of each claim for the past three years for AL, GL, WC; and a summary page with the annual total claim amounts for the past three years for AL, GL, and WC.

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Vendor Information & Signatory Form (continued)

16. Have any claims been made against the entity's performance bond? YES NO
17. Please indicate whether your entity is currently debarred from doing business in the State of Connecticut or any other state.
a YES States: _____ NO

With regard to this item No.17, the vendor understands and agrees that it has a continuing obligation to inform the Town if it is debarred from doing business in the State of Connecticut or any other State after it has submitted this Vendor Information Form. The Vendor understands and agrees that its obligation to keep the Town Informed of any change in status continues up to and including the time of award of the contract and if vendor is awarded the contract, its obligation shall continue during the entire duration of the contract.

FAILURE TO COMPLETE THIS FORM OR FAILURE TO PROVIDE THE NECESSARY BACK UP INFORMATION FOR ANY QUESTION ON THIS FORM MAY RESULT IN DISQUALIFICATION.

18. Signature _____ Date: _____

Name and Title (Print) _____

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SECTION 3

BID BOND

INSTRUCTIONS IN USE OF BOND FORM

1. The Bid Bond form given on the following pages shall be used.
2. The surety on the Bond may be any corporation authorized to act as surety in the State of Connecticut.
3. The full name and business or residence address of each individual party to the Bond shall be inserted in the space provided therefore, and each such party shall sign the Bond with their usual signature on the line opposite the scroll seal.
4. If the principals are partners, their individual names appear in the space provided therefore, with the recital that they are partners composing a firm, naming it, and the Bond shall be executed by a general partner who has been authorized to act on behalf of the partnership.
5. If the principal or surety is a corporation, the name of the state in which incorporated shall be inserted in the space provided therefore and said instrument shall be executed and attested under the corporate seal as indicated in the form. If the corporation has no corporate seal, the fact shall be stated, in which case a scroll of adhesive seal shall appear following the corporate name.
6. The official character and authority of the person or persons executing the Bond for a corporation shall be certified by a proper officer, in lieu of such certificate, there may be attached to the Bond, copies of so much of the records of the corporation as will show the official character and authority of the officers signing, duly certified by a proper office, under the corporate seal, to be true copies.
7. If the principal or surety is a Limited Liability Company (LLC), the names of the members shall appear in the spaces provided therefore, with the recital that they are members of an LLC, naming it, and the Bond shall be executed by a managing member who has been authorized to act on behalf of the LLC. The official character and authority of the person or persons executing the Bond for an LLC shall be certified by a proper managing member. In lieu of such certificate, there may be attached to the Bond, copies of so much of the records of the LLC as will show the official character and authority of the members signing, duly certified by a proper member to be true copies.
8. The date of this Bond must not be prior to the date of the instrument in connection with which it is given.

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FORM OF BID BOND

***** BID BOND *****

TOWN OF GREENWICH

_____ Date Bond Executed

Principals

Surety

_____ Penal Sum of Bond (Expressed in Words and Figures)

_____ Date of Bid

Know all persons by these presents, that we, the principals and surety above named, are held and firmly bound unto the Town of Greenwich, Connecticut, in the penal sum of the amount stated above, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents. The condition of this obligation is such that whereas the principal has submitted the accompanying Bid, dated as shown above, for:

Project Name

Now, therefore, if the principal shall not withdraw said Bid within the period specified therein after the opening of the same, or if no period be specified, within sixty (60) days after the said opening, and shall within the period specified therefore, or, if no period be specified, within ten (10) days after the prescribed forms are presented to them for signature, execute such further contractual documents, if any, as may be required by the terms of the Bid as accepted, and give bonds with good and sufficient surety or sureties as may be required, for the faithful performance and proper fulfillment of the resulting contract, and for the protection of all persons supplying labor and materials in the prosecution of the work provided for in such contract or in the event of the withdrawal of said Bid within the period specified, or the failure to enter into such contract and give such bonds within the time specified, if the principal shall pay the Town of Greenwich, Connecticut, the difference between the amount specified in said Bid and the amount for which said Town may procure the required work, supplies and services, if the latter amount be in excess of the former, then the above obligation shall be void and of no effect, otherwise to remain in full force and virtue.

In witness whereof, the above-bounden parties have executed this instrument under their several seals on the date indicated above. The name and corporate seal (if applicable) of each corporate party being hereto affixed.

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CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the _____ of the Corporation/Limited Liability Company named as Principal in the within Bond, that _____, who signed the said Bond on behalf of the Principal, was then _____ of _____ said Corporation/Limited Liability Company, that I know their signature and their signature thereto is genuine, and that said Bond was duly signed, sealed (if a Corporation) and attested for and in behalf of said Corporation/Limited Liability Company by authority of its governing body.

(CORPORATE SEAL)

(CORPORATE SECRETARY)

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AGREEMENT

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This agreement, herein referred to as the "Agreement", executed this _____ day of _____ in the year Two Thousand and _____, by and between the Town of Greenwich, Connecticut, acting _____ Through its Department of Public Works, duly authorized therefore, which acts, herein solely for said Town and without personal liability to itself, Party of the first part, and _____ Party of the second part.

Witnesseth, that the parties to these presents, each in consideration of the undertakings, promises and agreements on the part of the other herein contained, have undertaken, promised and agreed and do hereby undertake, promise and agree, the party of the first part for itself, its successors and assigns, and the party of the second part for themselves and their heirs, executors, administrators, successors and assigns, as follows

4.1 DEFINITIONS.

Wherever the words hereinafter defined or pronouns used in their stead occur in the contract documents, they shall have the following meaning

The word 'Owner' or 'Town' shall mean the party of the first part above designated.

The word 'Contractor' shall mean the party of the second part above designated.

The word 'Architect' and/or the word 'Engineer' shall mean that person or firm duly appointed by the Town to undertake the duties and powers herein assigned to the Engineer, acting either directly or through duly authorized representatives.

The word 'Specifications' when used herein shall be deemed to refer to the General Conditions, Technical and Materials Specifications and Special Conditions, if any.

The words 'Herein', 'Hereinafter', 'Hereunder' and words of like import, shall be deemed to refer to the contract documents.

4.2 THE CONTRACT DOCUMENTS.

The 'Agreement', the 'Information for Bidders', the Contractor's 'Bid' as accepted by the owner, the 'Special Conditions', if any, the 'General, Technical and Materials specifications', the 'Drawings' and all addenda and amendments to any of the foregoing, collectively constitute the contract documents, and are sometimes herein referred to as the "Contract".

The contract documents are complementary, and what is called for by anyone shall be as binding as if called for by all. In the event of any conflict or inconsistency between the provisions of the 'Special Conditions', if any, and the provisions of any of the other contract documents, the provisions of the "Special Conditions", if any shall prevail. In the event of conflict or inconsistency between the provisions of the 'Agreement' and the provisions of the contract documents other than the 'special Conditions', if any, the provisions of the 'agreement' shall prevail.

4.3 OBLIGATIONS AND LIABILITY OF CONTRACTOR.

The Contractor shall do all the work and perform and furnish all the labor, services, materials, equipment, plant, machinery, apparatus, appliances, tools, supplies and all other things (except as otherwise expressly provided herein) necessary and as herein specified for the proper performance and completion of the work in the manner and within the time hereinafter specified, in strict accordance with

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the drawings, specifications and other contract documents, in conformity with the directions and to the satisfaction of the Engineer, and at the prices herein agreed upon therefore.

All parts of the work and all fixtures, equipment, apparatus and other items indicated on the drawings and not mentioned in the specifications, or vice versa, and all work and material usual and necessary to make the work complete in all its parts, including all incidental work necessary to make it complete and satisfactory and ready for use and operation, whether or not they are indicated on the drawings or mentioned in the specifications, shall be furnished and executed the same as if they were called for both by the drawings and by the specifications.

The Contractor shall coordinate their operations with those of any other Contractors who may be employed on other work of the Town, shall avoid interference therewith, and shall cooperate in the arrangements for storage of materials and equipment.

The Contractor shall notify the Fire and Police Departments prior to any construction which is expected to block off vehicular or pedestrian traffic.

The Contractor shall conduct their work so as to interfere as little as possible with private business and public travel. Wherever and whenever necessary or required, they shall maintain fences, furnish watchmen, maintain lights and take such other precautions as may be necessary to protect life and property and at their own expenses unless specifically provided for otherwise herein.

The Contractor shall have complete responsibility for the work and the protection thereof and for preventing injuries to persons and damage to the work and property and utilities on or about the work, until final completion and acceptance thereof. They shall in no way be relieved of their responsibility by any right of the Engineer to give permission or directions relating to any part of the work, by any such permission or directions given, or by failure of the Engineer to give such permission or directions. The Contractor shall bear all costs, expenses, losses and damages on account of the quantity or character of the work or the nature of the land (including but not limited to subsurface conditions) in or under or on which the work is done being different from that indicated or shown in the contract documents or from what was estimated or expected, or on account of the weather, elements, or other causes. The Contractor shall indemnify and save harmless the Town and the Engineer and their officers, agents, servants and employees, from and against any and all claims, demands, suits, proceedings, liabilities, judgments, awards, losses, damages, costs and expenses, including attorneys' fees, on account of bodily injury, sickness, disease, death or other damages sustained by any person or persons or injury or damage to or destruction of any property, directly or indirectly arising out of, relating to or in connection with the work, whether or not due or claimed to be due in whole or in part to the active, passive or concurrent negligence or fault of the Contractor, their officers, agents, servants or employees, any of their subcontractors, the Town, the Engineer or any of their respective officers, agents, servants, or employees and/or any other person or persons, and whether or not such claims, demands, suits or proceedings are just, unjust, groundless, false or fraudulent, and the Contractor shall and does hereby assume and agrees to pay for (or, in the case of professional liability matters indemnify for,) the defense of all such claims, demands, suits and proceedings, provided, however, that the Contractor shall not be required to indemnify the Town, the Engineer, their officers, agents, servants or employees, against any such damages, occasioned solely by defects in maps, plans, drawings, designs, or specifications prepared, acquired or used by the Engineer and/or solely by the negligence or fault of the Engineer, and provided further, that the Contractor shall not be required to indemnify the Town, their officers, agents, servants, or employees, against such damages occasioned solely by acts or omissions of the Town in connection with the work.

The Contractor shall conduct their operations so as not to damage existing structures or work installed either by them or by other Contractors. In case of any such damage resulting from their operations, they shall repair and make good as new, the damaged portions at their own expense with the consent of the damaged party. In the event that consent is not given, the Contractor shall continue to be liable for the damages caused.

The Contractor shall be as fully responsible to the Town for the acts and omissions of their subcontractors, their officers, agents, servants and employees as they are for their own acts and omissions and those of their own officers, agents, servants and employees.

Should the Contractor sustain any loss, damage or delay through any act or omission of any other Contractor or any subcontractor of any such other contractor or any material supplier, the Contractor shall have no claim against the Town therefore, other than for an extension of time, but shall have recourse solely to such other Contractor, subcontractor or material supplier.

If any other Contractor or any subcontractor of any such other Contractor shall suffer or claim to have suffered loss, damage or delay by reason of the acts or omissions of the Contractor or of any of their subcontractors, the Contractor agrees to assume the defense against any such claim and to reimburse such other Contractor or subcontractor for such loss or damage. The Contractor agrees to and does hereby indemnify and save harmless the Town from and against any and all claims by such other Contractor or subcontractors, alleging such loss, damage or delay and from and against any and all claims, demands, suits, proceedings, liabilities judgments, awards, losses, damages, costs and expenses including attorneys' fees arising out of, relating to or resulting from such claims.

The Contractor shall promptly pay all federal, state and local taxes which may be assessed against them in connection with the work or their operations under the agreement and/or the other contract documents, including, but not limited to, taxes attributable to the purchase of material and equipment, to the performance of services and the employment of persons in the prosecution of the work.

4.4 AUTHORITY OF THE ENGINEER.

The Engineer shall be the sole judge of the intent and meaning of the drawings, special conditions, if any, and technical and material specifications and their decisions thereon and their interpretation thereof shall be final, conclusive and binding on all parties.

The Engineer shall be the Town's representative during the life of the contract and they shall observe the work in progress on behalf of the Town. They shall have authority (1) to act on behalf of the Town to the extent expressly provided in the contract or otherwise in writing. (2) to stop the work whenever such stoppage may be necessary, in their sole discretion, to prevent improper execution of the work or otherwise to protect the interests of the Town. (3) to approve and direct the sequence of execution and general conduct of the work and to direct that changes be made in such sequence where, in their sole discretion, public necessity or welfare, the interest of the Town or the progress of the work shall require. Such approval and/or direction shall, however, in no way relieve or diminish the responsibility of the Contractor for or in the conduct of the work. (4) to determine the amount, quality, acceptability and fitness of all work, materials and equipment required by the contract. (5) to decide all questions which arise in relation to the work, the execution thereof, and the fulfillment of the contract.

The Contractor shall proceed without delay to perform the work as directed, instructed, determined or decided by the Engineer and shall comply promptly with such directions, instructions, determinations or decisions. If the Contractor has any objections thereto, they may require that any such direction, instruction, determination or decision be put in writing and within ten (10) days after receipt of any such writing they may file a written protest with the Town stating clearly and in detail their objections, the reasons therefore and the nature and amount of additional compensation, if any, to which they claim they will be entitled thereby. A copy of such protest shall be filed with the Town. Unless the Contractor files such written protest with the Town and Engineer within such ten (10) day period, they shall be deemed to have waived all grounds for protest of such direction, instructions, determination or decision and all claims for additional compensation or damages occasioned thereby, and shall further be deemed to have accepted such direction, instruction, determination or decision as being fair, reasonable and finally determinative of their obligations and rights under the contract.

The Engineer's decision on any matter mentioned above shall be final and conclusive when made in good faith and in the exercise of their best judgment and shall be accepted by the Contractor and the owner in all cases.

4.5 SUPERVISION OF WORK.

The Contractor shall give the work the constant attention necessary to ensure the expeditious and orderly progress thereof and shall cooperate with the Engineer in every possible way.

At all times, the Contractor shall have as their agent on the work a competent superintendent capable of reading and thoroughly understanding the drawings and specifications, with full authority to execute the directions of the Engineer without delay and to supply promptly such labor, services, materials, equipment, plant, apparatus, appliances, tools, supplies and other items as may be required. Such superintendent shall not be removed from the work without the prior written consent of the Engineer. If, in the opinion of the Engineer, the superintendent or any successor proves incompetent, the Contractor shall replace them with another person approved by the Engineer, such approval, however, shall in no way relieve or diminish the Contractor's responsibility for the new superintendent.

Whenever the Contractor or their agent or superintendent is not present on any part of the work where it may be necessary to give directions or instructions with respect to such work, such directions or instructions may be given by the Engineer to and shall be received and obeyed by the foreman or any other person in charge of the particular work involved.

4.6 INSURANCE.

Insurance Requirements:

Before starting and until final completion and acceptance of the work called for in the Contract and expiration of the guarantee period provided for in the Contract, the Contractor shall procure and maintain insurance of the types and amounts checked in paragraphs A through F, below.

The Contractor shall require each of its subcontractors to procure and maintain, until final completion, acceptance and guarantee of each subcontractor's work, the same insurance of the types and amounts as checked in paragraphs A through F below.

Certification and Cancellation:

The Contractor shall furnish, prior to the start of work called for in the Contract, three (3) certificates to the Town of each insurance policy or policies with the Code Number of the policy for each, a representation that policy cannot be canceled or amended by the insurer in less than sixty (60) days after the Town has received written notice of cancellation or amendment by certified or registered mail, also a representation that the insurer will notify the Town immediately of any lapse in coverage cancellation or restrictive amendment and also attach a true copy of the broker or agent's license to do business in Connecticut. Such certificates shall be on the Town form attached hereto and shall contain an affirmative representation that the coverage afforded is as required herein.

The Contractor shall furnish prior to the start of work called for in the contract the Acord certificate of insurance form for insurance documentation purposes as well as an endorsement letter from their Agent/Broker.

The awarded vendor will be required to provide insurance coverage as specified on the **Insurance Requirements Sheet, enclosed herein**, of this Request for Bid. Upon award, the **Acord certificate of insurance form** must be completed by the vendor's insurance agent/broker and submitted to the Engineering Division. The Town of Greenwich must be added as an additional insured on the Acord form. The signing agent/broker must also certify in writing that the Town of Greenwich has been endorsed as an additional insured on the General Liability insurance policy. This letter shall be

addressed to the Engineering Division and **must follow exactly the format of the ‘Sample Agent/Broker Letter’ enclosed herein.** The letter must be dated on or after the date stated on the Acord certificate of insurance. If the insurance coverage required is provided on more than one Acord certificate of insurance, then additional endorsement letters are also required. **The authorized representative who signs the Acord form must sign the letter as well.**

The Town of Greenwich will not accept insurance coverage, other than Excess Liability coverage, from insurance providers that are surplus lines writers in Connecticut. All insurance companies providing coverage, other than excess liability coverage, must be licensed in the state of Connecticut. Please provide this information to your insurance agent/broker.

Please note that the Acord certificate of insurance must be signed by an individual authorized representative, not with the agency name. The signature must be an original ink signature, not a stamped signature.

Company name and address must conform on all documents including insurance documentation. The Contract number, project name and a brief description must be inserted in the “Description of Operations” section of the Acord form. **It must be confirmed on the Acord Form that the Town of Greenwich is endorsed as an additional insured by having the appropriate box checked off and stating such in the “Description of Operations” section. The "Description of Operations" section should also reference Contract No. (provided to the awarded vendor), Construction of the Replacement of John Street Bridge over East Branch Byram River, Bridge No. 056055, Town Project No. 06-15, Greenwich, Connecticut.**

The Contractor shall be responsible for maintaining the specified insurance coverage in force to secure all of the Contractor's obligations under the Contract with an insurance company or companies with an AM Best Rating of B+:VII or better, licensed to write such insurance in Connecticut and acceptable to the Risk Manager, Town of Greenwich. For excess liability only, non-admitted insurers are acceptable, provided they are permitted to do business through Connecticut excess line brokers per listing on the current list of Licensed Insurance Companies, Approved Reinsurers, Surplus Lines Insurers and Risk Retention Groups issued by the State of Connecticut Insurance Department.

The vendor should submit with the bid the signed, original **“Insurance Procedure”** form, enclosed herein, which states that the vendor agrees to provide the specified insurance coverage for this Bid at no additional charge above any insurance charge declared in the bid.

TOWN OF GREENWICH

INSURANCE PROCEDURE

PLEASE NOTE:

RETURN THIS COMPLETED FORM WITH YOUR BID/PROPOSAL. FAILURE TO DO SO MAY RESULT IN YOUR BID/PROPOSAL BEING REJECTED.

Please take the insurance requirements of the Contract to your agent/broker immediately upon receipt of the bid documents to determine your existing coverage and any costs for new or additional coverage required for the work noted in this Request for Bid/Proposal. Any bids/proposals which contain exceptions to the insurance requirements may be considered nonresponsive and may be rejected.

STATEMENT OF VENDOR:

I have read the insurance requirements for this work and have taken the documentation to my insurance agent/broker. The bid/proposal cost reflects any additional costs relating to insurance requirements for this work.

If I am awarded this contract, I or my insurance agent shall submit all of the required insurance documentation to the Town of Greenwich Engineering Division within ten (10) days after the date of the award of the contract.

Signature

Date

Contractor

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Insurance Requirement Sheet

Insurance Requirements: Before starting and until final completion and acceptance of the work called for in the Contract and expiration of the guarantee period provided for in the Contract, the Contractor and its subcontractors, if any, shall procure and maintain insurance of the types and amounts checked in paragraphs A through F below for all Contract operations.

- A. **General Liability, with minimum coverage for combined bodily injury and property damage liability of \$2,000,000 general aggregate, \$1,000,000 per occurrence including:**
 - 1. **Commercial General Liability.**
 - 2. **Town as additional insured.**
 - 3. **Owners and Contractors Protective Liability (separate policy in the name of the Town).**

- B. **Comprehensive Automobile Liability, with minimum coverage of \$1,000,000 combined single limit for bodily injury and property damage, including, where applicable, coverage for any vehicle, all owned vehicles, scheduled vehicles, hired vehicles, non-owned vehicles and garage liability.**

- C. **Excess Liability, with minimum coverage of \$5,000,000 in umbrella form, or such other form as approved by Town Department Head and Risk Management Director.**

- D. **Workers' Compensation and Employer's Liability, with minimum coverage as provided by Connecticut State Statutes.**

- E. **Professional Liability (for design and other professionals for Errors and Omissions), with minimum coverage of \$1,000,000. If the policy is on a claims-made basis, coverage shall be continually renewed or extended for three (3) years after work is completed under the Contract.**

- F. **Other (Builder's Risk, etc.):_____.**

- G. **CERTIFICATE HOLDER: TOWN OF GREENWICH
ATTN: ENGINEERING DIVISION (Also fill in on ACORD Certificate of Insurance)
101 Field Point Road, Greenwich, CT 06830.**

The **Acord certificate of insurance form** must be executed by your insurance agent/broker and returned to this office. Company name and address must conform on all documents including insurance documentation. It is required that agent/broker note the individual insurance companies providing coverage, rather than the insurance group, on the Acord form. The Contract number (provided to the awarded vendor), project name and a brief description must be inserted in the "Description of Operations" field. It must be confirmed on the Acord Form that the Town of Greenwich is endorsed as an additional insured by having the appropriate box checked off and stating such in the "Description of Operations" field. **A letter from the awarded vendor's agent/broker certifying that the Town of Greenwich has been endorsed onto the general liability policy as an additional insured is also mandatory.** This letter must follow exactly the format provided by the Purchasing Department and must be signed by the same individual authorized representative who signed the Acord form. If the insurance coverage required is provided on more than one Acord certificate of insurance, then additional endorsement letters are also required. Contract development will begin upon receipt of complete, correct insurance documentation.

The Contractor shall be responsible for maintaining the above insurance coverage in force to secure all of the Contractor's obligations under the Contract with an insurance company or companies with an AM Best Rating of B+:VII or better, licensed to write such insurance in Connecticut and acceptable to the Risk Manager, Town of Greenwich. For excess liability only, non-admitted insurers are acceptable, provided they are permitted to do business through Connecticut excess line brokers per listing on the current list of Licensed Insurance Companies, Approved Reinsurers, Surplus Lines Insurers and Risk Retention Groups issued by the State of Connecticut Insurance Department.

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**SAMPLE
AGENT/BROKER
(LETTERHEAD)**

(Date)

Town of Greenwich
Engineering Division
101 Field Point Road
Greenwich, CT 06830

Re: **(Name of the Insured)**
Town of Greenwich Contract No. XXXX

To Whom It May Concern:

The undersigned hereby certifies as follows:

- (1) I am a duly licensed insurance agent under the laws of the State of **[insert state]** and an authorized representative of all companies affording coverage under the Acord form submitted herewith;
- (2) The Town of Greenwich has been endorsed as an additional insured under general liability policy no. **[insert policy number]**, issued by **[insert company affording coverage]** to **[name of insured]**;
- (3) The general liability policy referenced in paragraph (2) above meets or exceeds the coverage in Commercial General Liability ISO form CG 00 01 10 01, including contractual liability;
- (4) The policies listed in the Acord form submitted to the Town of Greenwich in connection with the above referenced contract have been issued to the insured in the amounts stated and for the periods indicated in the Acord form; and
- (5) The Town of Greenwich shall be given thirty (30) days prior written notice of cancellation, lapse or restrictive amendment (except ten days' notice of nonpayment) of the policies listed in the Acord form.

Sincerely,

(Signature)

Authorized Representative for all companies listed in the Acord form

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4.7 PATENTS.

The Contractor shall indemnify and save harmless the Town and all persons acting for or on behalf of the Town from all claims and liability of any nature or kind, and all damages, costs and expenses, including attorneys' fees, arising from or occasioned by an infringement or alleged infringement of any patent rights on any invention, process, materials, equipment, article, or apparatus, or any part hereof, furnished and installed by the Contractor, or arising from or occasioned by the use or manufacture thereof, including their use by the Town.

4.8 COMPLIANCE WITH LAWS.

The Contractor shall keep themselves fully informed of all existing and future Federal, State and local laws, ordinances, rules and regulations affecting those engaged or employed on the work, the materials and equipment used in the work or the conduct of the work, and of all orders, decrees and other requirements of bodies or tribunals having any jurisdiction or authority over the same. If any discrepancy or inconsistency is discovered in the drawings, specifications or other contract documents in relation to any such law, ordinance, rule, regulation, order decree or other requirement, the Contractor shall forthwith report the same to the Engineer in writing. The Contractor shall at all times observe and comply with and cause all their agents, servants, employees and subcontractors to observe and comply with all such existing and future laws, ordinances, rules regulations, orders, decrees, and other requirements, and they shall protect, indemnify and save harmless the Town, its officers, agents, servants, and employees, from and against any and all claims, demands, suits, proceedings, liabilities, judgments, penalties, losses, damages, costs and expenses, including attorneys' fees, arising from or based upon any violation or claimed violation of any such law, ordinance, rule, regulation, order, decree or other requirement, whether committed by the Contractor or any of their agents, servants, employees or subcontractors.

4.9 PROVISIONS REQUIRED BY LAW DEEMED INSERTED.

Each and every provision of law and clause required by law to be inserted in the contract shall be deemed to be inserted herein, and the contract shall be read and enforced as though they were included herein. If through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party, the contract shall forthwith be physically amended to make such insertion.

4.10 PERMITS.

The Contractor shall, at their own expense, take out and maintain all necessary permits from the State, Town, or other public authorities, shall give all notices required by law and shall post all bonds and pay all fees and charges incidental to the due and lawful prosecution of the work.

4.11 NOT TO SUBLET OR ASSIGN.

The Contractor shall constantly give their personal attention to the faithful prosecution of the work, shall keep the same under their personal control, shall not assign the contract or sublet the work or any part thereof without the previous written consent of the Town, and shall not assign any of the monies payable under the contract, or their claim thereto, unless by and with the like written consent of the Town and the surety on the contract bonds. Any assignment or subletting in violation hereof shall be void and unenforceable.

4.12 TIME FOR COMMENCEMENT AND COMPLETION OF WORK.

The Contractor shall commence with the work within ten (10) days after receipt of notice to proceed from the Town. The rate of progress shall be such that the work shall be performed and completed in accordance with the contract before the expiration of the time limit stipulated, if any, under article 1.9, 'time limits and time charge', which time is of the essence of the agreement.

4.13 LIQUIDATED DAMAGES OR TIME CHARGE.

Liquidated damages or time charge, if any, shall be as specified under article 1.9, 'time limits and time charge'.

4.14 NIGHT AND SUNDAY WORK.

No work shall be done at night or on Sunday except (1) usual protective work, such as pumping and the tending of lights and fires, (2) work done in case of emergency threatening injury to persons or property, or (3) if all of the conditions set forth in the next paragraph below are met.

No work other than that included in (1) and (2) above, shall be done at night except when (A), in the sole judgment of the Engineer, the work will be of advantage to the Town and can be performed satisfactorily at night, (B) the work will be done by a crew organized for regular and continuous night work, and (C) the Engineer has given written permission for such night work.

4.15 EMPLOY COMPETENT INDIVIDUALS.

The Contractor shall employ only competent individuals on the work and shall not employ individuals or means which may cause strikes, work stoppages or disturbance by workers employed by the Contractor, any subcontractor, the Town, the Engineer or any other Contractor. Whenever the Engineer notifies the Contractor in writing that in their opinion, any person on the work is incompetent, unfaithful, disorderly, or otherwise unsatisfactory or not employed in accordance with the provisions of the contract, such person shall be discharged from the work and shall not again be employed on it, except with the written consent of the Engineer.

4.16 EMPLOY SUFFICIENT LABOR AND EQUIPMENT.

If in the sole judgment of the Engineer, the Contractor is not employing sufficient labor, plant, equipment or other means to complete the work within the time specified, the Engineer may, after giving written notice, require the Contractor to employ such additional labor, plant, equipment and other means as the Engineer deems necessary to enable the work to progress properly.

4.17 INTOXICATING LIQUORS.

The Contractor shall not sell and shall neither permit nor suffer the introduction or use of intoxicating liquors upon or about the work.

4.18 ACCESS TO WORK.

The Town, the Engineer and their officers, agents, servants, and employees may at any and all times and for any and all purposes, enter upon the work and the site thereof and the premises used by the Contractor, and the Contractor shall at all times provide safe and proper facilities therefore.

4.19 EXAMINATION OF WORK.

The Engineer shall be furnished by the Contractor with every reasonable facility for examining and inspecting the work and for ascertaining that the work is being performed in accordance with the requirements and intent of the contract, even to the extent of requiring the uncovering or taking down portions of finished work by the Contractor. Should the work thus uncovered or taken down prove satisfactory, the cost of uncovering or taking down and the replacement thereof, shall be considered as extra work unless the original work was done in violation of the contract in point of time or in the absence of the Engineer or their inspector and without their written authorization, in which case said cost shall be borne by the Contractor. Should the work uncovered or taken down prove unsatisfactory, said cost shall likewise be borne by the Contractor.

4.20 DEFECTIVE WORK.

The inspection of the work shall not relieve the Contractor of any of their obligations to perform and complete the work as required by the contract. Defective work shall be corrected and unsuitable materials, equipment, apparatus and other items shall be replaced by the Contractor, notwithstanding that such work, materials, equipment, apparatus and other items may have been previously overlooked or accepted or estimated for payment. If the work or any part thereof shall be found defective at any time before the final acceptance of the work, the Contractor shall forthwith make good such defect in a manner satisfactory to the Engineer. If any material, equipment, apparatus or other items brought upon the site for use or incorporation in the work, or selected for the same, is condemned by the Engineer as unsuitable or not in conformity with the specifications or any of the other contract documents, the Contractor shall forthwith remove such materials, equipment, apparatus and other items from the site of the work and shall at their own cost and expense, make good and replace the same and any material furnished by the Town which shall be damaged or rendered defective by the handling or improper installation by the Contractor, their agents, servants, employees or subcontractors.

4.21 PROTECTION AGAINST WATER AND STORM.

The Contractor shall take all precautions necessary to prevent damage to the work by storms or by water entering the site of the work directly or through the ground. In case of damage by storm or water, the Contractor shall at their own cost and expense make such repairs or replacements or rebuild such parts of the work as the Engineer may require in order that the finished work may be completed as required by the Contractor.

The Engineer may suspend the performance of any work at any time when, in their judgment, the conditions are not suitable or the proper precautions are not being taken, whatever the weather may be, in any season. The Contractor agrees that they shall not have or assert any claim for or be entitled to any additional compensation or damages on account of any such suspension.

4.22 MISTAKES OF CONTRACTOR.

The Contractor shall promptly correct and make good any and all defects, damages, omissions, or mistakes for which they and/or their agents, servants, employees or subcontractors are responsible, and they shall pay to the Town all costs, expenses, losses and damages resulting there from or by reason thereof as determined by the Engineer.

4.23 RIGHT TO MATERIALS.

Nothing in the contract shall be constructed as vesting in the Contractor any right or property in the materials, equipment, apparatus and other items furnished after they have been installed or incorporated in or attached or affixed to the work or the site, but all such materials, equipment, apparatus and other items shall, upon being so installed, incorporated, attached or affixed, become the property of the Town.

4.24 CHANGES.

The Town, through the Engineer, may make changes in the work and in the drawings and specifications therefore by making alterations therein, additions thereto or omissions there from. All work resulting from such changes shall be performed and furnished under and pursuant to the terms and conditions of the contract. If such changes result in an increase or decrease in the work to be done hereunder, or increase or decrease the quantities thereof, adjustment in compensation shall be made therefore, at the unit prices stipulated in the contract for such work, except that if unit prices are not stipulated for such work, compensation for additional or increased work shall be made as provided hereinafter under the article titled 'extra work', and for eliminated or decreased work the Contractor shall allow the Town a reasonable credit as determined by the Engineer. Except in an emergency endangering life or property, no change shall be made unless in pursuance of a written order from the Engineer authorizing the change and no claim for additional compensation shall be valid unless the change is so ordered.

The Contractor agrees that they shall neither have nor assert any claim for or be entitled to any additional compensation for damages or for loss of anticipated profits on work that is eliminated.

4.25 EXTRA WORK.

The Contractor shall perform any extra work (work in connection with the contract but not provided for herein) when and as ordered in writing by the Engineer, at the unit prices stipulated in the contract for such work, or, if none are so stipulated, either (A) at the price agreed upon before such work is commenced and named in the written order for such work, or (B) if the Engineer so elects, for the reasonable cost of such work, as determined by the Contractor and approved by the Engineer, plus a percentage of such cost, as set forth below. No extra work shall be paid for unless specifically ordered as such, in writing by the Engineer.

The cost of extra work done under (B) above, shall include the reasonable cost to the Contractor of materials installed and equipment used, common and skilled labor, and foremen and the fair rental of all machinery and equipment used on the extra work for the period of such use.

At the request of the Engineer, the Contractor shall furnish itemized statements of the cost of the extra work ordered as above, and give the Engineer access to all records, accounts, bills and vouchers and correspondence relating thereto.

The Contractor may include in the cost of extra work the amounts of additional premiums, if any, (other than premiums on bonds) paid on the required insurance on account of such extra work of social security or other direct assessments upon the Contractor's payroll by Federal or other properly authorized public agencies and of other approved assessments when such assessments are not normally included in payments made by the Contractor directly to their employees, but in fact are, and customarily recognized as, part of the cost of doing work.

The fair rental for all machinery and equipment shall be based upon the most recent edition of 'Compilation of Rental Rates for Construction Equipment', published by the Associated Equipment Distributors, or a similar publication approved by the Engineer. Rental for machinery and equipment shall be based upon an appropriate fraction of the approved monthly rate schedule. If said extra work requires the use of machinery or equipment not already on the site of the work, the cost of transportation, not exceeding a distance of 100 miles, of such machinery or equipment to and from the work shall be added to the fair monthly rental, provided however, that this shall not apply to machinery or equipment already required to be furnished under the terms of the contract.

The Contractor shall not include in the cost of extra work any cost or rental for small tools, buildings, or any portion of the time of the Contractor, their superintendent, or their office and engineering staff.

To the cost of extra work done by the Contractor's own forces under (B) above (determined as stated above), the Contractor shall add ten (10) percent to cover their overhead, use of capital, the premium on the bonds as assessed upon the amount of this extra work, and profit.

In the case of extra work done under (B) above, by a subcontractor, the subcontractor shall compute, as above, their cost for the extra work, to which they shall add ten (10) percent in the case of the Contractor, and the Contractor shall be allowed an additional ten (10) percent of the subcontractor's cost for the extra work to cover the costs of the Contractor's overhead, use of capital, the premium on the bonds as assessed upon the amount of this extra work, and profit. Said subcontractor's cost must be reasonable and approved by the Engineer.

If extra work is done under (B) above, the Contractor and/or subcontractor shall keep daily records of such extra work. The daily record shall include the names of persons employed; the nature of the work performed, and hours worked materials and equipment incorporated, and machinery or equipment used, if any, in the prosecution of such extra work. This daily record, to constitute verification that the work was done, must be signed both by the Contractor's authorized representative

and by the Engineer. A separate daily record shall be submitted for each extra work order. Extension of time on account of extra work shall, when applicable, be provided for under Article 1.09, 'Time Limits and Time Charge'.

4.26 CHANGES NOT TO AFFECT BONDS.

It is distinctly agreed and understood that any changes made in the work or the drawings or specifications therefore (whether such changes increase or decrease the amount thereof or the time required for its performance) or any changes in the manner or time of payments made by the Town to the Contractor, or any other modifications of the contract, shall in no way annul, release, diminish or affect the liability of the surety on the contract bonds given by the Contractor, it being the intent hereof that notwithstanding such changes, the liability of the surety on said bonds continue and remain in full force and effect.

4.27 CLAIMS FOR DAMAGES.

If the Contractor makes claim for any damages alleged to have been sustained by breach of contract or otherwise, they shall, within ten (10) days after occurrence of the alleged breach or within ten (10) days after such damages are alleged to have been sustained, whichever date is the earlier, file with the Engineer a written, itemized statement in triplicate of the details of the alleged breach and the details and amount of the alleged damages. The Contractor agrees that unless such statement is made and filed as so required, their claim for damages shall be deemed waived, invalid and unenforceable and that they shall not be entitled to any compensation for any such alleged damages within ten (10) days after the timely filing of such statement, the Engineer shall file with the Town one copy of the statement and shall file with the Town and the Contractor their determination thereon.

The Contractor shall not be entitled to claim any additional compensation for damages by reason of any direction, instruction, determination or decision of the Engineer, nor shall any such claims be considered, unless the Contractor shall have complied in all respects with the third paragraph of that article above, of this agreement titled 'Authority of the Engineer', including, but not limited to the filing of a written protest in the manner and within the time therein provided.

4.28 ABANDONMENT OF WORK OR OTHER DEFAULT.

If the work shall be abandoned, or any part thereof shall be sublet without previous written consent of the Town, or the contract or any monies payable hereunder shall be assigned otherwise than as herein specified, or if at any time the Engineer shall be of the opinion and shall so certify in writing, that the conditions herein specified as to rate of progress are not being complied with, or that the work or any part thereof is being unnecessarily or unreasonably delayed, or that the Contractor has violated or is in default under any of the provisions of the contract, or if the Contractor becomes bankrupt or insolvent or goes or is put into liquidation or dissolution, either voluntarily or involuntarily, or petitions for an arrangement or reorganization under the bankruptcy act, or makes a general assignment for the benefit of creditors or otherwise acknowledges insolvency, the happening of any of which shall be and constitute a default under the contract, the Town may notify the Contractor in writing, with a copy of such notice mailed to the surety, to discontinue all work or any part thereof. Thereupon, the Contractor shall discontinue such work or such part thereof as the Town may designate, and the Town may, upon giving such notice, by contract or otherwise as it may determine, complete the work of such part thereof and charge the entire cost and expense of so completing the work, the Town shall be entitled to reimbursement from the Contractor and the Contractor agrees to pay to the Town any losses, damages, costs and expenses, including attorneys' fees, sustained or incurred by the Town by reason of any of the foregoing causes. For the purpose of such completion, the Town may for itself or for any Contractors employed by the Town, take possession of and use or cause to be used, any and all materials, equipment, plant, machinery, appliances, tools, supplies and such other items of every description that may be found or located at the site of the work.

All costs, expenses, losses, damages, attorneys' fees, and any and all other charges incurred by the Town under this deducted and/or paid by the Town out of any monies due or article shall be charged against the Contractor and deducted and/or paid by the Town out of any monies due or payable or to

become due or payable under the Contract to the Contractor. In computing the amounts chargeable to the Contractor, the Town shall not be held to a basis of the lowest prices for which the completion of the work or any part thereof might have been accomplished, but all sums actually paid or obligated therefore to effect its prompt completion shall be charged to and against the account of the Contractor. In case the costs, expenses, losses, damages, attorneys' fees and other charges together with all payments therefore made to and for the account of the Contractor are less than the sum which would have been payable under the contract if the work had been properly performed and completed by the Contractor, the Contractor shall be entitled to receive the difference, and in case such costs, expenses, losses, damages, attorneys' fees and other charges, together with all payments, theretofore made to or for the account of the Contractor shall exceed the said sum, the Contractor shall pay the amount of the excess to the Town.

4.29 PRICES FOR WORK.

The Town shall pay and the Contractor shall receive the prices stipulated in the bid made a part hereof as full compensation for everything performed and furnished and for all risks and obligations undertaken by the Contractor under and as required by the contract.

4.30 MONIES MAY BE RETAINED.

The Town may at any time retain from any monies which would otherwise be payable hereunder so much thereof as the Town may deem necessary to complete the work hereunder and to reimburse it for all costs, expenses, losses, damage and damages chargeable to the Contractor hereunder. See articles 4.32 and 4.35.

4.31 USE OR PARTIAL PAYMENT NOT ACCEPTANCE.

It is agreed that this is an entire contract for one whole and complete work or result and that neither the Town's entrance upon or use of the work or any part thereof nor any partial payments by the Town shall constitute an acceptance of the work or any part thereof before its entire completion and final acceptance.

4.32 PROGRESS ESTIMATES.

Once a month, except as hereinafter provided, the Engineer shall make an estimate in writing of the total amount and value of the work done or any part thereof before its entire completion and final acceptance.

The Town shall retain five (5) percent of such estimated value as part of the security for fulfillment of the contract by the Contractor and shall deduct from the balance all previous payments made to the Contractor, all sums chargeable against the Contractor and all sums to be retained under the provisions of the contract.

The Town shall pay monthly to the Contractor, the balance not deducted and/or retained as aforesaid, except that payment may be withheld at any time if, in the judgment of the Engineer, the work is not proceeding in accordance with the contract. If the Town deems it expedient to do so, it may cause estimates and payments to be made more frequently than one in each month. No progress estimate or payment need to be made when, in the judgment of the Engineer, the total value of the work done since the last estimate amounts to less than One Thousand Dollars (\$1,000). Estimates of Lump-Sum items shall be based on a schedule dividing each such item into its appropriate component parts together with a quantity and a unit price for each part so that the sum of the products of prices and quantities will equal the contract Lump-Sum price for the item. This schedule shall be submitted by the Contractor for, and must have the approval of the Engineer before the first estimate becomes due.

If the Engineer determines that the progress of the work will be benefitted by the delivery to the site of certain materials and equipment, when available, in advance of actual requirement therefore, and if such materials, and equipment are delivered and properly stored and protected, the cost to the Contractor or subcontractor as established by invoices or other suitable vouchers satisfactory to the Engineer, less the retained percentages as above provided, may be included in the progress estimates,

provided always that they be duly executed and delivered by the Contractor to the Engineer, at the same time a bill of sale in form satisfactory to the Town, transferring and assigning to the Town full ownership and title to such materials or equipment.

Prior to contract signing, the Contractor shall submit for review by the Engineer a Schedule of Values. The Contractor will use the approved schedule to submit for payment as items are completed and accepted by the Town. The schedule's values are to correspond to the cost breakdown of the project submitted by the Contractor. At the project completion, the Contractor shall have submitted for payment, 98% of the project value, leaving two percent (2%) retainage for the warranty period of one year. The contract cannot be signed until the schedule and associated values has been approved by the Engineer.

The Contractor shall submit certified monthly payrolls in accordance with article 4.48. No progress payment will be processed until the payrolls submitted are current and up to date.

4.33 FINAL ESTIMATE AND PAYMENT.

As soon as practicable after the final completion and acceptance of the work by the Engineer, the Engineer shall make a final estimate in writing of the quantity of work done under the contract and the amount earned by the Contractor. The Engineer also shall fix the date of completion of the work and incorporate the same into the final estimate.

The Town shall pay to the Contractor, the entire amount found by the Engineer to be earned and due hereunder after deducting there from all previous payments, all charges against the Contractor as provided for hereunder, and all amounts to be retained under the provisions of the contract (see article 4.35). Except as in this article otherwise provided, such payment shall be made not later than fifteen (15) days after, but in no event before, the expiration of the time within which claims for labor performed or materials or equipment furnished must be filed under the applicable lien law, or if such time is not specified by law, the expiration of thirty (30) days after the completion of the Engineer's final estimate.

Final payment shall not be processed until the Contractor submits to the Town (A) an affidavit for final payment in the form attached hereto that payrolls, bills for materials, equipment, supplies and other indebtedness connected with the work has been paid or otherwise satisfied, and (B) consent of the surety to final payment has been furnished.

All quantities shown on progress estimates and all prior payments shall be subject to correction in the final estimate and payment.

4.34 GUARANTEE.

The Contractor guarantees that the work and services to be performed under the contract, and all workmanship, materials and equipment performed, furnished, used or installed in the construction of the same, shall be free from defects and flaws, and shall be performed and furnished in strict accordance with the drawings, specifications, and other contract documents, that the strength of all parts of all manufactured equipment shall be adequate and as specified and that the performance test requirements of the contract shall be fulfilled. This guarantee shall be for a period of one year from and after the date of completion and acceptance of the work as stated in the final estimate. The Contractor shall repair, correct or replace as required, promptly and without charge, all work, equipment and materials, or parts thereof, which fail to meet the above guarantee or which in any way fail to comply with or fail to be in strict accordance with the terms and provisions and requirements of the contract during such one-year period, and also shall repair, correct or replace all damage to the work resulting from such failure.

If the manufacturer's warrantee for equipment and materials installed is greater than the one year period for warrantee specified above, the warrantee will be passed through to the Town. Upon completion of the project by the Contractor and acceptance by the Town, all warrantees will be passed through to the Town and all paperwork turned over to the Town.

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CERTIFICATE FOR PAYMENT

TO: TOWN PROJECT NUMBER:
FROM:
CONTRACTOR:
TOWN PROJECT:
PREPARATION DATE:

CONTRACT NUMBER:
PAYMENT PERIOD TO:
PAYMENT NUMBER:

The Contractor is entitled to the present payment stated below for work substantially completed on the Subject Project. The Account tabulations are shown on the Attached sheets:

- 1. ORIGINAL CONTRACT AMOUNT\$ _____
 - 2. NET CHANGE BY CONTRACT SUPPLEMENT NUMBER(s):\$ _____
-

3. TOTAL CONTRACT TO DATE\$ _____

4. TOTAL CONTRACT AMOUNT EARNED TO DATE..... \$ _____

5. LESS ___% RETAINAGE OF COMPLETED WORK ... (\$ _____)

6. LESS PREVIOUS CERTIFICATES FOR PAYMENT:

PAYMENT NUMBER 1 DATED: _____ (\$ _____)

PAYMENT NUMBER 2 DATED: _____ (\$ _____)

PAYMENT NUMBER 3 DATED: _____ (\$ _____)

PAYMENT NUMBER 4 DATED: _____ (\$ _____)

PAYMENT NUMBER 5 DATED: _____ (\$ _____)

PAYMENT NUMBER 6 DATED: _____ (\$ _____)

PAYMENT NUMBER 7 DATED: _____ (\$ _____)

7. PRESENT PAYMENT DUE CONTRACTOR\$ _____

8. BALANCE OF CONTRACT \$ _____

TOWN PROJECT REPRESENTATIVE / INSPECTOR'S CERTIFICATE FOR PAYMENT:

In accordance with the Contract Documents and based on on-site observations and the data comprising the above payment, I declare that the construction for which this payment is being made has been performed substantially in accordance with the Contract Drawings and Specifications and approved change orders. Construction is about _____ percent complete.

Prepared By: Project Representative/Date _____ Checked By: _____ Date _____

Reviewed for Payment By: Project Mgr/Date _____ Approved for Payment By: Chief Engineer _____ Date _____

DISTRIBUTION:
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AFFIDAVIT FOR FINAL PAYMENT

The undersigned, being duly sworn, deposed and says

1. That they are the _____ of the Contractor
(TITLE)

In the project hereinafter referred to and is authorized to execute this affidavit on behalf of the Contractor,

2. In connection with Contract Number _____, the construction of the Replacement of John Street Bridge over East Branch Byram River, Bridge No. 056055, Town Project No. 06-15, Greenwich, Connecticut, it is represented that:

- a) all payrolls, bills for service, materials, supplies, equipment and other indebtedness bills for service, materials, supplies and that there are no outstanding claims against the undersigned by any subcontractor or material supplier.
- b) the provisions of Section 4.48 of these specifications, Minimum Wages, have been complied with.

3. This Affidavit is made at the request of the Town of Greenwich for the purpose of inducing final payment and knowing that it will rely upon the truth of the representation herein made.

Subscribed and sworn to

Before me this _____ day

Of _____ 20_____

(SIGNATURE OF PERSON
AUTHORIZED TO SIGN)

NOTARY PUBLIC

(TYPE OR PRINT NAME OF PERSON
AUTHORIZED TO SIGN)

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4.35 RETAIN MONEY FOR REPAIRS.

The Town shall retain out of the monies otherwise payable to the Contractor hereunder five (5) percent of the total construction cost for period of thirty (30) days after completion and acceptance of the work and two (2) percent of the total construction cost for the remainder of the one year guarantee period. The Town may expend said retainers, in the manner hereinafter provided, in making such repairs, corrections or replacements in the work as the Town, in its sole judgment, may deem necessary.

If at any time within the said period of guarantee any part of the work requires repairing, correction or replacement, the Town may notify the Contractor in writing to make the required repairs, corrections or replacements. If the Contractor neglects to commence making such repairs, corrections or replacements to the satisfaction of the Town within five (5) days from the date of receipt of such notice, or having commenced, fails to prosecute such work with diligence, the Town may employ other persons to make the same. The Town shall pay the cost and expense of the same out of the amounts retained for that purpose.

Upon the expiration of the said period of guarantee, provided that the work at that time is in good order, the Contractor will be entitled to receive the whole or such part of the sum last aforesaid, if any, as may remain after the cost and expense of making said repairs, corrections or replacements, in the manner aforesaid, have been paid there from.

4.36 APPLICATION OF MONIES RETAINED.

The Town may apply any monies retained hereunder to reimburse itself for any and all costs, expenses, losses, damage and damages, liabilities, suits, judgments and awards incurred, suffered or sustained by the Town and chargeable to the Contractor hereunder or as determined hereunder.

4.37 LIENS.

If at any time any notices of lien or other legal process are filed for labor performed or materials or equipment manufactured, furnished, or delivered to or for the work, the Contractor shall, at their own cost and expense, promptly discharge, remove or otherwise dispose of the same, and until such discharge, removal or disposition, the Town shall have right to retain from any monies payable hereunder an amount which, in its sole judgment, it deems necessary to satisfy such liens and pay the costs and expenses, including attorneys' fees of defending any actions brought to enforce the same, or incurred in connection therewith or by reason thereof.

4.38 CLAIMS.

If at any time there be any evidence of any claims for which the Contractor is or may be liable or responsible hereunder, the Contractor shall promptly settle or otherwise dispose of the same, and until such claims are settled or disposed of, the Town may retain from any monies which would otherwise be payable hereunder so much thereof as, in its sole judgment, it may deem necessary to settle or otherwise dispose of such claims and to pay the costs and expenses, including attorneys' fees, or defending any actions brought to enforce such claims or incurred in connection therewith or by reason thereof.

4.39 NO WAIVER.

Neither the inspection by the Town or the Engineer, nor any order, measurement, approval, determination, decision or certificate by the Engineer, nor any order by the Town for the payment of money, nor any payment for or use, occupancy, possession or acceptance of the whole or any part of the work by the Town, nor any extension of time, nor any other act or omission of the Town or of the Engineer shall constitute or be deemed to be an acceptance of any defective or improper work, materials, or equipment nor operate as a waiver of any requirements or provision of the contract, nor of any remedy, power or right to damages for breach of contract. Any and all rights and/or remedies provided for in the contract are intended and shall be construed to be cumulative and, in addition to each and every other right and remedy provided for herein or by law, the Town shall be entitled as of right to

a writ of injunction against any breach or threatened breach of the contract by the Contractor, their subcontractors or by any other person or persons.

4.40 LIABILITY OF TOWN.

No person, firm or corporation, other than the Contractor, who signed this contract as such, shall have any interest herein or rights hereunder, no claim shall be made or be valid either against the Town or any agent of the Town and neither the Town nor any agent of the Town shall be liable for or be held to pay any money, except as herein provided. The acceptance by the Contractor of the payment as fixed in the final estimate shall operate as and shall be a full and complete release of the Town and of every agent of the Town of and from any and all claims, demands, and liabilities of, by or to the Contractor for anything done or furnished for or arising out of or relating to or by reason of the work or for or on account of any act or neglect of the Town or of any agent of the Town or of any other person, arising out of, relating to or by reason of the work, except the claim against the Town for the unpaid balance, if any there be, of the amounts retained as herein provided.

4.41 RETURN OF DRAWINGS.

All drawings furnished by the Town or the Engineer to the Contractor may be used only in connection with the prosecution of the work and shall be returned by the Contractor upon completion of the work.

4.42 CLEANING UP.

The Contractor at all times shall keep the site of the work free from rubbish and debris caused by their operations under the contract. When the work has been completed, the Contractor shall remove from the site of the work all of their plant, machinery, tools, construction equipment, temporary work and surplus materials so as to leave the work and the site clean and ready for use.

The Contractor shall keep all street and sidewalk pavements clear of stone, earth, mud, debris and other materials which may result from the Contractor's operation.

4.43 LEGAL ADDRESS OF CONTRACTOR.

The Contractor's business address and their office at or near the site of the work are both hereby designated as places to which communications shall be delivered. The depositing of any letter, notice or other communication in a postpaid wrapper directed to the Contractor's business address in a post office box regularly maintained by the post office department or the delivery at either designated address of any letter, notice or other communication by mail or otherwise shall be deemed sufficient service thereof upon the Contractor, and the date of such service shall be the date of receipt. The first-named address may be changed at any time by an instrument in writing executed and acknowledged by the Contractor and delivered to the Engineer. Service of any notices, letter, or other communication upon the Contractor personally shall likewise be deemed sufficient service.

4.44 HEADINGS.

The headings or titles of any section, article, paragraph, provision or part of the contract documents shall not be deemed to limit or restrict the content, meaning or effect of such section, article, paragraph, provision or part.

4.45 MODIFICATION OR TERMINATION.

Except as otherwise expressly provided herein, the contract may not be modified or terminated except in writing, signed by the parties hereto.

4.46 GOVERNING LAW.

The laws of the State of Connecticut shall govern this Contract and any and all litigation related to this Contract. In the event of litigation related to this Contract, the exclusive forum shall be the State of Connecticut and the exclusive venue for such litigation shall be the Judicial District for Stamford/Norwalk at Stamford.

4.47 RESIDENT'S PREFERENCE.

The Contractor shall comply with the current provisions of Section 31-52 and 31-52a of the General Statutes of the State of Connecticut, a part of which is quoted below.

(A) PUBLIC BUILDINGS

"In the employment of labor to perform the work specified herein, preference shall be given to citizens of the United States, who are, and continuously for at least three months prior to the date hereof, have been residents of the labor market area, as established by the labor commissioner, in which such work is to be done, and if no such qualified person is available, then to citizens who have continuously resided in the county in which the work is to be performed for at least three months prior to the date hereof, and then to citizens of the State who have continuously resided in the State at least three months prior to the date hereof."

(B) PUBLIC WORKS PROJECTS OTHER THAN PUBLIC BUILDINGS

"In the employment of mechanics, laborers or workmen to perform the work specified herein, preference shall be given to residents of the State who are, and continuously for at least six months prior to the date hereof have been residents of this State, and if no such person is available then to residents of other states."

(C) The above provisions of Section 31-52 and 31-52a shall not apply where the State of Connecticut or any subdivision thereof may suffer the loss of revenue granted or to be granted from any agency or department of the Federal Government as a result of said sections or regulative procedures pursuant thereto.

4.48 PREVAILING WAGE RATES; CONSTRUCTION SAFETY AND HEALTH COURSE.

Except as noted below, the Contractor shall comply with the current provisions of Section 31-53 of the General Statutes of the State of Connecticut, a part of which is quoted as follows:

"The wages paid on an hourly basis to any person performing the work of any mechanic, laborer or worker on the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such person to any employee or welfare fund, as defined in subsection (h) of section 31-53 of the General Statutes, shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the town in which such public works project is being constructed. Any contractor who is not obligated by agreement to make payment or contribution on behalf of such persons to any such employee welfare fund shall pay to each mechanic, laborer or worker as part of such person's wages the amount of payment or contribution for such person's classification on each pay day."

All Contractors and subcontractors shall submit certified weekly payrolls, on forms furnished by the Town, for all contracts meeting the aforementioned monetary limits. The certified payrolls shall be submitted with the Contractor's monthly certificate for payment.

Section 31-55a of the General Statutes of the State of Connecticut provides that the prevailing wage rates applicable to any awarded contract or subcontract are subject to annual adjustments each July 1st for the duration of the project.

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

It is the Contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's web site. The annual adjustments will be posted on the Department of Labor's web page: www.ctdol.state.ct.us. For those without Internet access, contact the division listed below.

The Contractor shall also furnish proof with the weekly certified payroll for the first week each employee begins work that any person performing the work of a mechanic, laborer or worker has completed a course of at least ten (10) hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration in accordance with Connecticut General Statutes Section 31-53b and regulations adopted by the State of Connecticut Labor Commissioner.

The provisions of this section (4.48) shall not apply where the total cost of all work to be performed by all Contractors and subcontractors in connection with new construction of any public works project is less than four hundred thousand dollars (\$400,000) or where the total cost of all work to be performed by all contractors and subcontractors in connection with any remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project is less than one hundred thousand dollars (\$100,000). This prevailing wage rate schedule pertains to this project if the total cost including change orders exceeds \$100,000.

Questions can be directed to the Contract Compliance Unit, Wage and Workplace Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd., Wethersfield, CT 06109 at 860-263-6790.

4.49 PAYMENT OF SUBCONTRACTORS

As required by Section 49-41a of the Connecticut General Statutes, within thirty (30) days after payment to the Contractor by the Town for work under this contract, the Contractor shall pay any amount due any subcontractor, whether for labor performed or materials furnished when such labor or materials have been included in a requisition submitted by such Contractor and paid by the Town.

The general contractor shall include in each of its subcontracts, a provision requiring each subcontractor to pay any amounts due any of its subcontractors, whether for labor performed or materials furnished, within thirty days after such subcontractor receives a payment from the general contractor which encompasses labor or materials furnished by such subcontractor.

In witness whereof, the parties of this agreement have hereunto set their hands and seals as of the day and year first above written

TOWN OF GREENWICH, CONNECTICUT

BY

COMMISSIONER OF PUBLIC WORKS
(PARTY OF THE FIRST PART)

CONTRACTOR
(PARTY OF SECOND PART)

APPROVED AS TO LEGAL SUFFICIENCY

TOWN ATTORNEY

I hereby certify that the contract sum does not exceed the unencumbered balance of amounts duly appropriated and against which this contract is chargeable.

_____ 20 _____

BY

COMPTROLLER

ATTEST

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**CERTIFICATE OF ACKNOWLEDGEMENT OF CONTRACTOR
IF A CORPORATION
FOR AGREEMENT**

STATE OF _____

COUNTY OF _____

ON THIS _____ DAY OF _____ 20 _____,

BEFORE ME PERSONALLY CAME _____

TO ME KNOWN, WHO BEING BY ME FULLY SWORN, DID DEPOSE AND SAY AS FOLLOWS.

THAT THEY RESIDE AT _____

AND IS THE _____

OF _____

the corporation described in and which executed the foregoing instrument that they know the corporate seal of said corporation, that the seal affixed to the foregoing instrument is such corporate seal and it was so affixed by order of the board of directors of said corporation, and that by the like order, they signed thereto their name and official designation.

NOTARY PUBLIC (SEAL)

MY COMMISSION EXPIRES _____

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SECTION 5

***** CONTRACT BOND *****

PERFORMANCE, MAINTENANCE AND PAYMENT BOND

BOND NO. _____

KNOW ALL PERSONS BY THESE PRESENTS, that we _____,
_____, as principal, and _____,

a corporation organized under the laws of the state of

_____ and authorized to do business in the
State of Connecticut as surety, are holden and firmly bound jointly and severally unto the TOWN OF
GREENWICH, CONNECTICUT, thereafter referred to as the Town, a territorial corporation

located in the County of Fairfield, in the penal sum of

_____ Dollars

(\$ _____), to be paid to it or its certain attorney, successors or assigns, to which
payment well and truly to be made, we the said obligors to bind ourselves, and each of us, our heirs,
executors, administrators and successors firmly by these presents.

IN WITNESS WHEREOF we have hereunto set or caused to be set our respective hands, names and
seals this _____ day of _____
20____.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the above named principal has
entered into a certain written contract with the TOWN OF GREENWICH, CONNECTICUT, dated the
_____ day of _____ 20____, for construction of _____

according to the plans, specifications, and other contract documents prepared by the Engineering
Division of the Department of Public Works, which contract is hereby referred to and made a part
hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, if the said principal shall well and faithfully perform said contract according to
its provisions and fully indemnify and save harmless the Town from all cost and damages which the
Town may suffer by reason of failure so to do, and shall pay for all equipment, appurtenances, materials
and labor furnished, used or employed in the execution of said contract, and shall indemnify and save
harmless the Town from all suits or claims of any nature or description against the Town by reason of
any injuries or damages sustained by any person or persons on account of any act or omissions of said
principal, their servants or agents, or their subcontractors in the construction of the work or in guarding
the work, or on account of the use of faulty or improper materials, or by reason of claims under the
workmen's compensation laws or laws by any employee of the principal or their subcontractors or by
reason of the use of any patented material, machinery, device, equipment, process, method of
construction or design in any way involved in the work and shall indemnify the Town against such
defective workmanship, material and equipment as may be discovered within one (1) year after
completion and final acceptance of the work, and shall make good in such defective workmanship and
material as may be discovered within said period of one year, then this obligation shall be void,
otherwise to remain in full force and effect.

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The surety hereby stipulates and agrees that any modifications, omissions or additions in or to the terms of the aforesaid contract, or in or to the plans or specifications therefore, or any extension of time shall in no way affect the obligation of the surety under this bond, the surety hereby waiving any and all rights to any notice of any such modifications, omissions, changes, additions or extensions.

CONTRACTOR _____

By _____

SURETY _____

By _____

COUNTERSIGNED AT _____, CONNECTICUT

LOCAL RESIDENT AGENT

NO TEXT THIS PAGE

**CERTIFICATE OF ACKNOWLEDGEMENT OF CONTRACTOR
IF A CORPORATION
FOR CONTRACT BOND**

STATE OF _____

COUNTY OF _____

ON THIS _____ DAY OF _____ 20 _____,

BEFORE ME PERSONALLY CAME _____

TO ME KNOWN, WHO BEING BY ME FULLY SWORN, DID DEPOSE AND SAY AS FOLLOWS.

THAT THEY RESIDES AT _____

AND IS THE _____

OF _____

the corporation described in and which executed the foregoing instrument that they know the corporate seal of said corporation, that the seal affixed to the foregoing instrument is such corporate seal and it was so affixed by order of the board of directors of said corporation, and that by the like order, they signed thereto their name and official designation.

NOTARY PUBLIC (SEAL)

MY COMMISSION EXPIRES _____

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SECTION 6
GENERAL CONDITIONS

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DEFINITIONS	6.2
ABBREVIATIONS	6.3
HANDLING AND DISTRIBUTION	6.4
MATERIALS - SAMPLES - INSPECTIONS APPROVAL.....	6.5
INSPECTION OF WORK AWAY FROM SITE.....	6.6
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6.1 INTRODUCTION TO THE TECHNICAL SPECIFICATIONS

The following Technical Specifications shall apply to the various items of work which constitute the construction contemplated under this Contract except as supplemented and/or amended by Supplemental Technical Specifications. In cases of conflict between the Technical Specifications and the Supplemental Technical Specifications, the provisions of the Supplemental Technical Specifications shall apply.

To avoid excessive overlapping and repetition, there are certain sections and items that referred to in other sections. In these cases, it is understood that the words such as culvert and sewer; sanitary and storm; utility and sewer; manhole and catch basins; structure and culvert; etc., are interchangeable. In cases where references are not given and the need arises for a specification, similar sections or related items shall govern.

Further, it is provided that whenever anything is, or is to be, done if, as, or, when, or where "contemplated, required, determined, directed, specified, authorized, ordered, given, designated, indicated, considered necessary, deemed necessary, permitted reserved, suspended, established, approved, disapproved, acceptable, unacceptable, suitable, accepted, satisfactory, unsatisfactory, sufficient, insufficient, rejected, or condemned", it shall be understood as if the expression were followed by the words "by the Engineer" or "to the Engineer".

Within the Technical and/or Supplemental Technical Specifications of this Contract the following definitions shall apply:

1. **STANDARD SPECIFICATIONS:** Shall mean the State of Connecticut, Department of Transportation, Bureau of Highways, "Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, dated 2004, as amended to date. All standard specifications that are referred to in the "**DESCRIPTION**" and/or "**MATERIALS**" and/or "**CONSTRUCTION METHODS**" and/or "**METHOD OF MEASUREMENT**" and/or "**BASIS OF PAYMENT**" section of this Contract's Technical and/or Supplemental Technical Specifications, not supplemented and/or amended therein, shall apply. Within the referred to portions of the Standard Specifications wherein the following terms are used they shall mean respectively;

State, Town, Owner,
Department, Commissioner

The Commissioner of Public Works
The Town of Greenwich, Connecticut
or other duly authorized representative

Architect and/or Engineer

The Chief Engineer
Department of Public Works
Engineering Division
The Town of Greenwich, Connecticut
or other duly authorized representative

Inspector

Resident Project Representative of
the Department of Public Works
Engineering Division
The Town of Greenwich, Connecticut
or other duly authorized representative

Laboratory

Laboratory designed by the Engineer

Special Provisions

Supplemental Technical Specifications

2. **APPLICABLE SAFETY CODES:** Shall mean the latest edition including any and all amendments, revisions and additions thereto of the Federal Department of Labor. Occupational safety and Health Administration's "Occupational Safety and Health standards" and "Safety and health Regulations for Construction", the State of Connecticut, Labor Department, "Construction

Safety Code", or State of Connecticut "Building Code", whichever is the more stringent for the applicable requirements.

3. **ITEMS:** Reference within the text of these Specifications to items **without** a number but title only are Technical Specification Items within this contract. Sections for Articles referred to with a number refer to the State of Connecticut Department of Transportation, Bureau of High ways specification Sections or Articles.
4. **LOCAL REGULATORY AGENCY(IES):** Local Regulatory Agency(ies) shall be defined as the governing body or authority having jurisdiction over or responsible for a particular having jurisdiction over or responsibility for a particular activity within the scope of this Contract.
5. **"THESE SPECIFICATIONS":** Where used in the text of the Technical Specifications items shall mean the Technical Specifications for this contract.
6. **BID PROPOSAL ITEMS:** Payment will **only** be made for items in the Bid Proposal. Other items may be included in the specifications but payment for items not listed in the Bid Proposal will be included in the cost of other items of work. Bid Proposal items shall have the same basic alpha-numeric designation as the same items in the specifications with significant suffixes added as required.

6.2 DEFINITIONS.

Wherever the words defined in this section or pronouns used in their stead occur in the specifications, they shall have the meanings herein given.

AS DIRECTED, AS REQUIRED, ETC.

Wherever in the specifications, or on the drawings, the words 'As Directed', 'As Required', 'As Ordered', 'As Permitted', or words of like import are used, it shall be understood that the direction, order, request, requirements, or permission of the Engineer is intended. Similarly, the words 'Approved', 'Acceptable', 'Satisfactory', and words of like import shall mean approved by, acceptable to, or satisfactory to the Engineer.

ELEVATION

The figures given on the drawings or in the other contract documents after the word 'Elevation' or abbreviation of it shall mean the distance in feet above datum adopted by the Engineer.

ROCK

The word 'Rock' wherever used as the name of any excavated material or material to be excavated, shall mean only boulders and pieces of concrete or masonry exceeding one (1) cubic yard in volume, or solid ledge rock which, in the opinion of the Engineer, requires, for its removal, drilling and blasting, wedging, sledging, barring or breaking up with a power operated tool. No soft or disintegrated rock which can be removed with a hand pick or power-operated excavator or shovel, no loose, shaken or previously blasted rock or broken stone in rock fillings or elsewhere, and no rock exterior to the maximum limits of measurement allowed, which may fall into the excavation, will be measured or allowed as 'Rocks'.0

EARTH

The word 'Earth', wherever used as the name of an excavated material or material to be excavated, shall mean all kinds of material other than rock as above defined.

6.3 ABBREVIATIONS.

Where any of the following abbreviations are used in the specifications, they shall have the meaning set forth opposite each.

AASHO	AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS
ACI	AMERICAN CONCRETE INSTITUTE
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
ASA	AMERICAN STANDARDS ASSOCIATION
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERING
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
NEC	NATIONAL ELECTRICAL CODE, LATEST EDITION
CONN-DOT	STATE OF CONNECTICUT, DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS, FORM 815, 1995

6.4 HANDLING AND DISTRIBUTION.

The Contractor shall handle, haul and distribute all materials and all surplus material on the different portions of the work, as necessary or required, shall provide suitable and adequate storage room for materials and equipment during the progress of the work, and be responsible for the protection, loss of, or damage to materials and equipment furnished by them, until the final completion and acceptance of the work.

Storage and demurrage charges by transportation companies and vendors shall be borne by the Contractor.

6.5 MATERIALS.

Samples - inspection - approval. Unless otherwise expressly provided on the drawings or in any of the other contract documents, only new material and equipment shall be incorporated in the work. All material and equipment furnished by the Contractor to be incorporated in the work shall be subject to the inspection and approval of the Engineer. No material shall be processed or fabricated for the work or delivered to the work site without prior approval of the Engineer.

As soon as possible after execution of the agreement, the Contractor shall submit to the Engineer the names and addresses of the manufacturers and suppliers of all materials and equipment they propose to incorporate into the work. When shop and working drawings are required as specified below, the Contractor shall submit prior to the submission of such drawings, data in sufficient detail to enable the Engineer to determine whether the manufacturer and/or supplier have the ability to furnish a product meeting the specifications. As requested, the Contractor shall also submit data relating to the materials and equipment they propose to incorporate into the work in sufficient detail to enable the Engineer to identify and evaluate the particular product and to determine whether it conforms to the contract requirements. Such data shall be submitted in a manner similar to that specified for submission of shop and working drawings.

Facilities and labor for the storage, handling and inspection of all materials and equipment shall be furnished by the Contractor. Defective materials and equipment shall be removed immediately from the site of the work.

If the Engineer so requires, either prior to or after commencement of the work, the Contractor shall submit samples of materials for such special tests as the Engineer deems necessary to demonstrate

that they conform to the specifications. Such samples, including concrete test cylinders, shall be furnished, taken, stored, packed and shipped by the approved molds for making concrete test cylinder. Except as otherwise expressly specified, with technical specifications, the Town shall make arrangements for, and pay for the tests.

All samples shall be packed so as to reach their destination in good condition, and shall be labeled to indicate the material represented, the name of the building or work and location for which the material is intended and the name of the Contractor submitting the sample. To ensure consideration of samples, the Contractor shall notify the Engineer by letter that the samples have been shipped and shall properly describe the samples in the letter. The letter of notification shall be sent separate from and should not be enclosed with the samples.

The Contractor shall submit data and samples, or place their orders, sufficiently early to permit consideration, inspection, testing and approval before the materials and equipment are needed for incorporation in the work. The consequence of their failure to do so shall be the Contractor's sole responsibility

When required, the Contractor shall furnish to the Engineer triplicate sworn copies of manufacturer's shop or mill tests (or reports from independent testing laboratories) relative to materials, equipment, performance rating and concrete data.

After approval of the samples, data, etc., the materials and equipment used on the work shall in all respects conform therewith.

6.6 INSPECTION OF WORK AWAY FROM THE SITE.

If work to be done away from the construction site is to be inspected on behalf of the Town during its fabrication, manufacture, or testing, or before shipment, the Contractor shall give notice to the Engineer of the place and time where such fabrication, manufacture, testing, or shipping is to be done. Such notice shall be in writing and delivered to the Engineer in ample time so that the necessary arrangements for the inspection can be made.

6.7 CONTRACTOR'S SHOP AND WORKING DRAWINGS.

The Contractor shall submit for approval (in reproducible form unless otherwise specified) shop and working drawings of concrete reinforcement, structural details, piping layout, wiring, materials fabricated especially for the contract and materials and equipment for which such drawings are specifically requested.

Such drawings shall show the principal dimensions, weight, structural and operating features, space required, clearances type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawing, when it is customary to do so. When the dimensions are of particular importance, or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for the contract.

When so specified or if considered by the Engineer to be acceptable, manufacturer's specifications, catalog data, descriptive matter, illustrations, etc., may be submitted for approval in place of shop and working drawings. In such case for requirements shall be as specified for shop and working drawings, insofar as applicable, except that the submission shall be in quadruplicate.

The Contractor shall be responsible for the prompt and timely submittal of all shop and working drawings so that there shall be no delay to the work due to the absence of such drawings.

No material or equipment shall be purchased or fabricated especially for the contract until the required shop and working drawings have been submitted as hereinabove provided as conforming to the contract requirements. All such materials and equipment and the work involved in their installation or incorporated into the work shall then be as shown in and represented by said drawings.

Until the necessary approval has been given, the Contractor shall not proceed with any portion of the work (such as the construction of foundations), the design or details of which are dependent upon the design or details of work, materials, equipment or other features for which approval is required.

All shop and working drawings shall be submitted to the Engineer by and/or through the Contractor, who shall be responsible for obtaining shop and working drawings from their subcontractors and returning approved drawings to them. Unless otherwise approved, all shop and working drawings shall be prepared on standard size, 24 inch by 36 inch sheets, except those which are made by changing existing standard shop or working drawings. All drawings shall be clearly marked with the names of the Town, Contractor and building, equipment, or structure to which the drawings apply, and shall be accompanied by a letter of transmittal giving a list of the drawing numbers and the names mentioned above.

Only drawings which have been checked and corrected by the fabricator should be submitted to the Contractor by their subcontractors and vendors. Prior to submitting drawings to the Engineer, the Contractor shall check thoroughly all such drawings to satisfy themselves that the subject matter thereof conforms to the drawings and specifications in all respects. All drawings which are correct shall be marked with the date, checker's name and indication of the Contractor's approval, and then shall be submitted to the Engineer. Other drawings shall be returned for correction.

The approval of shop and working drawings, etc., will be general only and shall not relieve or in any respect diminish the responsibility of the Contractor for details of design, dimensions, etc., necessary for proper fitting and construction of the work as required by the contract and for achieving the result and performance specified hereunder.

Should the Contractor submit for approval, equipment that requires modifications to the structures, piping, layout, etc., they shall also submit for approval, details of the proposed modifications. If such equipment and modifications are approved, the Contractor, at no additional cost to the Town, shall do all work necessary to make such modifications.

The marked-up reproducible of the shop and working drawings or one marked-up copy of catalog cuts will be returned to the Contractor. The Contractor shall furnish additional copies of such drawings or catalog cuts when so requested.

6.8 OCCUPYING PRIVATE LAND.

The Contractor shall not (except after written consent from the proper parties) enter or occupy with persons, tools, materials, or equipment, any land outside the right-of-way or property of the Town. A copy of the written consent shall be given to the Engineer.

6.9 INTERFERENCE WITH AND PROTECTION OF STREETS.

The Contractor shall not close or obstruct any portion of a street, road or private way without obtaining permits therefore from the proper authorities. If any street, road or private way shall be rendered unsafe by the Contractor's operations, they shall make such repairs or provide such temporary ways or guards as shall be acceptable to the Engineer and to the proper authorities. See 'Agreement', Article 4.42, 'Clean Up'.

Streets, roads, private ways and walks not closed shall be maintained passable and safe by the Contractor, who shall assume and have full responsibility for the adequacy and safety of provisions made therefore.

The Contractor shall, at least 24 hours in advance, notify the Police and Fire Department in writing, with a copy to the Engineer, if the closure of a street or road is necessary. They shall cooperate with the Police Department in the establishment of alternate routes and shall provide adequate detour signs, plainly marked and well-lighted, in order to minimize confusion.

6.10 STORAGE OF MATERIALS AND EQUIPMENT.

All excavated materials, construction equipment and materials and equipment to be incorporated in the work shall be placed so as not to injure any part of the work or existing facilities and so that free access can be had at all times to all parts of the work and to all public utility installations in the vicinity of the work. Materials and equipment shall be kept neatly piled and compactly stored in such locations as will cause a minimum of inconvenience to public travel and adjoining owners, tenants and occupants.

6.11 INSUFFICIENCY OF SAFETY PRECAUTIONS.

If at any time, in the sole judgment of the Engineer, the work is not properly lighted, barricaded, or in any other respects safe in regard to public travel, persons on or about the work, or public or private property, the Engineer shall have the right to order such safeguards to be erected and such precautions to be taken as they deem advisable and the Contractor shall comply promptly with such orders. If, under such circumstances, the Contractor does not or cannot immediately put the work and the safeguards into proper and approved condition or if the Contractor or their representative is not upon the site so that they can be notified immediately of the insufficiency of safety precautions, the Engineer may put the work into such a condition that it shall be, in their opinion, in all respects safe. The Contractor shall pay all costs and expenses incurred by the Engineer or Town in so doing. Such action of the Engineer, or their failure to take such action, shall in no way relieve or diminish the responsibility of the Contractor for any and all costs, expenses, losses, liability, claims, suits, proceedings, judgments, awards or damages resulting from, by reason of or in connection with any failure to take safety precautions or the insufficiency of the safety precautions taken by them or by the Engineer acting under authority of this article or for failure to comply with the provisions of any state or federal occupational safety and health laws, rules or regulations.

6.12 SANITARY REGULATIONS.

When deemed necessary by the Engineer, the suitable Contractor shall provide sanitary facilities for the use of those employed on the work. Such facilities shall be made available when the first employees arrive on the site of the work, shall be properly secluded from public observation and shall be constructed and maintained during the progress of the work in suitable numbers and at such points and in such manner as may be required or approved.

The Contractor shall maintain the sanitary facilities in a satisfactory and sanitary condition at all times and shall enforce their use. They shall rigorously prohibit the committing of nuisances on the site of the work, on the lands of the Town, or on adjacent property.

The Town and the Engineer shall have the right to inspect such facilities at all times to determine whether or not they are being properly and adequately maintained.

6.13 LINES, GRADES AND LAYOUT OF WORK.

The Town shall provide the Contractor with a convenient base line and bench mark and it shall be the Contractor's responsibility to lay out their work as required to construct the work and/or as directed by the Engineer. The layout plan shall be prepared by the Engineer and provided to the Contractor prior to construction.

6.14 DIMENSIONS OF EXISTING STRUCTURES.

Where the dimensions and locations of existing structures are of importance in the installation or connection of any part of the work, the Contractor shall verify such dimensions and locations in the field before the fabrication of any material or equipment which is dependent on the correctness of such information.

6.15 WORK TO CONFORM.

During its progress, and on its completion, the work shall conform truly to the lines, levels and grades indicated on the drawings or given by the Engineer and shall be built in a thoroughly substantial and workmanlike manner, in strict accordance with the drawings, specifications and other contract documents and the directions given from time to time by the Engineer.

All work done without instructions having been given therefore by the Engineer, without proper lines or levels, or performed during the absence of the Engineer, will not be estimated or paid for except when such work is authorized in writing by the Engineer. Work, not so authorized, may be ordered uncovered or taken down, removed and replaced at the Contractor's expense.

6.16 COMPUTATION OF QUANTITIES.

For estimating quantities in which the computation of areas by geometric methods would be comparatively laborious, it is agreed that the planimeter shall be considered an instrument precision adapted to the measurement of such areas.

It is further agreed that the computation of the volume prisms shall be by the method of average end areas.

6.17 PLANNING AND PROGRESS SCHEDULES.

Before starting the work and from time to time during its progress, as the Engineer may request, the Contractor shall submit to the Engineer a written description of the methods they plan to use in doing the work and the various steps they intend to take.

Within two (2) days after the date of starting work, the Contractor shall prepare and submit to the Engineer (A) a written schedule fixing the respective dates for the start and completion of various parts of the work. Each such schedule shall be subject to review, approval and change by the Engineer from time to time during the progress of the work.

6.18 PRECAUTIONS DURING ADVERSE WEATHER.

During adverse weather and against the possibility thereof, the Contractor shall take all necessary precautions so that the work may be properly done and satisfactory in all respects. When required, protection shall be provided by use of plastic sheets, tarpaulins, wood and building-paper shelters or other approved means.

The Engineer may suspend construction operations at any time when, in their sole judgment, the conditions are unsuitable or the proper precautions are not being taken, whatever the weather may be, in any season.

6.19 UNDERGROUND INSTALLATIONS

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

"CALL BEFORE YOU DIG," toll free, statewide, 1-800-922-4455 at least 24 hours in advance of performing any excavation.

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SECTION 7

**STATE PROJECT NO. 9056-0055
REPLACEMENT OF BRIDGE NO. 056055
JOHN STREET BRIDGE OVER EAST BRANCH BYRAM RIVER
GREENWICH, CONNECTICUT**

SPECIAL PROVISIONS AND TECHNICAL SPECIFICATIONS

For

**FINAL DESIGN SUBMISSION
January, 2013**

NO TEXT THIS PAGE

January, 2013
State Project No. 9056-0055
Federal Aid Project No: (N/A)
Town: Greenwich

INDEX TO SPECIAL PROVISIONS AND TECHNICAL SPECIFICATIONS

Note: This index 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 index shall not be considered part of the contract.

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JANUARY 2013
FEDERAL AID PROJECT NO. (N/A)
STATE PROJECT NO. 9056-0055

(REPLACEMENT OF JOHN STREET BRIDGE OVER EAST BRANCH BYRAM RIVER)

Town of Greenwich

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 July 2009 (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"), September 17, 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 Replacement of John Street Bridge over The East Branch Byram River in the Town of Greenwich.

CONTRACT TIME AND LIQUIDATED DAMAGES

Two hundred (200) calendar days will be allowed for completion of the work on this project and the liquidated damages charge to apply will be Two Thousand Dollars (\$2000.00) per calendar day.

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 - CONTRACT DURATION

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

The full closure of the roadway shall be limited to the date that coincides with the first business day after the official end of the public school year in 2013 and 6:00pm Friday, September 27, 2013. Temporary road closures shall with be coordinated with the Town and shall not affect the public school bus transportation schedule outside of the dates allowed for the full closure of the roadway provided above.

**NOTICE TO CONTRACTOR –CONNECTICUT DEPARTMENT OF
TRANSPORTATION DISCLAIMER**

Connecticut Department of Transportation bidding and other information and documents which are obtained through the Internet, World Wide Web Sites or other sources are not to be construed to be official information for the purposes of bidding or conducting other business with the Department.

It is the responsibility of each bidder and all other interested parties to obtain all bidding related information and documents from official sources within the Department.

Persons and/or entities which reproduce and/or make such information available by any means are not authorized by the Department to do so and may be liable for claims resulting from the dissemination of unofficial, incomplete and/or inaccurate information.

NOTICE TO CONTRACTOR - VEHICLE EMISSIONS

All motor vehicles and/or construction equipment (both on-highway and non-road) shall comply with all pertinent State and Federal regulations relative to exhaust emission controls and safety.

The contractor shall establish staging zones for vehicles that are waiting to load or unload at the contract area. Such zones shall be located where the emissions from the vehicles will have minimum impact on abutters and the general public.

Idling of delivery and/or dump trucks, or other equipment shall not be permitted during periods of non-active use, and it should be limited to three minutes in accordance with the Regulations of Connecticut State Agencies Section 22a-174-18(b)(3)(c):

No mobile source engine shall be allowed “to operate for more than three (3) consecutive minutes when the mobile source is not in motion, except as follows:

- (i) When a mobile source is forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control,
- (ii) When it is necessary to operate defrosting, heating or cooling equipment to ensure the safety or health of the driver or passengers,
- (iii) When it is necessary to operate auxiliary equipment that is located in or on the mobile source to accomplish the intended use of the mobile source,
- (iv) To bring the mobile source to the manufacturer’s recommended operating temperature,
- (v) When the outdoor temperature is below twenty degrees Fahrenheit (20 degrees F),
- (vi) When the mobile source is undergoing maintenance that requires such mobile source be operated for more than three (3) consecutive minutes, or
- (vii) When a mobile source is in queue to be inspected by U.S. military personnel prior to gaining access to a U.S. military installation.”

All work shall be conducted to ensure that no harmful effects are caused to adjacent sensitive receptors. Sensitive receptors include but are not limited to hospitals, schools, daycare facilities, elderly housing and convalescent facilities. Engine exhaust shall be located away from fresh air intakes, air conditioners, and windows.

A Vehicle Emissions Mitigation plan will be required for areas where extensive work will be performed in close proximity (less than 50 feet (15 meters)) to sensitive receptors. No work will proceed until a sequence of construction and a Vehicle Emissions Mitigation plan is submitted in writing to the Engineer for review and all comments are addressed prior to the commencement of any extensive construction work in close proximity (less than 50 feet (15 meters)) to sensitive receptors. The mitigation plan must address the control of vehicle emissions from all vehicles and construction equipment.

If any equipment is found to be in non-compliance with this specification, the contractor will be issued a Notice of Non-Compliance and given a 24 hour period in which to bring the equipment into compliance or remove it from the project. If the contractor then does not comply, the Engineer shall withhold all payments for the work performed on any item(s) on which the non-conforming equipment was utilized for the time period in which the equipment was out of compliance.

Any costs associated with this "Vehicle Emissions" notice shall be included in the general cost of the contract. In addition, there shall be no time granted to the contractor for compliance with this notice. The contractor's compliance with this notice and any associated regulations shall not be grounds for claims as outlined in Section 1.11 – "Claims".

NOTICE TO CONTRACTOR - TRAFFIC DRUMS AND TRAFFIC CONES

Traffic Drums and 42-inch (1 m) Traffic Cones shall have four six-inch (150 mm) wide stripes (two - white and two - orange) of flexible bright fluorescent sheeting.

The material for the stripes shall be one of the following, or approved equal:

- 3M Scotchlite Diamond Grade Flexible Work Zone Sheeting, Model 3910 for the white stripes and Model 3914 for the orange stripes,
- Avery Dennison WR-7100 Series Reboundable Prismatic Sheeting, Model WR-7100 for the white stripes and Model WR-7114 for the orange stripes.

NOTICE TO CONTRACTOR - NCHRP REPORT 350 REQUIREMENTS FOR WORK ZONE TRAFFIC CONTROL DEVICES

CATEGORY 1 DEVICES (traffic cones, traffic drums, tubular markers, flexible delineator posts)

Prior to using the Category 1 Devices on the project, the Contractor shall submit to the Engineer a copy of the manufacturer's self-certification that the devices conform to NCHRP Report 350.

CATEGORY 2 DEVICES (construction barricades, construction signs and portable sign supports)

Prior to using Category 2 Devices on the project, the Contractor shall submit to the Engineer a copy of the Letter of Acceptance issued by the FHWA to the manufacturer documenting that the devices (both sign and portable support tested together) conform to NCHRP Report 350 (TL-3).

Specific requirements for these devices are included in the Special Provisions.

Information regarding NCHRP Report 350 devices may be found at the following web sites:

FHWA: http://safety.fhwa.dot.gov/roadway_dept/road_hardware/index.htm

ATSSA: <http://www.atssa.com/resources/NCHRP350Crashtesting.asp>

NOTE: The portable wooden sign supports that have been traditionally used by most contractors in the State of Connecticut do NOT meet NCHRP Report 350 criteria and shall not be utilized on any project advertised after October 01, 2000.

CATEGORY 3 DEVICES (Truck-Mounted Attenuators & Work Zone Crash Cushions)

Prior to using Category 3 Devices on the project, the Contractor shall submit to the Engineer a copy of the Letter of Acceptance issued by the FHWA to the manufacturer documenting that the devices conform to NCHRP Report 350.

NOTICE TO THE CONTRACTOR - EXISTING UTILITIES

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

The contractor shall notify "Call Before You Dig", telephone: 1-800-922-4455 for the location of public utility underground facilities, in accordance with Section 16-345 of the Regulations of the Department of Public Utility Control.

Contractors are cautioned that it is their responsibility to verify locations, conditions, and field dimensions of all existing features, as actual conditions may differ from information shown on the plans or contained elsewhere in the specifications.

The Contractor shall notify the Engineer prior to the start of his work and shall be responsible for all coordination with the Department. The Contractor shall allow the Engineer complete access to the work.

The Contractor is hereby notified that utility work schedules will have to be accommodated prior to proceeding. The Contractor shall coordinate with the Utility Companies to accommodate his schedule with all utility company schedules. Any inconvenience or delay that may result from the utility company work shall be included in the contract bid for the work.

All of the existing utility infrastructure must remain in service until the new facilities are acceptable to be put in service. The contractor shall explore with the utilities this aspect of the project. This condition of serviceability applies to the work being done by the contractor for the utilities and to work that is being done under the control of the utility.

Also, refer to "Section 1.07 - Legal Relations and Responsibility to the Public".

NOTICE TO CONTRACTOR – PERMITS

A Memorandum of Understanding (MOU) issued by the Connecticut Department of Transportation (ConnDOT) on behalf of the Connecticut Department of Energy and Environmental Protection (CTDEEP) is hereby made part of the Contract. In accordance with the MOU, the contractor shall adhere to the stipulations outlined in the MOU.

A Wetlands Permit issued By Town of Greenwich Inland Wetlands And Watercourses Agency is hereby made part of the Contract. In accordance with the permit issued, the contractor shall adhere to the General Conditions outlined in the permit.

SECTION 1.07 - LEGAL RELATIONS AND RESPONSIBILITIES

Article 1.07.13 - Contractor's responsibility for Adjacent Property and services is supplemented as follows:

The contractor shall give notice to utility companies a minimum of 30 days prior to required work or services to the utility company. The following list of utility companies and representatives may be used for the convenience of the contractor.

Verizon - Bell Atlantic (New York)
500 Summit Lake Drive - 3rd floor
Valhalla, NY 10595
Attn: Mr. Thomas M. McArdle,
Outside Plant Engineering Manager
(914) 741-8740

Town of Greenwich
Department of Public Works
101 Field Point Road
Greenwich, CT 06836-2540
Attn: David P. Thompson
Chief Engineer
(203) 622-7769

Northeast Utilities Service Company
T&D Systems Project
107 Seldon Street
Berlin, CT 06037
Attn: Mr. Stephen J. Klubnik, Engineering Mgr.
(860) 665-2820

Cablevision of Connecticut, LP
Mr. George Rebentisch,
Construction Manager
122 River Street
Bridgeport, CT 06604
(203) 696-4765

SECTION 1.08 - PROSECUTION AND PROGRESS

Section 1.08 - Prosecution and Progress is amended as follows:

Article 1.08.03 - Prosecution of Work is supplemented by the following:

The Contractor shall not be permitted to interrupt traffic for any continuous period of time exceeding an eight (8) hour duration until both of the following conditions are satisfied:

1. The Contractor has secured all of the required approvals from the Engineer, and
2. The Contractor has, as much as practical, all of the required materials needed on the site or readily available for that construction which requires the interruption of traffic.

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

In order to provide for traffic operations as outlined in the Special Provision “Maintenance and Protection of Traffic,” the Contractor will not be permitted to perform any work that will interfere with the existing traffic operations as follows:

The Contractor shall not be permitted to perform any work that will interfere with the existing number of lanes in each direction, including turning lanes (the length of the turning lanes to be the same as existing), during the following periods:

John Street, Riversville Road, North Porchuck Road, Old Mill Road, and Round Hill Road

Monday through Friday between 7:00 a.m. and 9:00 a.m. and between 4:00 p.m. and 6:00 p.m.

On all Saturdays and Sundays.

Road Closure

John Street 14+50 to 20+00

The Contractor shall not be permitted to close any roadway until the following conditions are satisfied:

1. The Contractor has established the detour route signage.
2. The Contractor has all of the required materials to close the roadway.
3. The Contractor has coordinated with the Engineer and the Town.

Full Depth Reconstruction

John Street 14+50 to 20+00

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 or as directed by the Engineer. The full width of the full depth reconstruction 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.

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 is 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 an entire roadway, 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".

Utility Coordination:

The Contractor's attention is hereby called to the fact that included in the plans may be plan sheets prepared by the utility companies affected by the proposed construction and the anticipated work to be performed by the Utilities in conjunction with the project. These plan sheets are intended to show proposed work and utility installations to be done by the various utility companies or municipal authorities or both before, during, or after the life of this contract but may not depict all work to be done. In addition to the work indicated on these plans, the utility companies and authorities may make adjustments to or remove their installations other than those indicated on the plans or may install facilities not indicated. It is the Contractor's responsibility to make himself aware of any proposed utility work, anticipated utility schedule,

affect the work will have on the construction schedule and coordinate with the utility company schedule.

The Contractor is hereby notified that utility work may be proceeding during the construction and the Contractor shall coordinate his activities with the utility company. The Contractor shall coordinate with the utility companies to accommodate his schedule with all utility company schedules. Any inconvenience or delay that may result from utility work shall be included in the contract bid for the work.

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.

No 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 drop downs greater than 3 inches will not be allowed during those periods when the maximum number of lanes of through traffic are required. The Contractor shall temporarily provide a 4:1 traversable slope of suitable material in those areas where a longitudinal drop down exists. The cost of furnishing, installing and removing this material shall be included in the contract lump sum for "Maintenance and Protection of Traffic."

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. The Engineer shall approve the material for this taper.

All temporary concrete barriers, other 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. Temporary concrete barrier may be salvaged, but must meet all applicable specifications for its item.

All temporary concrete barriers, other protective systems and traffic control devices shall be maintained in a "like new" condition, otherwise they must be replaced.

Prior to construction, particularly as will affect traffic operations, the Contractor shall submit, for the review and approval of the Engineer, a detailed Progress Schedule. It shall show all fundamental work items and operations as a function of estimated time periods. This submittal shall also include a listing of shop drawings and other required submittals keyed to the Progress Schedule activities. It shall reflect realistic processing, delivery and construction periods.

The Progress Schedule shall provide ample space for plotting of actual related progress. It shall be prominently displayed in the Construction Field Office and shall be updated by the Contractor on a biweekly basis throughout the full period of the project.

The Contractor shall schedule his construction operations so as to cause minimal inconvenience to adjoining property owners. The Contractor shall meet with the owner(s) or his/her agent and discuss their access requirements. The Contractor shall provide temporary access to all properties whose access is disturbed by his construction operations.

In order to provide for traffic operations as outlined in the special provisions "Maintenance and Protection of Traffic," the Contractor shall progress his construction activities in accordance with the "Sequence of Construction" as outlined on the plans. Any revisions shall require the written approval of the Town.

The Contractor will be permitted to interfere with normal or staged traffic operations only at the discretion of the Engineer.

SECTION 12.08 - SIGN FACE-SHEET ALUMINUM

Work under this item shall conform to the requirements of Section 12.08 amended as follows:

General: Delete all references to parapet mounted sign supports.

Article M.18.15 – Sign Mounting Bolts: *Replace with the following:*

Bolts used for sign mounting shall be stainless steel and conform to ASTM F593, Group 1 or 2 (Alloy Types 304 or 316). Locking nuts shall be stainless steel and shall conform to ASTM F594 (Alloy Types 304 or 316). Washers shall also be stainless steel and shall conform to ASTM A240 (Alloy Types 304 or 316).

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 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), those categories derived from the mix-design procedure used, such as “Marshall” mixes or “Superpave” mixes, or those defined on the basis of composition, such as 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 lift concrete mixture placed and compacted to a specified thickness in a single paver pass.

Marshall: A bituminous concrete mix design used in mixtures designated as “Bituminous Concrete Class ()”.

Polymer Modified Asphalt (PMA): A bituminous concrete mixture containing a polymer modified asphalt binder in accordance with contract specifications.

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 volumetrics, gradation or temperature.

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 QC plan requirements are defined in Section M.04.

2. Recycle Option: The Contractor has the option of recycling reclaimed asphalt pavement (RAP) or Crushed Recycled Container Glass (CRCG) in bituminous concrete mixtures in accordance with Section M.04. CRCG shall not be used in the final lift of the surface course.

4.06.03—Construction Methods:

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

Delivery tickets must 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.

English

- d. Mixture Designation If RAP is used, the plant printouts shall include RAP dry weight, percentage and daily moisture content. If WMA technology is used, the technology and the additive rate or the water injection rate must be noted on the ticket. Class 3 mixtures for machine-placed curbing must state "curb mix only".
- e. Net weight of mixture loaded into truck (When RAP is used, RAP moisture shall be excluded from mixture net weight).
- f. Gross weight (Either equal to the net weight plus the tare weight or the loaded scale weight).
- g. Tare weight of truck – Daily scale weight.
- h. Project number, purchase order number, name of Contractor (if Contractor other than Producer).
- i. Truck number for specific identification of truck.
- j. Individual aggregate, RAP, and virgin asphalt high/target/low weights shall be printed on batch plant tickets (For drum plants and silo loadings, the plant printouts shall be printed out at 5 minute intervals maintained by the vendor for a period of three years after the completion of the project).
- k. 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.

English

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 are 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. A sufficient number of spare lamps shall be available on site as replacements in the event of failures. The Contractor shall provide brackets and hardware for mounting light fixtures and generators to suit the configuration of the rollers and pavers. Mounting brackets and hardware shall provide for secure connection of the fixtures, minimize vibration, and allow for adjustable positioning and aiming of the light fixtures. Lighting shall be aimed to 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 120 V AC of electric power to operate the specified lighting equipment. A sufficient amount of fuel shall be available on site. There shall be switches to control the lights. Wiring shall be weatherproof and installed to all applicable codes. The minimum lighting requirements are found in tables 4.06-1 and 4.06-2:

Table 4.06-1: Paver Lighting

Fixture	Quantity	Remarks
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

Table 4.06-2: Roller Lighting

Fixture*	Quantity	Remarks
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
OR		
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

*All fixtures shall be mounted above the roller.

Type A: Fluorescent fixture shall be heavy-duty industrial type. It shall be enclosed and sealed to keep out dirt and dampness. It shall be UL listed as suitable for wet locations. The fixture shall contain two 4-foot long lamps - Type "F48T12CWHO". The integral ballast shall be a high power factor, cold weather ballast, and 120 volts for 800 MA HO lamps. The housing shall be aluminum, and the lens shall be acrylic with the lens frame secured to the housing by hinging latches. The fixture shall be horizontal surface mounting, and be made for continuous row installation.

Type B: The floodlight fixture shall be heavy-duty cast aluminum housing, full swivel and tilt mounting, tempered-glass lens, sealed door, reflector to provide a wide distribution or narrow distribution as required, mogul lamp socket for 250 watt Metal Halide lamp, 120 volt integral ballast, and be UL listed as suitable for wet locations.

Type C: The power beam holder shall have ribbed die cast aluminum housing and a clear tempered-glass lens to enclose the fixture. There shall be an arm fully adjustable for aiming, with a male-threaded mount with serrated teeth and lock nuts. There shall be a 120-volt heatproof socket with extended fixture wiring for an "Extended Mogul End Prong" lamp base. The fixture shall have gaskets, and shall be UL listed as suitable for wet locations. The lamps shall be 1000-watt quartz PAR64, both Q1000PAR64MFL (flood) and Q1000PARNSP (spot) will be required.

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 have the capability to remix the bituminous concrete mixture.

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. Seasonal Requirements: Paving including placement of temporary pavements shall be divided into two seasons, In-Season and Extended Season; In-Season shall be from May 1 – September 30, and Extended Season shall be from October 1- April 30. The following requirements shall apply unless otherwise authorized or directed by the Engineer:

- The final lift of bituminous concrete shall not be placed during the Extended Season.
- Bituminous concrete mixes shall not be placed when the air or base temperature is below 40°F.
- The Contractor's Quality Control Plan shall include a section on Extended Season Paving and address mix temperature, paver speed, roller patterns and balancing mixture delivery and placement operations to meet specification requirements.

5. Superpave 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.

6. 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 35 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 35 MPH or less
 - (1) Leading and Trailing = 4 feet per inch of vertical change (thickness)

Note: Any temporary transition to be in-place over the winter shutdown period, holidays, or during extended periods of inactivity (more than 7 calendar days) shall conform to the “Permanent Transition” requirements shown above.

7. 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 QC plan.

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.

English

- 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

Mixture Designation	Lift Tolerance
Class 4 and S1	+/- 3/8 inch
Class 1, 2 and 12 and 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: A thin uniform coating of tack coat shall be applied to the pavement immediately before overlaying and be allowed sufficient time to break (set). 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.

English

The Contractor shall only operate rollers in the dynamic mode using the oscillatory system at the lowest frequency setting on concrete structures such as bridges and catch basins. The use of the vibratory system on concrete structures is prohibited. Rollers operating in the dynamic mode shall be shut off when reversing directions.

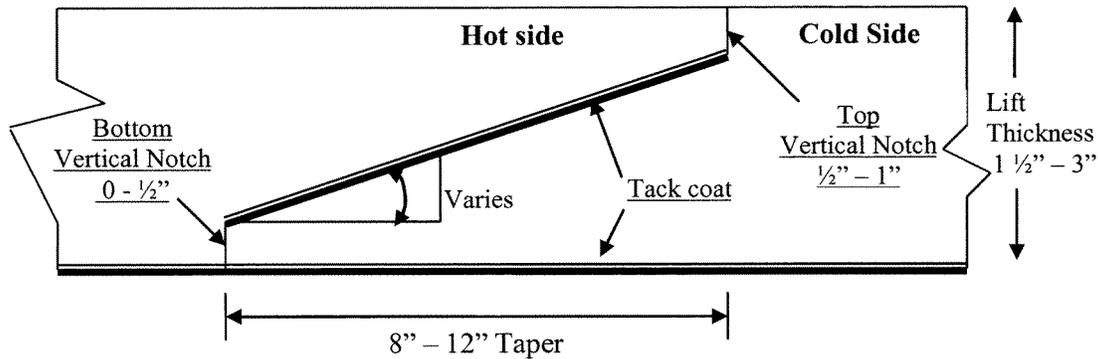
If the Engineer determines that the use of compaction equipment in the dynamic vibratory mode may damage highway components, utilities, or adjacent property, the Contractor shall provide alternate compaction equipment. The Engineer may allow the Contractor to operate rollers in the dynamic mode using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

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 shall not exhibit segregation, rutting, cracking, disintegration, flushing or vary in composition as determined by the Engineer.

8. Longitudinal Joint Construction Methods: Unless noted on the plans or the contract documents or directed by the Engineer, 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 S1 and Class 4 mixes. 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 S1 and Class 4 mixes. 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.

Method I - Notched Wedge Joint:**Figure 4.06-1**

A notched wedge joint shall be constructed, as shown in the figure using a device that is capable of adjusting the top and bottom vertical notches independently and is attached to the paver screed.

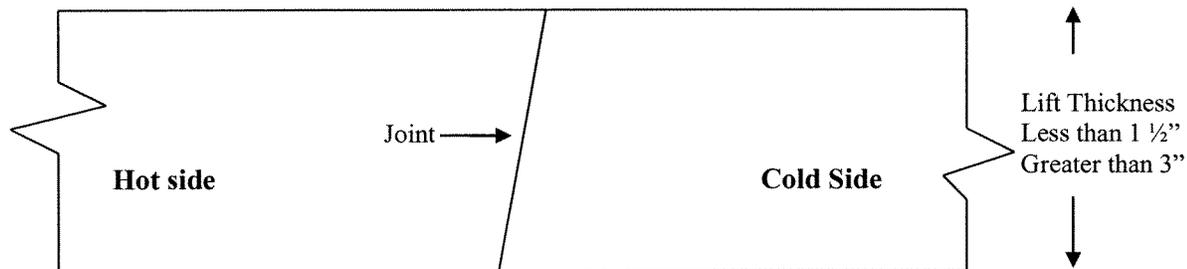
The taper portion of the joint must be placed over the longitudinal joint in the lift immediately below. The top vertical notch must be located at the centerline or lane line in the final lift. The requirement for paving full width "curb to curb" as described in Method II may be waived if addressed in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

The taper portion of the wedge joint shall be compacted and 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.

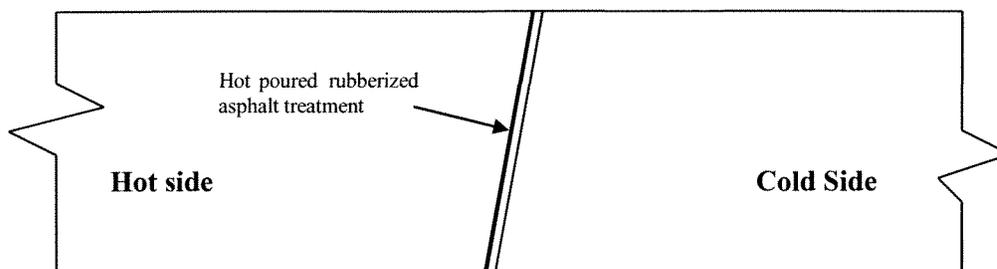
The Engineer reserves the right to define the paving limits when using a wedge joint that will be exposed to traffic.

Method II - Butt Joint:**Figure 4.06-2**

When adjoining passes are placed, the Contractor shall utilize equipment that creates a near vertical edge (refer to figure). 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: When required by the contract or allowed by the Engineer, Method III (see figure 4.06-3) may be used.

Figure 4.06-3

All of the requirements of Method II must be met with Method III. In addition, the longitudinal vertical edge must be treated with a joint seal material meeting the requirements of Section M.04 prior to placing a completing pass. 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.

9. Contractor Quality Control (QC) Requirements for Placement:

The Contractor shall be responsible for maintaining adequate quality control procedures throughout the placement operations. Therefore, the Contractor must ensure that the materials, mixture and work provided by Subcontractors, Suppliers and Producers also meet contract specification requirements.

Quality Control Plan: Prior to placement the Contractor shall submit a QCP to the Engineer for approval. The QCP shall be in the format provided by the Engineer. Work covered by the QCP shall not commence until the Engineer's comments have been incorporated into the QCP. The QCP shall detail every aspect of the placement process. Information provided shall include the organization and procedures which the Contractor shall use to control all project site activity. The QCP must 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 QCP shall also include details on when and who will communicate with personnel at the bituminous concrete plant to determine when immediate changes to the production or placement processes are needed, and to implement the required changes.

In addition the QCP shall also 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.

Approval of the QCP will be based on the inclusion of all of the required information. Approval of the QCP does not relieve the Contractor of its responsibility to comply with the project specifications. The Contractor may modify the QCP as work progresses and must document the changes in writing prior to commencing the next paving operation. These changes include but are not limited to changes in quality control procedures or personnel. Placement may be suspended by the Engineer until the revisions to the QCP have been put into effect.

The Quality Control Plan shall also include the name and qualifications of any outside testing laboratory performing any QC functions on behalf of the Contractor.

Quality Control Inspection, Sampling and Testing: The Contractor shall perform all quality control sampling and testing, provide inspection, and exercise management control to ensure that bituminous concrete production and placement conforms to the requirements as outlined in its QCP during all phases of the work.

- a) Control Charts: The Contractor shall develop and maintain density control charts and shall submit them to the Engineer. The control charts shall include the project number, test numbers, test parameter, applicable upper and lower specification limits, and test data. The control charts shall be used as part of the quality control system to document the placement

process. The control chart(s) shall be updated each day of production, and a copy shall be submitted prior to the next day's production.

b) Records of Inspection and Testing: For each day of placement, the Contractor shall document all test results and inspections on forms approved by the Engineer. The document shall be certified by the Quality Control Manager or his representative that the information in the document is accurate, and that all work complies with the requirements of the contract.

The Contractor shall submit complete and accurate density sampling, testing and inspection documents to the Engineer within 48 hours. The documents shall be submitted in a manner acceptable to the Engineer.

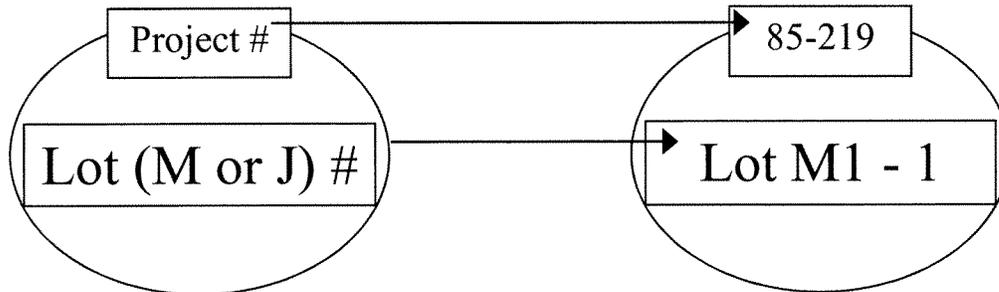
The Contractor may obtain one (1) mat core and one (1) joint core per day for process control, provided this process is detailed in the QCP. The results of these process control cores shall not be used to dispute the Department determinations from the acceptance cores. The Contractor shall submit the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

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. Each lift including the longitudinal joints shall be compacted to the degree specified in Tables 4.06-9 and 4.06-10. The density of each core shall be determined using the production lot's average maximum theoretical gravity established from the plant production testing. Bituminous concrete Class 4 and HMA S1 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



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
≥ 500 TONS**

Lot Type	No. of Mat Cores	No. of Joint Cores	Target Lot Size (Tons)
Lot Without Bridge ⁽¹⁾	4	4	2000
Lot With Bridge(s) ⁽¹⁾⁽²⁾	4 plus 1 per structure (≤ 300')	4 plus 1 per structure (≤ 300')	2000
	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 ⁽¹⁾	3	3	1 per lift
Lot With Bridge(s) ⁽¹⁾⁽²⁾	3	3	1 per lift

Note (1): 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.

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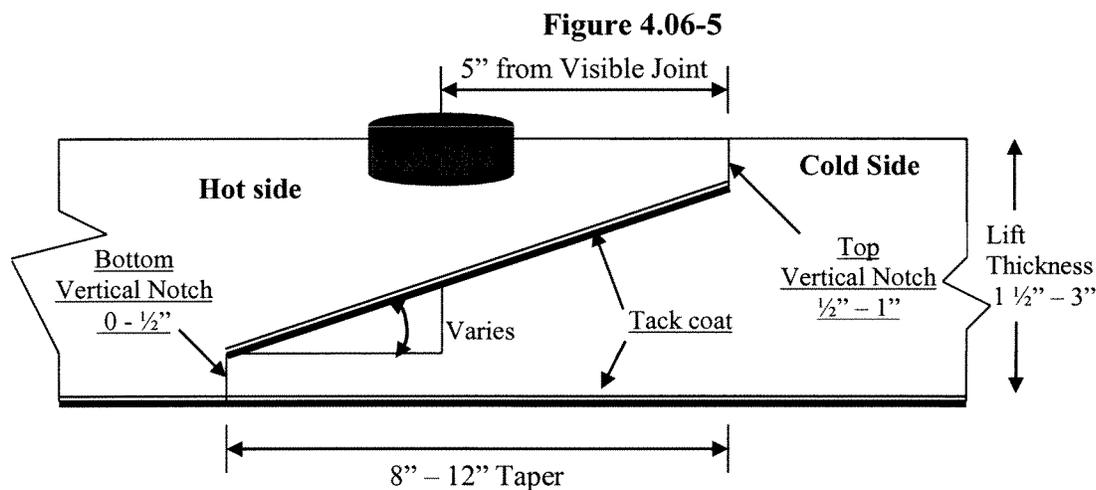
Note (2): If a non-bridge mat or joint core location randomly falls on a structure, the core is to be obtained on the structure in addition to the core(s) required on the structure.

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.

Joint cores must 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.



Cores may be obtained daily or weekly. 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.

Core holes shall be filled immediately 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 with a mixture containing the same

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nominal maximum aggregate size and compacted with a hand compactor or other mechanical means to the maximum compaction possible. The bituminous concrete mixture shall be compacted to 1/8 inch above the finished pavement prior to opening the roadway to traffic.

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 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's test results for a subject lot or sub lot may be replaced with verification's result 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(M).

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 10 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. 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 30 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 36" from the original acceptance core location forward along a line parallel to the baseline that results in the same type (mat, joint, or structure) of core. 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

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corrective courses placed as the final wearing surface shall not be less than 1½ inches in 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. Bituminous Concrete Class () or 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.

$$\text{Tons Adjusted for Area (T}_A\text{)} = [(L \times W_{\text{adj}})/9] \times (t) \times 0.0575 \text{ Tons/SY/inch} = (-) \text{ Tons}$$

Where: L = Length (ft)

(t) = Actual thickness (inches)

$W_{\text{adj}} = (\text{Designed width (ft)} + \text{tolerance} / 12) - \text{Measured Width}$

- 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:

$$\text{Tons Adjusted for Thickness (T}_T\text{)} = A \times t_{\text{adj}} \times 0.0575 = (-) \text{ Tons}$$

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

$t_{\text{adj}} = \text{Adjusted thickness} = [(\text{Dt} + \text{tolerance}) - \text{Actual thickness}]$

Dt = Designed thickness (inches)

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

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

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

- d) Mixture Adjustment: If the quantity of bituminous concrete representing the produced mixture exceeds one or more of the production tolerances for Marshall (Table 4.06-6) or Superpave mix designs (Table 4.06-7 and 4.06-8), an adjustment will be made using the following formulas. The Department's Division of Material Testing will calculate the daily adjustment values for T_{MD} and T_{SD} .

- (1) *Marshall Design*- The tolerances shown in Table 4.06-6 for gradation and binder content will be used to determine whether a mixture adjustment will apply. If the mixture does not meet the requirements of Section M.04, an adjustment will be computed using the following formula:

Tons Adjusted for Marshall Design (T_{MD}) = $M \times 0.10$

Where: M= Tons of bituminous concrete mixture exceeding the tolerances in Table 4.06-5.

**TABLE 4.06-6
TOLERANCES FOR CONSECUTIVE TESTS (MARSHALL)**

Classes	Criteria	% Tolerances (+/-)
-	Binder	0.4
1, 2, 4, 5, 5A & 5B	#200	2.0
1, 2, 4	#50	4
1, 2, 5, 5A & 5B	#30	5
1, 2, 4, 5, 5A & 5B	#8	6
1, 2, 4, 5, 5A & 5B	#4	7
1, 2, 4, 5, 5A & 5B	$\frac{3}{8}$ & $\frac{1}{2}$ inch	8

- (2) *Superpave Design*- The adjustment values in Table 4.06-7 and 4.06-8 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:

Tons Adjusted for Superpave Design (T_{SD}) = $[(AdjAV_t + AdjPB_t) / 100] \times \text{Tons}$

Percent Adjustment for Air Voids = $AdjAV_t = [AdjAV_1 + AdjAV_2 + AdjAV_i + \dots + AdjAV_n] / n$

Where: $AdjAV_t$ = Total percent air void adjustment value for the lot

$AdjAV_i$ = 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 4.06-7
ADJUSTMENT VALUES FOR AIR VOIDS (SUPERPAVE)**

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

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

Where: AdjPB_i = Total percent liquid binder adjustment value for the lot
 AdjPB_i = Adjustment value from Table 4.06-7 resulting from each sub lot
 n = number of binder tests in a production lot

TABLE 4.06-8

Adjustment Value (AdjAV _i) (%)	<u>S0.25, S0.375, S0.5, S1</u> Pb (refer to Table M.04.03-5)
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 for a specified lift of pavement 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).

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

Where: T_D = Total tons adjusted for density for each lot
 PA_M = Mat density percent adjustment from Table 4.06-9
 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) (1,2)
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) (1,2)
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)

(1) ACRPD = Average Core Result Percent Density

(2) 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 bituminous material based on the specific gravity 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.

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. Bituminous Concrete Class (), HMA S* or PMA S*: The furnishing and placing of bituminous concrete will be paid for at the Contract unit price per ton for "Bituminous Concrete, Class ()" or "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 constructing longitudinal joints are included in the general cost of the work.
- All costs associated with obtaining cores for core correlation 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 do not equal zero. A payment will be made for a positive adjustment. A deduction from monies due the Contractor will be made for a negative adjustment.

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 estimated cost figure if included in the bid proposal or estimate 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.

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>
Bituminous Concrete, Class ()	ton
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 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.04.03-6.

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 Material Safety Data Sheet (MSDS) 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_{sa}, G_{sb}, and P_{wa} 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 or elongated shall be determined in accordance with ASTM D 4791 and shall not exceed 10% by weight when tested to a 3:1 ratio, as shown in Tables M.04.02-2 thru M.04.02-4.

2. Fine Aggregate:

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.

- a. 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 mixtures.

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_{sa}, G_{sb}, and Pw_a 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.

- c. 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. Liquid Bituminous Materials:

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-320(M) and AASHTO R-29(M). 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, and shall indicate such information on each bill of lading and certified test report.
- ii. The asphalt binder shall be Performance Grade PG 64-22.

c. Modified Performance Grade (PG) Binder

Unless otherwise noted, the asphalt binder shall be Performance Grade PG 76-22 asphalt modified 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-320(M) and AASHTO R-29(M).

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.
- 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-320(M) and AASHTO R-29(M) 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.
- iv. Cut-backs (medium cure type):
 - i. Requirements: The liquid petroleum materials shall be produced by fluxing an asphalt base with appropriate petroleum distillates to produce the grade specified.
 - ii. Basis of Approval: The request for approval of the source of supply shall be submitted at least seven days prior to its use listing the location where the materials will be produced, and manufacturing, processing, handling and storage methods. The Contractor shall submit a Certified Test Report in accordance with Section 1.06 and a Material Safety Data Sheet (MSDS) for the grade to be used on the Project. The liquid asphalt shall be MC-250 conforming to AASHTO M-82.

e. Emulsions

- i. Requirements: The emulsified asphalt shall be homogeneous and not be used if exposed to freezing temperatures.
- ii. Basis of Approval: The request for approval of the source of supply must include the location where the materials will be produced, and manufacturing, processing, handling and storage methods.
 1. Emulsified asphalts shall conform to the requirements of AASHTO M-140. Materials used for tack coat shall not be diluted and meet grade RS-1. When ambient temperatures are 80°F and rising, grade SS-1 or SS-1h may be substituted if accepted by the Engineer. Each shipment shall be accompanied with a Certified Test Report listing Saybolt viscosity, residue by evaporation, penetration of residue, and weight per gallon.
 2. Cationic emulsified asphalt shall conform to the requirements of AASHTO M-208(M). 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 accepted by the Engineer. Each shipment shall be accompanied with a Certified Test Report listing Saybolt viscosity, residue by evaporation, penetration of residue, and weight per gallon.

5. 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.

6. 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:

CRCG Grading Requirements	
<u>Sieve Size</u>	<u>Percent Passing</u>
3/8-inch	100
No. 4	35-100
No. 200	0.0-10.0

7. Joint Seal Material:

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 AASHTO M-324 – Type 2.

8. Plant Requirements:

- a. Mixing Plant and Machinery:

The mixing plant used in the preparation of the bituminous concrete shall comply with AASHTO M-156(M)/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 truck 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, 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(M), *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. Marshall Method - Class 1, 2, 3, 4, 5, 5A, 5B and 12:

- a. Requirements: When specified, the Marshall method shall be employed to develop a bituminous concrete mix design that includes a JMF consisting of target values for gradation and bitumen content for each class of bituminous concrete designated for the project in accordance with the latest Asphalt Institute's MS-2 manual. Each class of bituminous concrete must meet the requirements as shown in Table M.04.02-1.
- 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 and production percentage of bitumen must be accepted by the Engineer, and the Contractor must demonstrate the ability to meet the accepted JMF and production percentage of bitumen for each class of mixture. Additionally, the fraction of material retained between any two consecutive sieves shall not be less than 4%.

The Engineer will test each class of 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(M). 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. All equipment, tests and computations shall conform to the Marshall method in accordance with AASHTO T 245(M).

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.

- c. Marshall Mixture (Virgin): For bituminous concrete mixtures that contain no recycled material, the limits prescribed in Table M.04.02-1 govern. The Contractor shall submit to the Engineer for approval, a JMF with the individual fractions of the aggregate expressed as percentages of the total weight of the mix and the source(s) of all materials. The JMF shall indicate two bitumen contents; the JMF target percentage and a production percentage (actual amount added to mix) of bitumen for each mix class by total weight. For surface course Class 1, a 0.45 power gradation chart shall also be submitted on which is plotted the percentage passing each sieve. The JMF shall also indicate the target temperature of completed mixture as it is dumped from the mixer and tested in accordance with Article M.04.03.
- d. Marshall Mixtures with RAP: In addition to subarticles M.04.02 – 1a through c, RAP in bituminous concrete shall comply with requirements stated in Article M.04.01, and as stated herein. Upon approval of the Engineer, a maximum of 15% RAP may be used with no binder grade modification. RAP material shall not be used with any other recycling option.
The Contractor may increase the RAP percentage in 5% increments up to a maximum of 30% provided a new JMF is accepted by the Engineer. The following information shall be included in the JMF submittal:
- Gradation and asphalt content of the RAP.
 - Percentage of RAP to be used.
 - Virgin aggregate source(s).
 - Total binder content based on total mixture weight.
 - Production pull percentage of added virgin binder based on total mixture weight.
 - Gradation of combined bituminous concrete mixture (including RAP).
 - Grade of virgin added, if greater than 15% of total mix weight.
- e. Marshall Mixture with CRCG: In addition to subarticle M.04.02 – 1a through c, for bituminous concrete that contains CRCG, the Contractor shall submit a materials certificate to the Engineer stating that the mixture and its components comply with requirements stated in subarticle M.04.01 - (6). 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.

2. Cold Patch Method - Class 5, 5A, 5B:

- a. Requirements: This mixture must be capable of being stockpiled and workable at all times. A non-stripping agent accepted by the Engineer shall be used in accordance with manufacturer's recommendations. The Contractor shall take necessary steps to ensure that this mixture uses aggregate containing no more than 1% moisture and is not exposed to any rain, snow, or standing water for a period of 6 hours after being mixed. This mixture shall be mixed and stockpiled at the point of production on a paved surface at a height not greater than 4 feet during the first 48 hours prior to its use.

- i. Class 5A mixture shall have $\frac{3}{8}$ to $\frac{1}{2}$ inch polypropylene fibers that have been approved by the Engineer added at a rate of 6 pounds per ton of mixture.
 - ii. Class 5B mixture shall have $\frac{1}{4}$ inch polyester fibers that have been approved by the Engineer added at the rate of 2 $\frac{1}{2}$ pounds per ton of mixture.
 - iii. Class 5 mixture shall not contain fibers.
- b. Basis of Approval: The aggregates, fibers and binder (MC-250) shall meet the requirements as specified in sub articles M.04.01-1 through 4 and in Table M.04.02-1. The use of recycled material is not permitted with these classes of bituminous concrete. Mixtures not conforming to the binder content as shown in Table M.04.02-1 shall be subject to rejection. There is a two test minimum per day of production. Mixtures not conforming to the gradation as shown in Table M.04.02-1 shall be subject to payment adjustment as specified in Section 4.06.

TABLE M.04.02 - 1 MASTER RANGES FOR MARSHALL BITUMINOUS-CONCRETE MIXTURES

Notes: (a) 75 blow (Marshall Criteria). (b) 3-6% when used for a roadway wearing surface. (c) For divided highways with 4 or more lanes, a stability of 1500 lbs is required. (d) Contains an accepted non-stripping compound. (e) To help prevent stripping, the mixed material will be stockpiled on a paved surface and at a height not greater than 4 feet during the first 48 hours. (f) As determined by AASHTO T 245(M). (g) The percent passing the #200 sieve shall not exceed the percentage of bituminous asphalt binder determined by AASHTO T 164 or AASHTO T 308(M). (h) Mixture with 5% or more aggregate retained on 3/8" sieve. (i) Mixtures finer than condition (h) above. (j) Class 5 mixture shall contain no fibers. Class 5A mixture shall have 3/8 to 1/2 inch polypropylene fibers that have been previously accepted by the Engineer added at a minimum rate of 6 pounds per ton of mixture. Class 5B mixture shall have 1/8 inch polyester fibers that have been previously accepted by the Engineer added at the minimum rate of 2 1/2 pounds per ton of mixture.

CLASS	1	2	3	4	12	5 (e)(j)	5A (e)(j)	5B (e)(j)	JMF % Tol. (±)	
Grade of PG Binder content %	PG 64-22 5.0 - 6.5	PG 64-22 5.0 - 8.0	PG 64-22 6.5 - 9.0	PG 64-22 4.0 - 6.0	PG 64-22 7.5 - 10.0	MC-250 (d) 6.0 - 7.5	MC-250 (d) 6.0 - 7.5	MC-250 (d) 6.0 - 7.5	0.4	
Percent Passing (%)										
Sieve Size										
# 200	3.0 - 8.0 (g)	3.0 - 8.0 (g)	3.0 - 8.0 (g)	0.0 - 5.0 (g)	3.0 - 10.0 (g)	0.0 - 2.5	0.0 - 2.5	0.0 - 2.5	2.0	
# 50	6 - 26	8 - 26	10 - 30	5 - 18	10 - 40				4	
# 30	10 - 32	16 - 36	20 - 40		20 - 60	2 - 15	2 - 15	2 - 15	5	
# 8	28 - 50	40 - 64	40 - 70	20 - 40	60 - 95	10 - 45	10 - 45	10 - 45	6	
# 4	40 - 65	55 - 80	65 - 87	30 - 55	80 - 95	40 - 100	40 - 100	40 - 100	7	
1/4"										
3/8"	60 - 82	90 - 100	95 - 100	42 - 66	98 - 100	100	100	100	8	
1/2"	70 - 100	100	100		100				8	
3/4"	90 - 100			60 - 80					8	
1"	100									
2"				100						
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 - %	3.0 - 6.0 (a)	2.0 - 5.0 (b)	0 - 4.0							0 - 5.0 (a)
Stability (f) lbs. min.	1200 (c)	1000	1000							1000
FLOW (f) in.	.08 - .15	.08 - .15	.08 - .18							.08 - .15
VMA % - min.	15(h) :16 (i)									
25 °F										

3. 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(M) and AASHTO R 35(M). 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. In addition the G_{sa} , G_{sb} , Pw_a shall also be provided for each component aggregate.
2. 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.

The Contractor shall supply the Engineer with 1 gallon of the specified PG binder and 1 gallon of the same PG binder with the warm mix additive blended into it. The MSDS for the WMA additive shall be included with every submittal.

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(M). 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, but outside the restricted zone limits as shown in Tables M.04.02-2 thru Table M.04.02-5. Mixes with documented performance history which pass through the restricted zone may be permitted for use as long as all other physical and volumetric criteria meets specifications as specified in Tables M.04.02-2 thru Table M.04.02-5 and with prior approval from the Engineer. 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 and test results that show the combined binder (recovered binder from the RAP, virgin binder at the mix design proportions and warm mix asphalt additive if used) meets the requirements of the specified binder grade.

Unless approved by the Engineer, RAP 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:
 - a. Gradation, specific gravities and asphalt content of the RAP,
 - b. Source of RAP and percentage to be used.
 - c. Warm mix Technology and manufacturer's recommended additive rate and tolerances, mixing and compaction temperature ranges for the mix with and without the warm-mix technology incorporated.
 - d. Result of TSR testing, and if applicable Anti-strip manufacturer, and dosage rate.
 - e. Target Temperature at plant discharge.

Note – Testing to be performed shall be done in accordance with section M.04.03.

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(M) and AASHTO M-323(M).

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.

Superpave mixture with CRCG: In addition to subarticles M.04.02 – 3 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.

- 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 a “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	S0.25				S0.375				S0.5				S1			
	CONTROL POINTS (3)		RESTRICTED ZONE		CONTROL POINTS(3)		RESTRICTED ZONE		CONTROL POINTS(3)		RESTRICTED ZONE		CONTROL POINTS(3)		RESTRICTED ZONE	
	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)
inches																
2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3/4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/2	100	-	-	-	100	-	-	-	100	-	-	-	-	-	-	-
3/8	97	100	-	-	90	100	-	-	-	90	-	-	-	-	-	-
#4	-	90	-	-	-	90	-	-	-	-	-	-	-	-	-	-
#8	32	67	47.2	47.2	32	67	47.2	47.2	28	58	39.1	39.1	19	45	26.8	30.8
#16	-	-	31.6	37.6	-	-	31.6	37.6	-	-	25.6	31.6	-	-	18.1	24.1
#30	-	-	23.5	27.5	-	-	23.5	27.5	-	-	19.1	23.1	-	-	13.6	17.6
#50	-	-	18.7	18.7	-	-	18.7	18.7	-	-	15.5	15.5	-	-	11.4	11.4
#100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
#200	2.0	10.0	-	-	2.0	10.0	-	-	2.0	10.0	-	-	1.0	7.0	-	-
Pb (1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VMA (2) (%)	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(4)	0.6 – 1.2				0.6 – 1.2				0.6 – 1.2				0.6 – 1.2			
Agg. Temp(5)	280 – 350F				280 – 350F				280 – 350F				280 – 350F			
Mix Temp(6)	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															

Notes: (1) Minimum Pb as specified in Table M.04.02-5. (2) Voids in Mineral Aggregates shall be computed as specified herein. (3) Control point range is also defined as the master range for that mix. (4) Dust is considered to be the percent of materials passing the #200 sieve. (5) For WMA, lower minimum aggregate temperature will require Engineer's approval. (6) For WMA and PMA, the mix temperature shall meet manufacturer's recommendations.

**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 (1) ASTM D 5821	Fine Aggregate Angularity (7) AASHTO T 304	Flat or 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 ANTICIPATED DESIGN LIFE OF THE PAVEMENT.	SPITTINGS PRESENTED AS MINIMUM VALUES. 95/90 DENOTES THAT A MINIMUM OF 95% OF THE COARSE AGGREGATE, BY MASS, SHALL HAVE ONE PARTICLE PER 100 PARTICLES PRESENTED AS MINIMUM OF 90% SHALL HAVE TWO PARTICLES PER 100 PARTICLES PRESENTED AS MINIMUM VALUES FOR FINE AGGREGATE PASSING THE #80 SIEVE.	SPITTINGS PRESENTED AS MINIMUM PERCENT AIR VOIDS IN LOOSELY COMPACTED FINE AGGREGATE PASSING THE #80 SIEVE.	SPITTINGS PRESENTED AS MAXIMUM PERCENT BY MASS OF FLAT OR ELONGATED PARTICLES OF THE #4 SIEVE, DETERMINED AS 3:1 RATIO.	SPITTINGS PRESENTED AS MINIMUM VALUES FOR FINE AGGREGATE PASSING THE #80 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 (million)	Number of Gyration by Superpave Gyrotory Compactor			Percent Density of Gmm from HMA/WMA specimen			Voids Filled with Asphalt (VFA) Based on Nominal mix size – inch			
		Nini	Ndes	Nmax	Nini	Ndes	Nmax	0.25	0.375	0.5	
1*	< 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 & LEVEL.**

Mix Type	Level	Binder Content Minimum ⁽¹⁾
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. Quality Control Plan and Processes: The Contractor shall submit a Quality Control Plan (QCP) for bituminous concrete production specifically for the plant producing the bituminous concrete mixture for review and approval of the Engineer on an annual basis.

The QCP 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. 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 upon request.

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. All daily QC sampling, inspection and test reports shall be reviewed by the Quality Control Manager and be submitted to the Engineer upon request.

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: 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 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 number of sub lots and tests required per sub lot is based on the total estimated tons of 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 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).

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 on the retained specimens in accordance with the Department's QA Program for Materials.

Should the Department be unable to verify the Contractor's acceptance test result(s) due to a failure of the Contractor to retain acceptance test specimens or supporting documentation, the Contractor shall review its quality control plan, determine the cause of the nonconformance and respond in writing within 24 hours to the Engineer describing the corrective action taken 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, and during 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.

Table M.04.03 – 1: 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

i. Marshall Mix Acceptance Sampling and Testing Procedures: When the Marshall mix design is specified, the following acceptance procedures and AASHTO test methods shall be used:

Table M.04.03 – 2: Marshall Acceptance Test Procedures

Protocol	Reference	Description
1	AASHTO T 30(M)	Mechanical Analysis of Extracted Aggregate
2	AASHTO T 40(M)	Sampling Bituminous Materials
3	AASHTO T 308(M)	Binder content by Ignition Oven method (adjusted for aggregate correction factor)
4	AASHTO T 245(M)	Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
5	AASHTO T 209(M)	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
6	AASHTO T 269(M)	Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
7	AASHTO T 329	Moisture Content of Hot-Mix Asphalt (HMA) by Oven Method

- a. Cessation of Supply: Marshall Mix Production shall cease for the Project from any facility that consistently fails to produce mixture that meets the JMF and volumetric properties. The criteria for ceasing the supply of a class of mixture from any plant are as follows:
- i. Off-Test Status: The results of AASHTO T 164 or AASHTO T 308(M) and T 30(M) will be used to determine if the mixture is within the tolerances shown in Table M.04.02-1. The Contractor will be notified that a plant is "off test" for a class of mixture 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 class of mixture.
 - 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" adjusted payment.
 - iii. If a test indicates that the bitumen content or gradation are outside the tolerances, the Contractor may make a single JMF change on classes 1, 2, 3, 4 and 12 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.

- iv. The Engineer may cease supply of mixture from the plant when the test results from three non-consecutive samples of a class of mixture are not within the JMF tolerances or the test results from two non-consecutive samples not within the master range indicated in Table M.04.02-1 during any one production period, due to inconsistent production.
 - v. 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.
- b. Adjustments for Off Test Mixture under Cessation of Supply: The bituminous concrete plant shall cease supplying to the project:
- i. When the test results from three consecutive samples are “off test” and not within the JMF tolerances or,
 - ii. The test results from two consecutive samples are “off test” and not within the ranges indicated in Table M.04.02 – 1 or,
 - iii. When the percent of material passing the minus #200 sieve material exceeds the percent of extracted bitumen content for three consecutive samples during any production period of the values stated in Table M.04.02-1:
 - a. The quantity of mixtures shipped to the project determined to be “off test” and outside the tolerances will be tabulated by the Engineer and will be adjusted in accordance with Section 4.06.
 - b. Following cessation, a trial production period will be required at the plant for that class of mixture. Use of that class of mixture from that plant will be prohibited on the Project until the plant has demonstrated the ability to consistently produce acceptable mixture.
 - c. When the Engineer has accepted the mixtures from the trial production period, the use of that mixture on the Project may resume.

ii. Superpave Mix Acceptance Sampling and Testing Procedures: 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(M)	Sampling of bituminous concrete
2	AASHTO T 308(M)	Binder content by Ignition Oven method (adjusted for aggregate correction factor)
3	AASHTO T 30(M)	Gradation of extracted aggregate for bituminous concrete mixture
4	AASHTO T 312(M)	⁽¹⁾ Superpave Gyrotory molds compacted to N_{des}
5	AASHTO T 166(M)	⁽²⁾ Bulk specific gravity of bituminous concrete
6	AASHTO R 35(M)	⁽²⁾ Air voids, VMA
7	AASHTO T 209(M)	Maximum specific gravity of bituminous concrete (average of two tests)
8	AASHTO T 329	Moisture content of Production bituminous concrete

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, and MSDS sheet for the anti-strip additive (if applicable) to the Engineer. In addition, compaction of samples shall be accomplished utilizing an accepted Superpave Gyrotory 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. Off Test Status: 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.04.03-3 and the computed binder content (Pb) established by AASHTO T308(M)

or as documented on the vehicle delivery ticket is below the minimum binder content stated in sub article M.04.03-5. 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 VMA or Gmm, regardless of date of production due to inconsistency (i.e., small production requires 1 test per day for multiple days).
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 the binder content (P_b) is below the requirements of Table M.04.03-5 on the ignition oven test result after two (2) 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.

JMF changes to the G_{mm} or mix Absorption Correction Factor (A_{cf}) 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 form provided by the Engineer.
- iv. A revised JMF submittal shall include the date and name of the Engineer that allowed it.

TABLE M.04.03-3: SUPERPAVE MASTER RANGE FOR BITUMINOUS CONCRETE MIXTURE PRODUCTION

Sieve	S0.25		S0.375		S0.5		S1		Tolerances JMF Limits (4) ±Tol
	min[%]	max[%]	min[%]	max[%]	min[%]	max[%]	min[%]	max[%]	
2.0	-	-	-	-	-	-	-	-	
1.5	-	-	-	-	-	-	100	-	
1.0	-	-	-	-	-	-	90	100	
3/4	-	-	-	-	-	-	-	90	
1/2	100	-	100	-	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(2)	-	-	-	-	-	-	-	-	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 (5)	280 – 350F		280 – 350F		280 – 350F		280 – 350F		
Mix Temp (6)	265 – 325 F (1)		265 – 325 F (1)		265 – 325 F (1)		265 – 325 F (1)		
Prod. TSR	N/A		N/A		>80%		N/A		
T-283 Stripping	N/A		N/A		Minimal as determined by the Engineer		N/A		

Notes: (1) 300°F minimum after October 15. (2) Minimum Pb as specified in Table M.04.03-5 (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.

TABLE M.04.03– 4: SUPERPAVE MASTER RANGE FOR TRAFFIC LEVELS AND DESIGN VOLUMETRIC PROPERTIES.

Traffic Level	Design ESALs	Number of Gyration by Superpave Gyrotory 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– 5: SUPERPAVE MINIMUM BINDER CONTENT BY MIX TYPE & LEVEL.

Mix Type	Level	Binder Content Minimum ⁽¹⁾
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.

**Table M.04.03-6:
Modifications to Standard AASHTO and ASTM Test Specifications and Procedures.**

AASHTO Standard Specification	
Reference	Modification
M 320	<p>1. Mass change for PG 64-22 shall be a maximum loss of 0.5% when tested in accordance with AASHTO T 240.</p> <p>2. The two bottles used for the mass change determination may be re-heated and used for further testing.</p>
AASHTO Standard Methods of Test	
Reference	Modification
T 27	Section 7.7 Samples are not washed
T 30	Section 6.2 thru 6.5 Samples are not routinely washed
T 168	<p>Samples are taken at one point in the pile. All types of bituminous concrete except Class 4 are scooped from the sample container instead of remixing and quartering. (Method verified by laboratory study).</p> <p>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>
T 195	Section 4.3 only one truck load of mixture is sampled. Samples are taken from opposite sides of the load.
T 209	<p>Article 9.5.1 Bowl is suspended 2 minutes prior to reading rather than 10 minutes. This makes no significant difference in results.</p> <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>
T 245	<p>Article 3.3.2 A compacting temperature of 140 to 146°C (284 to 295°F) is used</p> <p>Article 3.5.2 Seventy-five (75) blows per side are used on Classes 1 and 12, per ConnDOT design requirements</p> <p>Section 3.1 for production testing: one specimen is molded for each extraction test for production over 275 metric tons/day (300 tons/day). Other mixtures: two specimens per extraction test.</p>
T 283	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.
T 308	<p>In addition to the standard testing procedure, the Department has adopted a procedure that addresses a correction factor that is calculated using the composite aggregate percentages (Composite Aggregate Correction Factor Method (CACF)).</p> <p>The aggregate is burned in compliance with the standard AASHTO procedure Method A exclusively. All modifications are listed for this method only.</p> <p>A2.2 and A2.3 Omit</p> <p>A2.4 Omit. Replace with: Determine an aggregate gradation for each aggregate component “blank” in accordance with T30.</p> <p>A2.5 Omit. Replace with: The individual aggregate samples are to be dried in an oven at a maximum temperature of $148 \pm 5^{\circ}\text{C}$ ($300 \pm 9^{\circ}\text{F}$) to a constant weight. RAP samples are to be oven dried at a maximum temperature of $110 \pm 5^{\circ}\text{C}$ ($230 \pm 9^{\circ}\text{F}$) to a constant weight. RAP samples will be burned for total binder content only and not to arrive at a correction factor for a mixture.</p> <p>A2.6 and A2.7 and A2.8 Omit.</p> <p>A2.8.1 Omit Note 2</p> <p>A2.9 Omit. Replace with: Perform a gradation analysis on the residual aggregate in accordance with T30 and compare it to the gradation performed prior to burning.</p> <p>A2.9.1 and A2.9.2 Omit</p> <p>The correction factors for each size aggregate are provided by the Contractor to the Engineer prior to the Annual Plant Inspection. The Engineer may verify the correction factors. The Composite Aggregate Correction Factor (CACF) for any mixture may be calculated by summing the result of the correction factor for each individual aggregate multiplied by the percentage of that aggregate in the overall mixture.</p> <p>(Note: All correction factors must be re-calculated every time the percentage of any aggregate changes within the mixture.)</p> <p>If the average corrected Pb content from the ignition oven differs by 0.3% or more from the average bituminous concrete facility production weigh 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 correction factor calculation for all the aggregate components in the mix.</p> <p>In addition to the standard testing procedure, the Department has adopted a procedure that addresses the time involved between sampling the hot-mix asphalt specimen and the beginning of the test.</p> <p>6.3 Omit. Replace with: The test specimen must be ready to be placed in an approved ignition furnace for testing within ten minutes of being obtained from the hauling vehicle and the test shall start immediately after.</p>

T 331	6.1 Cores are dried to a constant mass prior to testing using a core-dry machine.
AASHTO Standard Recommended Practices	
Reference	Modification
R 35	<p><u>Volumetric Calculations of VMA and Correction Factor</u> VMA_a - Voids in Mineral Aggregate from (V_a + V_be) the mix:</p> <p>A. VMA calculated from the mix shall be determined in accordance with <i>Formula 5.16.1A</i>. It can be correlated that the VMA calculated from AASHTO R-35 is equivalent to VMA_a when the Pb_a x (100-Pb_t) / 100 is known and substituted for A_{cf}, as shown in <i>Formula 5.16.1A (ii)</i>. Test results from VMA_a shall therefore be required to meet all contract specifications. Values of VMA_a that are out of specifications during production may be cause for the contractor to determine assignable reason, take corrective action, and modify the Job Mix Formula (JMF), as needed. Continued VMA_a data that is out of specifications may be cause for the Engineer to order cessation of supply.</p> <p><i>Formula 5.16.1A</i>. Determining the VMA of bituminous concrete by the mix or air voids & effective binder method:</p> $VMA_a = V_a + \left[\frac{(Gmb_d \times (Pb_t - A_{cf}))}{G_b} \right]$ <p>Where: VMA_a = VMA calculated from plant production mix(V_a + V_be) Gmb_d = Bulk specific gravity as determined by AASHTO T 166(M) Pb_t = Total Binder Content (corrected) by AASHTO T 308(M) A_{cf} = Absorption correction factor provided by Contractor (refer to B. i and ii)</p> <p>B. Determining the bituminous concrete mix binder correction factor for each class by use of percent absorption of water by AASHTO T 84/85, AASHTO M 323 and D_f method. This value shall be performed by the Contractor during the mix design only and submitted as a JMF value. Two methods for determining the A_{cf} are shown, although method (i) will be the desired method to be used. Both methods are equivalent when the G_{sa}, G_{sb} and P_{wa} are recent and valid for the mix.</p> <p>i. $A_{cf} = D_f \times P_{wa} \times (100 - Pb_t) / 100$ ii. $A_{cf} = (Pb_a \text{ from annual JMF submittal}) \times (100 - Pb_t) / 100$</p> <p>Where: D_f = as determined by Formula 5.16.1B. P_{wa} = as determined by AASHTO T 84/85 Pb_a = as determined by AASHTO M 323 (from annual JMF submittal) D_f (Density Factor): The Contractor shall calculate the bituminous concrete</p>

	<p>mix design D_f (derived from formula XI.2 APPENDIX XI of AASHTO R 35) for each class of material, in accordance with Formula 5.16.1B.</p> <p>Formula 5.16.1B. Determining the Density Factor (D_f) of mix design bituminous concrete:</p> $D_f = \left(\frac{G_{se} - G_{sb}}{G_{sa} - G_{sb}} \right)$ <p>Where: D_f = Density Factor or multiplier determined by AASHTO R-35(M) G_{se} = Effective Specific Gravity determined by AASHTO M-323 at plant G_{sa} = Apparent Specific Gravity determined by AASHTO T 84/85 of mix design G_{sb} = Bulk Specific Gravity determined by AASHTO T 84/85 of mix design</p>
<p>R 26</p>	<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"> 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. 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). 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. 4. All laboratories testing binders for the Department are required to be accredited by the AASHTO Materials Reference Laboratory (AMRL). 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. 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. <p>Suppliers shall provide AASHTO M-320 Table 2 testing at a minimum of once per month on one sample of material. Each supplier shall rotate the PG grade each month (including polymer-modified asphalt (PMA)), so that data can be collected for all the grades produced.</p>

ITEM NO. 0210306A TURBIDITY CONTROL CURTAINS

Description: Work under this item shall consist of the furnishing, deployment, maintenance and removal of a silt dam/debris containment floating barrier for protection of the environment.

Materials: Turbidity control curtain shall consist of: fabric made of polyester reinforced vinyl high visibility yellow 18 oz/sq. yd. weight; connectors shackled and bolted load lines with slotted reinforced PVC pipe for fabric closure, and flotation of 8" expanded polystyrene over 19 lbs / ft buoyancy, with ballast line made of 5/16" galvanized chain (1.1 lbs / ft) and top load line made of 5/16" galvanized wire rope enclosed in heavy tubing, as manufactured by Containment Systems, Parker Systems Inc., Brockton Equipment Co., Sunshine Technology Corp. or approved equivalent.

Construction Methods: The depth, length and location configuration, and method of deployment of the turbidity control curtain shall conform to the manufacturer's specifications. The Contractor shall submit a plan showing this information to the Engineer for approval. Construction shall not begin until such approval is obtained in writing.

The silt dam/ turbidity control curtain shall be ready for installation prior to the start of construction and shall be in place at all times when the Contractor is required to work in the water, or perform work causing any type of disturbance in the water which results in silting of the waterway. The turbidity control curtain may be kept in place continuously at the Contractor's option. The turbidity control curtain shall be changed and disposed of in accordance with the manufacturer's recommendations or at the direction of the Engineer.

The Contractor shall note that high water flows may result in damage or loss of the turbidity control curtains, in which case the curtains shall be repaired, reset or replaced, as directed by the Engineer.

Method of Measurement: This work will be measured for payment by the actual number of linear feet of "Turbidity Control Curtains" installed and accepted. Measurement shall be along the centerline of the curtains.

Basis of Payment: Payment for this work will be made at the contract unit price per linear foot for “Turbidity Control Curtains” complete in place, which price shall include all materials, equipment, tools and labor incidental to the installation, maintenance, replacement, removal and disposal of the system and surplus material. No payment shall be made for the clean out of accumulated sediment.

<u>Pay Item</u>	<u>Pay Unit</u>
Turbidity Control Curtains	l.f.

ITEM #503001A - REMOVAL OF SUPERSTRUCTURE

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

5.03.01 - Description: Delete the first two paragraphs and replace with the following:

Work under this item shall consist of the removal and satisfactory disposal of the existing superstructure. Those items to be removed and disposed of shall include, but not be limited to, concrete deck, curbs, parapets, bituminous wearing surface, metal bridge rail and other appurtenances attached to the bridge deck as shown on the plans or as directed by the Engineer.

Work under this item shall also consist of removing, containing, and collecting existing paint from all areas where the Contractor will use flame cutting, arc gouging, or welding for the demolition of painted steel items from the superstructure, because of the possible presence of lead in the existing paint. The lead removal is required to comply with OSHA Regulation Nos. 1926.353, 1926.354, and 1926.62. Additional information on lead removal and definitions of the terms used within this special provision may be obtained from the latest edition of the "SSPC 6I Guide for Containing Debris Generated During Paint Removal Operations."

Work under this item also consists of storage of the paint debris collected under this item.

5.03.03 - Construction Methods: Add the following:

1 - Amount of Paint Removal: Prior to applying the heat of welding equipment to localized areas of steel superstructures, the existing paint shall be removed to a minimum of 6" from wherever the heat will be applied, and as directed by the Engineer.

2 - Methods of Paint Removal: Where required, the existing paint shall be removed by chemical stripping, needle guns with vacuum attachments, or by any of the closed abrasive blast cleaning techniques described in SSPC Guide 6I. Open abrasive blast cleaning will not be permitted. All of the debris resulting from the paint removal operations shall be contained, collected, and stored in leakproof storage containers placed on wooden pallets. A test patch shall be done on the existing steel to demonstrate the Contractor's proposed methods of paint removal to the satisfaction of the Engineer.

The Contractor is advised that chemical paint removers may require several days and multiple applications to completely remove the existing paint, especially in temperatures below 60° F.

The Contractor is also advised that chemical paint strippers may not be effective in removing some paints.

3 - Removal of Superstructure: All work shall proceed as directed by and to the satisfaction of the Engineer in accordance with the details shown on the plans and the requirements of the Special Provisions "Maintenance and Protection of Traffic" and "Prosecution and Progress", contained elsewhere in these Specifications.

Material that is not specified for salvage shall become the property of the Contractor and shall be

removed and disposed of by him.

Material designated for salvage shall be removed by methods that shall not cause damage to the salvaged material.

The removal shall not result in damage to any permanent construction (new or existing) or to adjoining property. If any damage does occur it shall be repaired by the Contractor to the satisfaction of the Engineer at no additional expense to the State.

The Contractor shall prepare and submit to the Engineer for review working drawings, computations, and written procedures for the removal of the existing deck and beams to the Engineer for review in accordance with Article 1.05.02. Acceptance of the Contractor's plans shall not be considered as relieving the Contractor of any responsibility.

5.03.04 - Method of Measurement: Delete the entire article and replace with the following:

This work, being paid for on a lump sum basis, will not be measured for payment.

5.03.05 - Basis of Payment: Delete the second and third paragraphs and replace with the following:

This work will be paid for at the contract lump sum price for "Removal of Superstructure", which price shall include the removal and disposal of the superstructure components, the containment, removal, collection, and storage of paint debris as herein described, and all equipment, tools and labor incidental thereto.

Disposal of lead based debris and chemical stripper residue shall be paid for under item "Disposal of Lead Debris".

ITEM NO. 0507019A TYPE "C-1" CATCH BASIN

This work shall conform to Section 5.07 "Catch Basins, Manholes, and Drop Inlets" as supplemented and amended as follows:

Article 5.07.02 - Materials:

Add the following:

Catch basin trap assembly shall conform to Article M.08.02.05.

Article 5.07.03 - Construction Methods:

Add the following:

This work shall conform to Town of Greenwich Specifications. Catch basin trap assemblies shall be hung from two 1/2" square stainless steel hanger hooks embedded in wall of catch basin.

Article 5.07.03 – Method of Measurement:

Add the following:

There will be no measurement or direct payment for catch basin trap assemblies and work involved for installing catch basin trap assemblies, but cost of this work to be considered as included in cost of catch basin.

ITEM #514716A - PRECAST CONCRETE FRAME

Description

This work shall consist of furnishing and placing three-sided precast concrete frame sections and appurtenances. The frame sections shall be the span, rise and skew angle as shown on the plans.

Types

Precast concrete frames shall be provided as manufactured by The Fort Miller Co., Inc., P.O. Box 98, Schuylerville, NY 12871 (518-695-5000) or approved equal. Frame sections shall be manufactured in accordance with the plans and specifications and the manufacturer's recommendations.

Basis of Acceptance

Acceptability of the three-sided frames produced in accordance with requirements from "Design" section, shall be determined by the results of the concrete compressive strength tests described in "Physical Requirements" section, by the material requirements described in "Material Section", and by inspection of the furnished precast concrete three-sided frames.

Materials

Cement - Portland cement - Type I, II or III shall conform to the requirements of ASTM Specification C150. A minimum cement content shall be 750 lb. per cubic yard of the approved concrete design mix.

Aggregates - Aggregates shall conform to ASTM Specification C33, except that the requirements for gradation shall not apply.

Admixtures and Blends - Admixtures and blends may be used per an approved manufacturers design mix.

Steel Reinforcements - All structural reinforcement shall consist of epoxy coated welded wire fabric conforming to ASTM Specifications A185 or A497 or epoxy coated deformed billet-steel bars conforming to ASTM Specification A615 Grade 60. Any additional reinforcement or embedded devices required for shipping and handling purposes shall be Thermo-plastic, epoxy coated and/or hot dipped galvanized and as shown on the shop drawings.

Design

The Contractor shall submit design calculations prepared in accordance with the latest AASHTO Standard Specifications for Highway Bridges and the Connecticut Department of Transportation Bridge Manual for HS-20-44 loading for approval of the Engineer. The design computations shall consider all loadings as are appropriate during fabrication, shipment, erection, construction, and upon completion of construction based upon the contract drawings.

The frame dimensions and reinforcement details shall be as shown on the plans. Said plans and calculations shall be prepared by a Professional Engineer licensed to practice in the State of Connecticut. Dimensioning and steel reinforcement as shown on the detailed shop drawings are subject to the provisions of this specification with review and final approval by the engineer of record. The minimum concrete compressive strength shall be 5,000 psi at 28 days. Prior to fabrication, six (6) sets of complete shop drawings showing a layout plan, reinforcing details and individual unit dimensions shall be submitted to the engineer for approval.

Placement of Reinforcement - The minimum cover of concrete over the reinforcement shall be 2 inches (+1/2" -3/8"). The clear distance of the end circumferential reinforcement shall be not less than 1" nor more than 2" from the ends of the frame. Reinforcement shall be assembled utilizing any combination of single or multiple layers of welded-wire fabric or deformed billet-steel bars. The welded-wire fabric or deformed billet-steel bars shall meet the spacing requirements shown on the plans and as approved by the engineer. The ends of the longitudinal distribution reinforcement shall be not more than 3" from the ends of the frame. The exposure of the ends of longitudinal reinforcement, stirrups, and spacers used to position the reinforcement shall not be a cause for rejection. Thermo-plastic chairs or an approved equal method shall be used to keep reinforcement in position. All reinforcement tie wires shall be epoxy coated.

Laps, Welds and Spacing - Splices in the circumferential reinforcement shall be made by lapping and not by welding. The overlap measured between the outermost longitudinal wires of each fabric sheet shall be not less than the spacing of the longitudinal wires plus 2". The spacing center to center of the circumferential wires in a fabric sheet shall be not less than 2" nor more than 8". The spacing center to center of the longitudinal distribution wires for either line of reinforcing in the top slab shall be not more than 8".

Joints

The precast reinforced concrete three-sided frame shall be produced with grout-filled keyways per the manufacturer's recommendations and as approved by the engineer. The ends shall be manufactured such that when the sections are laid together they will make a continuous line of frames with a smooth interior surface free of appreciable irregularities, and in compliance with the permissible variations in "Permissible Variations" section.

Manufacture

Concrete Mixture - The aggregates, cement, and water shall be proportioned and mixed to produce a homogeneous concrete meeting the strength requirements of this specification and as approved by the engineer.

Percent of entrained air shall be 5%-9% by volume. Plastic air tests shall be taken and recorded using either ASTM C173 or ASTM C231 (pressure method) for every manufactured frame section.

A slump test in accordance with ASTM C143 shall be taken and recorded for every manufactured frame section.

Curing - The frames shall be cured for a sufficient length of time so that the concrete will develop the specified compressive strength in 28 days or less. Any one of the following methods of curing or combinations thereof shall be used; however, only one method shall be allowed and the procedure shall be submitted to the engineer for approval.

Steam Curing - The frames may be low pressure, steam-cured by a system that will maintain a moist atmosphere.

Water Curing - The frames may be water-cured by any method that will keep the sections moist.

Membrane Curing - A sealing membrane conforming to the requirements of ASTM Specification C309 may be applied and shall be left intact until the required concrete compressive strength is attained.

The concrete temperature at the time of the application shall be within $\pm 10^{\circ}$ F of 70° F. All surfaces shall be kept moist prior to the application of any curing compounds and shall be damp when the compound is applied.

Forms- The forms used in manufacture shall be sufficiently rigid and accurate to maintain the frame dimensions within the permissible variations given in "Permissible Variations". All casting surfaces shall be of a smooth material.

Handling - Handling devices or holes shall be permitted in each frame for the purpose of handling and laying.

The manufacturer shall be an NPCA (National Precast Concrete Association) Certified facility with ACI grade level I certified technicians.

Physical Requirements

Type of Test Specimen - Concrete compressive strength shall be determined from compression tests made on cylinders. If required and agreed to by the purchaser and manufacturer, cores may be used. For each continuous production run, each group of 15 frames of a single size or fraction thereof shall be considered separately for the purpose of core testing and acceptance. As a minimum, a production run shall be considered continuous if not interrupted for more than 3 consecutive days.

Compression Testing of Cylinders:

Cylinders may be obtained and tested for compressive strength in accordance with the provisions of ASTM C39. Four (4) - 6"x12" specimens shall be made in accordance with ASTM C31 for every one day of production.

One core may be cut from a section selected at random from each group of 15 frames or fraction thereof of a single size from each continuous production run if required by the engineer.

Acceptability of Cylinder/Core Tests:

The compressive strength of the concrete in each group of frames defined in "Type of Test Specimen" is acceptable when the cylinder test strengths are equal to or greater than the design concrete strength.

When the compressive strength of a cured cylinder tested is less than the design concrete strength, the frame from which that cylinder is made must be recorded. When the compressive strength of a core taken from the same frame section is equal to or greater than the design concrete strength, the compressive strength of the concrete in that group of frames is acceptable.

When the compressive strength of any recore is less than the design concrete strength, the frames from which that core was taken shall be rejected. Two frames from the remainder of the group shall be selected at random and one core shall be taken from each. If the compressive strength of both cores is equal to or greater than the design concrete strength, the compressive strength of the remainder of that group of frames is acceptable. If the compressive strength of either of the two cores tested is less than the design concrete strength, the remainder of the group of frames shall be rejected or, at the option of the manufacturer, each frame of the remainder of the group shall be cored and accepted individually, and any of these frames that have cores with less than the design concrete strength shall be rejected.

Plugging Core Holes - The core holes shall be plugged and sealed by the manufacturer in a manner such that the frame will meet all of the test requirements of this specification.

Frames so sealed shall be considered satisfactory for use and shall not be cause for rejection.

Testing Equipment - Every manufacturer furnishing frames under this specification shall furnish all facilities and personnel necessary to carry out the tests required. The manufacturer shall use ACI-Grade Level I certified technicians.

Permissible Variations

Internal Dimensions - The internal dimensions shall not vary more than ± 1 " in span and $\pm 1/2$ " in rise from the design dimensions. The haunch dimensions shall not vary by more than $\pm 1/2$ " from the design dimensions.

Slab and Wall Thickness - The slab, wall and haunch thickness shall not be less than that shown in the design by more than $1/2$ ". A thickness more than that required in the design shall not be cause for rejection.

Length of Opposite Surfaces - Variations in laying lengths of two opposite surfaces of the frame shall not be more than $\pm 3/4$ " in any frame, except where beveled ends for laying of curves are specified by the purchaser.

Length of Section - The length of any section shall not be more or less than $1/2$ " in any frame section.

Position of Reinforcement - The maximum variation in the position of the reinforcement shall be $\pm 1/2$ " unless otherwise stated and in accordance with ACI 318 Section 7.5. In no case, however, shall the cover over the reinforcement be less than $1\ 5/8$ ", as measured to the internal surface or the external surface of the frame. The above tolerances or cover requirements do not apply to mating surfaces of the joint.

Area of Reinforcement - The areas of steel reinforcement shall be the design steel areas as shown on the plans and as approved by the engineer of record. Steel areas greater than those required shall not be cause for rejection. The permissible variation in diameter for any reinforcement shall conform to the tolerances prescribed in the ASTM Specification for that type of reinforcement.

Workmanship and Finish

The frames shall be substantially free of fractures. The ends of the frames shall be normal to the walls and center line of the frame, within the limits of variations given in "Permissible Variations", except where beveled ends are specified. All exterior exposed corners shall have a $1"x1"$ chamfer.

Repairs

Frames may be repaired, if necessary, because of occasional imperfections in manufacture or

handling damage and will be acceptable if, in the opinion of the engineer, the repairs are sound, properly finished and cured, and the repaired frame conforms to the requirements of this specification.

Inspection

The quality of materials, the process of manufacture, and the finished frames shall be subject to inspection by the purchaser.

Rejection

Frames shall be subject to rejection due to the failure to conform to any of the specification requirements. Individual frames may be rejected because of any of the following:

Fractures or cracks passing through the wall, except for a single end crack that does not exceed the depth of the joint.

Defects that indicate imperfect proportioning, mixing and molding.

Excessive honeycombed or open texture.

Damaged ends at time of delivery, where such damage would prevent making a satisfactory joint.

Marking

The following information shall be clearly marked on the interior of each frame by indentation, waterproof paint, or other approved means:

Frame span and rise,

Date of manufacture, lot number,

Name and trademark of the manufacturer

Damp-proofing

Bituminous damp-proofing shall be applied to all exterior frame surfaces to be in contact with soil, as shown on the plans or as directed by the Engineer. This work shall conform to Section 7.08 of the Connecticut Department of Transportation Form 816 (2004) but shall be paid for under pay item "Precast Concrete Frame".

Installation

The precast concrete frame system shall be installed in a workmanlike manner in accordance with the lines and grades indicated on the plans and the requirements described in the plans and specification. The contractor shall supply competent workmen and equipment sufficient to install the frame units in a safe, accurate, workmanlike manner.

A representative of the manufacturer shall be on site at the commencement of the installation to assist the contractor. The representative shall offer advisory assistance only and shall not supplant the contractor's representative, owner's representative or engineer of record.

Method of Measurement

This item, being paid for on a lump sum basis, will not be measured for payment.

Basis of Payment

Payment for this item will be made at the contract lump sum price for "Precast Concrete Frame," complete and accepted, which price shall include all tools, material, equipment, labor and work incidental to the installation of the Precast Concrete Frames.

Pay Item Pay	Unit
Precast Concrete Frame	l.s. (l.s.)

ITEM #0520036A - ASPHALTIC PLUG EXPANSION JOINT SYSTEM

Description: Work under this item shall consist of furnishing and installing an asphaltic plug expansion joint system (APJ) in conformance with ASTM D6297, as shown on the plans, directed by the Engineer and as specified herein.

Work under this item shall also consist of removal and disposal of bituminous concrete, membrane waterproofing, and existing joint components and sealing elements, excluding the removal of Portland cement concrete headers.

Work under this item shall also consist of cleaning and sealing median barrier joints, parapet joints, and sidewalk joints in accordance with the plans and this specification.

Materials: The following APJ's are qualified for use under this item:

Product	Supplier
Expandex	BASF/Watson Bowman Acme Inc. 95 Pineview Drive Amherst, NY 14228
Matrix 502 ¹	Crafco, Inc. 420 N.Roosevelt Ave. Chandler, AZ 85226
Thorma-Joint	Dynamic Surface Application, Ltd. 373 Village Road Pennsdale, PA 17756

1. Matrix 502 is sold exclusively by D. S. Brown Company, 300 East Cherry Street, North Baltimore, Ohio 45872

The APJ component materials including asphaltic binder, aggregate, bridging plates, and the backer rods shall comply with ASTM D6297.

The material composition of the binder and aggregate and their relative mix proportions shall be as specified in Table 1 of ASTM D6297. The aggregate shall meet the requirements of Article M.04.01-1 for wear and soundness and shall meet a gradation as specified by the Supplier.

All backer rods shall satisfy the requirements of ASTM D5249, Type 1.

The bridging plates shall be steel conforming to the requirements of ASTM A36 and be a minimum ¼" thick and 8" wide. For joint openings in excess of 3" the minimum plate dimensions shall be ⅜" thick by 12" wide. Individual sections of plate shall not exceed 4' in

length. Steel locating pins for securing the plates shall be size 16d minimum, hot-dip galvanized, and spaced no more than 12” apart.

Other materials which shall be used in conjunction with the qualified APJ’s are as follows:

Parapet Sealant:

The sealant used in parapet joint openings shall be a single component non-sag silicone sealant that conforms to the requirements of ASTM D5893.

Sidewalk Sealant:

The sealant used in sidewalk joint openings shall be a rapid cure, self-leveling, cold applied, two-component silicone sealant. The silicone sealant shall conform to the following requirements:

Properties - As Supplied	Test Method	Requirement
Extrusion Rate	ASTM C1183	200-600 grams/min
Leveling	ASTM C639	Self-Leveling
Specific Gravity	ASTM D792	1.20 to 1.40

Properties - Mixed	Test Method	Requirement
Tack Free Time	ASTM C679	60 min. max.
Joint Elongation – Adhesion to concrete	ASTM D5329 ^{1,2,3}	600% min
Joint Modulus @ 100% elongation	ASTM D5329 ^{1,2,3}	15 psi max
Cure Evaluation	ASTM D5893	Pass @ 5 hours

1. Specimens cured at 77±3⁰F. and 50±5% relative humidity for 7 days
2. Specimens size: ½”wide by ½”thick by 2” long
3. Tensile Adhesion test only

The date of manufacture shall be provided with each lot. No sealant shall be used beyond its maximum shelf-life date.

The following two-part silicone sealants are known to have met the specified requirements:

Product	Supplier
Dow Corning 902RCS	Dow Corning Corporation 2200 W Salzburg Road Auburn, Michigan 48611
Wabo SiliconeSeal	BASF/Watson Bowman Acme Corporation 95 Pineview Drive Amherst, New York 14228

Other two-component silicone joint sealants expressly manufactured for use with concrete that conform to the aforementioned ASTM requirements will be considered for use provided they are submitted in advance for approval to the Engineer. Other joint sealants will be considered for use only if a complete product description is submitted, as well as documentation describing at least five installations of the product. These documented installations must demonstrate that the product has performed successfully for at least three years on similar bridge expansion joint applications.

A Materials Certificate and Certified Test Report for the asphaltic binder shall be submitted by the Contractor in accordance with the requirements of Article 1.06.07 certifying that the asphaltic binder satisfies the requirements of the most current version of ASTM D6297.

A Materials Certificate for all other components of the APJ, backer rod and sealant used in sealing parapet and sidewalk joint openings, shall be submitted by the Contractor in accordance with the requirements of Article 1.06.07

Construction Methods: The APJ shall be installed at the locations shown on the plans and in stages in accordance with the traffic requirements in the special provisions “Maintenance and Protection of Traffic” and “Prosecution and Progress”.

At least 30 days prior to start of installation of the APJ, the Contractor shall submit to the Engineer for approval a detailed Work Quality Control Plan for the installation of the APJ. The submittal shall include all aspects of the installation of the expansion joint system including name of the qualified product selected by the Contractor, a detailed step by step installation procedure and a list of the specific equipment to be used for the installation. The detailed Work Quality Control Plan must fully comply with the supplier’s written recommendations and address all anticipated field conditions.

An experienced technical representative employed by the APJ supplier, acceptable to the Engineer, shall be present during the first installation of the APJ to provide the Contractor aid and independent instruction as required to obtain an installation in accordance with ASTM D6297 and satisfactory to the Engineer. Should the Engineer determine that additional technical

aid is required after the first installation of the APJ, the technical representative shall be present at additional installations as ordered by the Engineer at no additional cost to the State.

The APJ shall not be installed when bituminous concrete overlay is wet. The APJ shall only be installed when the bridge superstructure surface temperature is within the allowable limits specified in the table below and when the ambient air temperature is within the range of 40⁰F and rising to 95⁰F with no rain in the work-shift forecast. The allowable bridge superstructure surface temperature range is determined using the thermal movement range provided on the contract plans for the proposed APJ deck installation location and the selected APJ product.

ALLOWABLE BRIDGE SUPERSTRUCTURE SURFACE TEMPERATURE RANGE DURING ASPHALTIC PLUG EXPANSION JOINT INSTALLATION¹			
Deck Joint Thermal Movement Range Indicated on the Plans²	Expansion Joint Product		
	Expandex	Matrix 502	Thorma Joint
0" to ¾"	40° F to 95° F	40° F to 95° F	40° F to 95° F
7/8"	40° F to 93° F	40° F to 93° F	40° F to 95° F
1"	40° F to 80° F	40° F to 80° F	40° F to 95° F
1-1/8"	40° F to 70° F	40° F to 70° F	40° F to 95° F
1-1/4"	40° F to 62° F	40° F to 62° F	40° F to 86° F
1-3/8"	45° F to 55° F	45° F to 55° F	40° F to 77° F
1-1/2"	50° F limit	50° F limit	40° F to 70° F

1. The superstructure surface temperature shall be determined from the average of three or more surface temperature readings taken at different locations on the interior girder surfaces by the Contractor as directed by the Engineer. Temperature measurements of the superstructure shall be taken by the contractor with a calibrated hand held digital infrared laser-sighted

thermometer on the surfaces of an interior steel girder, or interior concrete girder protected from direct sunlight. The infrared thermometer to be supplied by the Contractor for this purpose shall meet certification requirements of EN61326-1, EN61010-1, and EN60825-1 maintained by the European Committee for Electrotechnical Standardization (CENELEC). The thermometer shall have a minimum distance-to-spot ratio of 50:1 and shall have adjustable emissivity control. The thermometer shall have a minimum accuracy value of $\pm 1\%$ of reading or $\pm 2^\circ\text{F}$, whichever is greater. The thermometer shall be used in strict accordance with the manufacturer's written directions. An additional infrared thermometer satisfying the same standards to be used in this application shall also be provided to the Engineer for quality assurance purposes.

2. Linear interpolation may be used to determine an allowable surface temperature range for thermal movement ranges in between values shown in the table, as approved by the Engineer.

Prior to installing the APJ, the Contractor shall determine the exact location of the deck joint beneath the bituminous concrete overly.

The APJ shall be installed symmetrically about the deck joint opening to the dimensions shown on the plans and as directed by the Engineer. The proposed saw cut lines shall be marked on the bituminous concrete overlay by the Contractor and approved by the Engineer, prior to sawcutting. The maximum width of the APJ, measured perpendicular to the deck joint, shall not exceed 24" unless approved by both the Engineer and supplier. The sawcuts delineating the edges of the APJ shall extend full depth of the bituminous concrete overlay.

The existing bituminous concrete overlay, waterproofing membrane and/or existing expansion joint material, within the saw cut limits shall be removed and disposed of by the Contractor to create the joint cutout.

Concrete surfaces, that will support the bridging plates, shall be smooth and form a plane along and across the deck joint. Rough and damaged concrete surfaces shall be repaired with suitable cementitious leveling compound as recommended by the APJ supplier. The existing and repaired concrete surfaces shall provide continuous uniform support for the bridging plate and prevent the plate from rocking and deflecting.

Prior to the installation of the backer rod, all horizontal and vertical surfaces of the joint cutout shall be cleaned using a hot compressed air lance to remove any moisture and debris. The hot air lance shall be capable of producing an air stream at $3,000^\circ\text{F}$ with a velocity of 3,000 feet per second. Primer, if required, shall be applied to the joint cutout surfaces as recommended by the joint supplier.

Backer rod, with a diameter at least 25% greater than the existing joint opening at the time of installation, shall be installed in the existing deck joint opening between the concrete edges.

Prior to application, the binder shall be heated, with equipment recommended by the supplier, to a temperature within the supplier's recommended application temperature range. During application, the temperature of the binder shall be maintained within this range. In no case shall

the temperature of the binder go below 350° F nor exceed the supplier's recommended maximum heating temperature.

After installing the backer rod in the deck joint opening, asphaltic binder shall then be poured into the joint opening until it completely fills the gap above the backer rod. A thin layer of binder shall next be applied to the all horizontal and vertical surfaces of the joint cutout.

Bridging plates shall be placed over the deck joint opening in the joint cutout. The plates shall be centered over the joint opening and secured with locating pins along its centerline. The plates shall be placed end to end, without overlap, such that the gap between plates does not exceed ¼". The plates shall extend to the gutter line, where concrete support exists on both sides of the joint. Within APJ installation limits, where concrete support does not exist at both sides of the joint opening (such as where a bridge deck end abuts a bituminous concrete roadway shoulder), bridging plates shall not be installed. Installed bridging plates shall not rock or deflect in any way. After installation of bridging plates, asphaltic binder shall be applied to all exposed surfaces of the plates.

The remainder of the joint cutout shall then be filled with a matrix of hot asphaltic binder and aggregate prepared in accordance with the joint supplier's instructions and the following requirements: The aggregate shall be heated in a rotating drum mixer to the supplier's recommended minimum temperature, but not less than 350° F. Asphaltic binder material, heated separately to a temperature within the range specified in the supplier's written instructions, shall be added to the mixer in a proportional amount recommended by the manufacturer to coat the aggregate. The temperature of the aggregate and binder shall be monitored with a calibrated digital thermometer. All aggregate shall be fully coated with hot asphaltic binder in the mixer before placement in the joint cutout. The combined matrix of hot binder and aggregate shall be installed in the joint cutout in lifts. The combined matrix lift thickness shall not exceed the supplier's written instructions but shall not exceed 2 inches in any case. Each intermediate lift shall be leveled and flooded with hot binder to the level of the matrix aggregate to fill voids in the surface. Following installation of the matrix in the joint cutout, the joint shall be compacted and top-dressed in accordance with the supplier's written instructions.

The Contractor shall be responsible for removing all binder material that leaks through the joint and is deposited on any bridge component, including underside of decks, headers, beams, diaphragms, bearings, abutments and piers.

Traffic shall not be permitted over the joint until it has cooled to 130° F when measured with a digital infrared thermometer. Use of water to cool the completed joint is permitted.

Before placement of any sealing materials in parapets, curbs, or sidewalks, the joints shall be thoroughly cleaned of all scale, loose concrete, dirt, dust, or other foreign matter by abrasive blast cleaning. Residual dust and moisture shall then be removed by blasting with oil free compressed air using a hot air lance providing an air temperature and directional air velocity capacity recommended by the joint manufacturer. Projections of concrete into the joint space shall also be removed. The backer rod shall be installed in the joint as shown on the plans. The

joint shall be clean and dry before the joint sealant is applied. Under no circumstances is the binder material to be used as a substitute for the joint sealant.

Whenever blast cleaning is performed under this specification the Contractor shall take adequate measures to ensure that the blast cleaning will not cause damage to adjacent traffic or other facilities.

The joint sealant shall be prepared and placed in accordance with the manufacturer's instructions and with the equipment prescribed by the manufacturer. Extreme care shall be taken to ensure that the sealant is placed in accordance with the manufacturer's recommended thickness requirements.

The joint sealant shall be tooled, if required, in accordance with the manufacturer's instructions.

Primer, if required, shall be supplied by the sealant manufacturer and applied in accordance with the manufacturer's instructions.

When the sealing operations are completed, the joints shall be effectively sealed against infiltration of water. Any sealant which does not effectively seal against water shall be removed and replaced at the Contractor's expense.

The Contractor must certify that the plug joints were installed in accordance with the supplier's recommendations.

Any installed APJ that exhibits evidence of failure such as debonding, cracking, rutting, or shoving of the matrix shall be removed and replaced full-width and full-depth to a length determined by the Engineer. The reinstallation of joint shall be in accordance with the approved Work quality Control Plan, as directed by the Engineer, following a determination of the cause of failure, all at no additional cost to the State.

Method of Measurement: This work will be measured for payment by the number of cubic feet of Asphaltic Plug Expansion Joint System installed and accepted within approved horizontal limits. No additional measurement will be made for furnishing and installing backer rod and joint sealant in the parapets, concrete medians, curbs and/or sidewalks.

Basis of Payment: This work will be paid for at the contract unit price per cubic foot for "Asphaltic Plug Expansion Joint System", complete in place, which price shall include the, sawcutting, removal and disposal of bituminous concrete, membrane waterproofing, and existing joint components and sealing elements, the furnishing and placement of the cementitious leveling compound, cleaning of the joint surfaces, furnishing and installing bridging plates, furnishing and installing the asphaltic plug joint matrix, the cost of furnishing and installing joint sealant in parapets and sidewalks, the cost of all services associated with the technical representative, and all other materials, equipment including but not limited to portable lighting, tools, and labor incidental thereto. No additional payment shall be made for the 12" wide bridging plates that are required for deck joint openings with widths in excess of 3".

ITEM # 0603253A - DISPOSAL OF LEAD DEBRIS

Description: Under this item the Contractor shall dispose of all debris that has been classified or identified as hazardous by the Department. This debris is the collected by-product of the removal of paint containing lead, removal of lead based products, and chemical solvents used to remove paint. The Department will sample and test the debris in accordance with the criteria required by the Department's Division of Environmental Compliance.

The Contractor shall conform to the latest requirements of the Hazardous Waste Management Regulations prepared by the D.E.P.'s Hazardous Waste Management Section, subject to regulations of Section 22a-449(c) of the Connecticut General Statutes.

Disposal of the debris after testing shall be in strict conformance with all Federal E.P.A. and D.E.P. regulations for hazardous materials.

Material: The debris must be offered for transportation and transported in compliance with the Code of Federal Regulations, Title 49, Chapter 1, Part 173, Subparts A, B, C, and D and Paragraph 178.118. Transport vehicles (hopper or dump type) must be free from leaks and discharge openings must be securely closed during transportation. All storage containers (roll offs or drums) shall have a protective liner and removable lid. These containers shall not have any indentations or damage that would allow seepage of the contained material.

Construction Methods: Prior to generation, a temporary E.P.A. ID number shall be obtained from the Department's Division of Environmental Compliance (telephone number 594-2067 or 594-3344) by the Department's Project Engineer (Construction).

The disposal of the debris classified as hazardous shall be completed within 90 calendar days of the date on which it began to be accumulated in the lined containers. Storage of containers shall be in accordance with current Department procedures.

A licensed hazardous waste transporter and a licensed hazardous waste treatment/disposal facility must be secured from lists available from the D.E.P. and approved by the Department's Division of Environmental Compliance.

The disposal containers shall be labeled with a 6-inch square, yellow, weatherproof, Hazardous waste sticker in accordance with U.S. DOT regulations, by the Contractor. Stickers are available through the Department's Project Engineer (Construction). Additional labels or stenciling shall indicate "Abrasive Blast and/or Construction Paint Residue."

All necessary forms, including the "Uniform Hazardous Waste Manifest" obtained from the Hazardous Waste Management Section of D.E.P., must be filled out, approved and signed by the Department's Project Engineer (Construction), and appropriate copies returned to the Department's Division of Environmental Compliance.

When all necessary procedures have been completed, then the hazardous waste shall be shipped to the hazardous waste disposal facility.

Any spillage of debris during disposal operations i.e. loading, transport and unloading shall be

cleaned up in accordance with the Code of Federal Regulations, Title 40, Chapter 1, Part 265, Subparts C and D, at the Contractor's expense.

The Contractor is liable for any fines, costs or remediation costs incurred as a result of their failure to be in compliance with this special provision and all Federal, State and Local laws.

Method of Measurement: This item will be measured for payment by the contract unit price per 55 gallon barrel of hazardous lead waste. Barrels that have been partially filled because of weight limitations will be measured as a partial unit dependent upon actual volume in barrel. Material may be disposed of in larger containers, with a conversion factor of 0.273 CY to 55 gallon barrel. Materials incidental to the construction, which become contaminated due to the lead debris removal, such as but not limited to, gloves, coveralls, tarps and filters shall be disposed of in accordance with this specification. These incidental materials shall be kept separate from the blast debris. These materials will not be measured for payment, but will be included in the general cost of the work.

Basis of Payment: This work will be paid for at the contract unit price per 55 gallon barrel, of hazardous lead waste for "Disposal of Lead Debris". The price shall include all materials, transportation, storage containers, disposal, equipment, tools, labor, and work incidental thereto.

Pay Item Pay	Unit
Disposal of Lead Debris	bb1

ITEM #0603444A - LEAD HEALTH PROTECTION PROGRAM (LHPP)

Description: The structure(s) on this project are coated with paint containing lead. Any work which disturbs the paint coating may expose workers to health hazards. The Contractor is fully responsible for the protection of his employees and ConnDOT project-related employees from exposure to lead under OSHA regulations. This item includes all related monitoring, protective equipment, decontamination facilities, hand-wash facilities, necessary shuttle vehicle(s), reports, and services of Certified Industrial Hygienist(s) (CIH).

At least 20 working days prior to performing any work on the structure, the Contractor shall submit to the Engineer a written site specific Lead Health Protection Program (LHPP) prepared by a CIH that covers all workers on the project (Contractor, Subcontractor and ConnDOT representatives). The CIH shall be listed by the American Board of Industrial Hygiene. The LHPP shall include procedures for medical surveillance of the contractors, subcontractors and the state project-related representatives, hazard communication procedures, employee training, protective equipment, and all other procedures that may be necessary to comply with 29 CFR Part 1926.62 pertaining to lead exposure in construction.

Typical work tasks that pose a lead exposure risk consist of, but are not limited to, welding, burning paint, flame cutting, abrasive blast cleaning, grinding, chipping, needle gun cleaning, lead burning, manual scraping and sanding, manual demolition of structures, heat gun cleaning, peening on existing structural steel, abrasive blasting debris cleanup, using lead containing mortar, abrasive blasting enclosure movement and removal, power tool cleaning, lead removal equipment cleaning, decontamination trailer cleaning, rehabilitation of existing structural steel, gouging, and rivet busting.

All projects where employee lead exposure without regard to the use of respirators, may exceed the action level, that is employee exposure to an airborne concentration of lead of 30 micrograms per cubic meter of air (30 µg/m³) averaged over an 8-hour period (i.e. removal of paint containing lead, bearing replacement, etc.) must have a decontamination facility and hand-wash facility on site and available for use by the designated staff.

The Contractor shall comply with the requirements of the OSHA Standard for Lead in Construction, 29 CFR 1926.62 and any other applicable federal and state laws. Additional Federal Regulations that must be followed with respect to lead and this specification include, but are not limited to:

- 29 CFR Part 1910.1000 (a, b, c
Tables Z-1-A, Z-2, and Z-3 as
currently in effect)Air Contaminants
- 29 CFR Part 1926.154.....Temporary Heating Devices

29 CFR Part 1910.20.....Access to Employee Exposure and Medical Records

29 CFR Part 1910.120.....Hazardous Waste Operations & Emergency Response

29 CFR Part 1910.134.....Respiratory Protection

29 CFR Part 1910.141.....Sanitation

29 CFR Part 1910.146.....Permit Required Confined Spaces

29 CFR Part 1910.94.....Abrasive Blasting

29 CFR Part 1926.16.....Rules of Construction

29 CFR Part 1926.20.....General Safety and Health Provisions

29 CFR Part 1926.21.....Safety Training

29 CFR Part 1926.28.....Personal Protective Equipment

29 CFR Part 1926.32.....Competent Person

29 CFR Part 1926.51.....Sanitation

29 CFR Part 1926.55.....Gases, Vapors, Fumes, Dusts and Mists

29 CFR Part 1926.57.....Ventilation

29 CFR Part 1926.59.....Hazard Communication

29 CFR Part 1926.103.....Respiratory Protection

29 CFR Part 1926.200.....Accident Prevention Signs and Tags

29 CFR Part 1926.353.....Ventilation and Protection in Welding, Cutting and Heating

29 CFR Part 1926.354.....Welding, Cutting and Heating in Way of Preservative Coatings

The Contractor shall also comply with the most recent Connecticut Lead Intervention Network in Construction (CLINIC) guidelines and protocols.

FAILURE OF THE CONTRACTOR OR HIS SUBCONTRACTORS TO COMPLY WITH THE PROVISIONS OF THIS SECTION WILL AFFECT WHETHER THE CONTRACTOR OR HIS SUBCONTRACTOR WILL BE CONSIDERED A RESPONSIBLE CONTRACTOR OR SUBCONTRACTOR ON FUTURE WORK INVOLVING STRUCTURE REHABILITATION AND REMOVAL OF LEAD PAINT COATINGS ON DEPARTMENT OF TRANSPORTATION PROJECTS.

CLINIC personnel or their representatives shall be allowed access to each work site covered by the provisions of the "LHPP" and shall be furnished upon request with such information and assistance by the Contractor as is required to make a complete and detailed inspection.

Materials:

Protective Equipment: Respiratory protective equipment shall conform to 30 CFR Part 11, 29 CFR Part 1910.134, and 29 CFR Part 1926.62. Protective Clothing shall be in conformance with 29 CFR Parts 1910.132 and 1910.133. The minimum protective clothing required shall be head covering, coveralls (reusable or disposable clothing), gloves, dedicated work-boots or disposable over-boots, eye protection, hearing protection and hardhat.

Hand-Wash Facility: The number of facilities to be provided will be dictated by the site(s) and the approved by the Engineer. Each facility shall be equipped with hot and cold clean water, hand soap or similar cleansing agents and individual hand towels or sections made of cloth or paper, warm air blowers or clean individual sections of continuous cloth toweling which the workers will use to wash and dry their hands, face and any exposed skin prior to eating, drinking, smoking or applying cosmetics. Each facility shall be located as close to the work site as is physically possible. Ownership of and liability for the facility shall remain with the Contractor throughout the duration of the project. The facility shall comply with 29 CFR Part 1926.51.

Each portable handwash facility shall be trailer, skid or cart-mounted and have a minimum of one (1) sink with a fresh water tank, and a holding tank. The facility shall also be equipped with hot water heater, eye wash station, storage cabinets, lights for night use, an electric or pneumatic water pump, and lead filtration system. Containers for the collection and disposal of refuse generated at the facility shall also be provided.

Each facility shall be kept in a sanitary condition and clean as defined in the most recent CLINIC and OSHA requirements. At a minimum, the facility shall be cleaned after every shift in which it is used.

Decontamination Facility: The number of facilities to be provided will be dictated by the site(s) and the approved by the Engineer. Each facility shall consist of a "clean" area where workers can remove and store clean street clothing when they arrive on site for work, shower room with hot and cold running water, soap and towels and a "dirty" area where work clothing and personal protective equipment may be stored. The showers shall be located between the two areas. The facility shall have adequate clean storage for all employees who are required to use the facility to store their non-work clothing. The facility shall be located as close to the work site as is physically possible. If the Contractor is unable to locate the decontamination facility close to specific work areas, a designated shuttle vehicle shall be provided. This vehicle shall be classified as contaminated and shall remain

at the job site in the decontamination zone. This vehicle shall be operated and maintained to eliminate any possibility of cross contamination with the support zone. The vehicle shall be cleaned as defined in the most recent CLINIC or OSHA protocols. Ownership of and liability for the facility and shuttle vehicle shall remain with the Contractor throughout. The facility shall comply with 29 CFR Part 1926.51.

The walls, ceiling and floors shall be constructed of impervious material to aid in the cleaning of the facility such as, but not limited to, fiberglass and plastic.

Each decontamination facility shall have adequate floor space to accommodate the work force and a minimum ceiling height of seven feet. 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 and screens. The entrance shall be secure, screened and fitted with a lock.

Each facility shall be provided with a lavatory with hot and cold running water or tepid running water and a lead filtration system. It shall also include hand soap or similar cleansing agents. Individual hand towels, paper or cloth, warm air blowers or clean individual sections of continuous cloth toweling shall be provided.

Showers shall be provided for each 10 employees of each sex or numerical fraction thereof, who are required to shower during the same shift. Body soap or other appropriate cleansing agents convenient to the shower shall be provided. Showers shall be provided with hot and cold water feeding a common discharge line. Employees using showers shall be provided with individual clean towels.

Where working clothes are provided by the employer and become wet or are washed between shifts, provision shall be made to ensure that such clothing is dry before reuse.

Each facility and shuttle vehicle shall be cleaned as required or at least once a week. The "clean" area shall be as defined in the most recent CLINIC or OSHA requirements. If wipe sampling shows that cleaning must be conducted more frequently to maintain this standard, then the frequency of cleaning must be increased. Any wastewater that is generated shall be filtered/treated to be acceptable to current state and/or local standards for discharge into the existing public wastewater system.

The Contractor shall equip each facility with an adequate and safe climate controlled system including all necessary fuel; adequate waterproof lighting fixtures and waterproof electrical outlets. All electrical circuits shall be ground fault protected. The Contractor shall also provide exterior illumination of each decontamination facility site. The minimum illumination level shall be two foot candles for a minimum distance of ten feet on each side of the facility. The Contractor shall provide proper trash receptacle(s) and disposal.

If the decontamination facility remains in service through periods of winter weather, the Contractor shall provide snow and ice removal services for the facility site, including but not limited to, driveways, walkways, parking areas and adjacent sidewalks.

Construction Methods: At least 20 working days prior to performing any work on the structure, the Contractor shall submit to the Engineer a written site specific Lead Health Protection Program (LHPP) prepared by a CIH that covers all workers on the project (Contractor, Subcontractor and ConnDOT representatives). The CIH shall be listed by the American Board of Industrial Hygiene. The LHPP shall include procedures for medical surveillance of the contractors, subcontractors and the state project-related representatives, hazard communication procedures, employee training, protective equipment, and all other procedures that may be necessary to comply with the noted requirements and regulations. The submittal shall also include the following information:

- Name, address, phone number of firm providing the CIH services. Note: Subcontractor approval is required in accordance with Article 1.08.01 – “Transfer of Work or Contract.”
- Qualifications/certifications of the firm and staff to be assigned to the project.

Definitions:

"Action level" means employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air ($30 \mu\text{g}/\text{m}^3$) averaged over an 8-hour period.

"Permissible Exposure Limit" (P.E.L.) means employee exposure to airborne concentrations of lead equal to or greater than 50 micrograms per cubic meter of air ($50 \mu\text{g}/\text{m}^3$) averaged over an eight-hour period. If an employee is exposed to lead for more than 8 hours in any work day, the permissible exposure limit, as a time weighted average (TWA) for that day, shall be reduced according to the following formula: Maximum permissible limit (measured in $\mu\text{g}/\text{m}^3$) shall be equal to $400 \div$ number of hours worked in the day.

"Employee" means all workers on the project including contractor, subcontractors and ConnDOT representatives.

"Lead" means metallic lead, all inorganic lead compounds and organic lead soaps.

"Employee Lead Exposure" is that exposure which would occur if the employee were not using a respirator.

Lead Health Protection Program:

The LHPP shall consist of written LHPP procedures and on-site inspections, occupational air sampling, wipe sampling and reporting of the procedures by a CIH. The frequency of the on-site surveillance and monitoring shall be dependent upon the type of work to be performed and shall be detailed in the written LHPP procedures.

At the outset of a given job, the IH Firm must submit all written procedures under this item. If there are changes to these procedures, they shall be resubmitted.

The written LHPP procedures shall consists of, but is not be limited to:

1. A written record of all employees involved in work tasks that pose an airborne lead exposure risk at the work site or who may on any day have an exposure exceeding the action level. Tasks where $30 \mu\text{g}/\text{m}^3$ may be exceeded include but are not limited to: welding, burning paint, flame cutting, gouging, abrasive blasting, grinding, chipping, needle gun cleaning, lead burning, manual scraping and sanding, manual demolition of structures, heat gun cleaning, peening on existing structural steel, abrasive blasting debris cleanup, using lead containing mortar, containment moving and removal, power tool cleaning, lead removal equipment cleaning, decontamination trailer cleaning, rivet busting, etc. Those working in the vicinity of these tasks may also be exposed.

For this purpose a daily sign in/out log provided by CLINIC which identifies persons by name, affiliation, and work task for all employees who were at the site during the reporting period must be maintained at the work site and submitted monthly to ConnDOT.

All workers exposed to airborne lead at or above the Action Level on any day will be required to participate in the medical surveillance program. The IH firm shall determine levels of airborne exposure by breathing zone air sampling for airborne lead exposure over a full representative shift. In addition, all workers except those specifically exempted from the comprehensive medical surveillance program who do have or may be anticipated to have lead exposure will be enrolled in the comprehensive medical surveillance program. Those who are exempted from the comprehensive medical surveillance program will be enrolled in the limited medical surveillance program and will be listed with justification for their exemption by the site CIH and the list will be submitted to ConnDOT within five working days of the decision to exempt.

2. Procedures for instituting a medical surveillance program in accordance with 29 CFR Part 1926.62(j) except as noted herein. Frequency of medical examination shall conform to Part 1926.62(j) except where additional testing is specified. Medical surveillance will consist of, but not be limited to, an entry/annual testing protocol, an exit testing protocol, interval and comprehensive examination testing as indicated based upon exposure and prior blood lead level and Zinc Protoporphyrin levels.
3. An entry/annual testing protocol shall apply to all workers covered under this specification and shall include the following:
 - A) Complete medical and occupational exposure history focused on lead.
 - B) Complete medical examination by a physician trained or experienced in occupational medicine. The records from a previous complete medical examination (conducted within three months) which meets the requirements of Part 1926.62(j) are acceptable in place of another complete medical examination provided that the previous medical

examination was conducted by a physician trained or experienced in occupational medicine, utilized appropriate CLINIC protocol and forms and includes vital signs.

- C) Lab testing to include complete blood count (CBC), chemistry screen, blood lead level, Zinc Protoporphyrin level, spirometry and urinalysis including microscopic examination. Other laboratory work or testing dictated by sound medical practice shall be included. Subsequent testing shall include a blood lead and Zinc Protoporphyrin level monthly for the first four months after the Entry/Annual exam and at month 6. If the blood lead level remains less than 25 µg/dl for all previous months and at month 6, testing shall be conducted at three-month intervals, and there shall be an exit test for blood lead and Zinc Protoporphyrin level. For projects lasting longer than one month exit tests must be done on the employee's last day of employment on the project.

If, at any time during testing, a blood lead level of 25 µg/dl or greater is detected, those workers with blood lead levels greater than 25 µg/dl shall be monitored with blood lead and Zinc Protoporphyrin levels monthly until the blood lead level is less than 25 µg/dl. These workers must also be given one-on-one intervention training by an Industrial Hygienist (IH) on the job. Material discussed should include a determination of how the worker may have gotten the elevated level including specific tasks or practices and what must be done to prevent future excessive exposure. The IH shall report the results of such determination as part of the monthly compliance report.

- D) Other medical and/or other testing as required.

4. The Medical Removal requirements shall be as follows:

Blood Lead Level for Removal from Lead Exposure = 30 µg/dl

The reasons for the elevated blood lead level will be investigated by the IH and the worker and a plan of action for reducing exposures will be developed and followed.

This will include:

- A) Determination of the reasons for the elevated blood lead level will be made by the IH in consultation with the worker.
- B) Development of a plan of action for reducing the exposures.
- C) Implementation of the plan.

Should the employee's blood lead level not decrease to below 30 µg/dl on subsequent testing, the employee can be moved to a non-lead exposed job or removed from the exposure at the employer's expense if the doctor so determines based on medical finding. Medical removal protection shall conform at a minimum to 29 CFR Part 1926.62(k) with the exception that medical removal may be required at 30 µg/dl. ConnDOT will not pay for any and all costs associated with the medical removal of an employee.

Employees removed for medical protection may return to their former job status as specified in Part 1926.62(k) with the exception that 2 (two) consecutive test results taken at least 1 week apart indicate a level below 25 µg/dl.

5. Intervention. For any employee with a blood lead level at or above 30 µg/dl the IH Firm shall be immediately informed by the responsible clinic or medical facility and shall be responsible for determining the cause of the elevated lead level and instituting additional protective and hygiene measures against lead exposure at the job site. A written statement of these determinations shall be included with the monthly compliance report.
6. Procedures for Employee Notification. Within five (5) working days of receipt of the medical surveillance results, the employer shall notify all tested employees in writing of the results of their tests. Also, the employee shall be immediately notified by the employer (within 24 hours of receipt of results) of the blood lead levels which require removal from lead exposure.
7. Employee's exposure should be assessed in accordance with OSHA Part 1926.62(d) and the current CLINIC guidelines for air and wipe sampling. Airborne lead samples shall be analyzed by a laboratory accredited by the AIHA for the analysis of lead in air. Wipe and chip samples may alternatively be analyzed by a laboratory meeting the proficiency requirement of the ELPAT program. The results of all testing shall be reported as part of the monthly compliance report.
8. The CIH shall determine and recommend the implementation of intervention measures based on the airborne lead exposure, wipe sampling, blood lead levels and the observation of work practices. The determination and recommendations should not rely solely on airborne exposure levels (See Parts 1926.62 (h) & (j)).
9. Procedures for the selection of appropriate respiratory equipment and protective clothing for the particular work task shall be developed in conformance with 29 CFR Part 1926.62. The minimum respiratory protective equipment required shall conform to 29 CFR Part 1926.62 for particular work tasks unless a higher level protection is required by the Project IH Firm. If a higher level of protection is recommended, the CIH shall provide written justification of its need. The CIH will assure that proper testing, training, cleaning/storage or replacement and disposal of the utilized articles will be in accordance with 29 CFR Parts 1926.62 (f) & (g), especially 29 CFR Parts 1926.62 (g)(2)(ii-viii). The IH Firm shall monitor the selection and use of respiratory equipment and protective clothing during on-site surveillance and monitoring inspections. The IH Firm will conduct weekly inspections and the CIH will certify that the respirators are being cleaned properly.
10. Procedures for conducting employee training on lead hazards in accordance with 29 CFR Part 1926.62 (1). This training will cover a minimum of, but not limited to, those topics specified in 29 CFR Parts 1926.62 (1)(2)(i-viii) and the Lead Standard 29 CFR Part 1926.62. Employees must be given access to 29 CFR Part 1926.62 and its appendices and all relevant materials. The procedures shall define the site personnel requiring training, the

frequency of training, maintenance and training records and qualifications required of the instructor performing the training. In addition, a blood lead level > 25 µg/dl will trigger a special retraining session where the IH works with the individual to determine the cause of the elevation and another session where the IH discusses with the individual the result of that determination and the protective measures instituted. Training shall be provided on-site.

11. The Contractor shall establish and have available at the work site a written Hazard Communication Procedure in accordance with 29 CFR Part 1926.59. This written procedure shall describe how warning signs, labels, material safety data sheets and employee training will be provided. It must also contain proper work practices for working around hazardous materials. Also contained in this procedure will be a list of hazardous materials generated by a work task, i.e., lead fumes, lead dust, etc. Any training required to meet Part 1926.59 above that required of Part 1926.62 shall be provided.
12. A written Personal Hygiene Procedure which shall be available at the work site and must be in accordance with 29 CFR Part 1926.62 (e)(2)(ii)(F), Paragraph (h) Housekeeping and Paragraph (i) Hygiene Facilities and Practices of 29 CFR Part 1926.62. Workers will not be allowed to eat, drink or smoke or apply cosmetics in areas where there is a potential for lead exposure. The Contractor shall provide a climate controlled decontamination facility containing washing and shower facilities with clean hot and cold water, soap and disposable towels, which the workers will use to wash their hands and face before eating, drinking or smoking and after each working shift. In addition, portable wash units will be provided as the site dictates for use during breaks for personal hygiene. The Contractor shall provide a clean area for eating and drinking and separate clothes - changing area to reduce the chance for lead cross contamination. After employees change clothes and shower, the work clothing, shoes and protective equipment shall remain at the job site until properly cleaned or disposed of. The written plan shall also include procedures for cleaning and assuring cleanliness of these facilities.

The CIH shall include the following as part of the monthly compliance report:

- a) Certification that all requirements of the LHPP, OSHA, CLINIC guidelines and protocols including occupational air and wipe sampling, training medical surveillance, and elevated blood lead level intervention and reporting have been followed;
- b) A monthly report including:
 - 1) Results of all air and wipe sampling done during the past month reported on the forms.
 - 2) A narrative report describing progress on the job site, interpreting the sampling results and making any recommendations necessary.
 - 3) Blood lead and zinc protoporphyrin levels for all employees listed by name and Social Security Number and a listing of exempted workers by name with

justification for exemption. **Copy furnished to ConnDOT shall not include employees' names or Social Security Numbers.**

- 4) Reports of the investigations made subsequent to any employees having blood lead level at or above 25 $\mu\text{g}/\text{dl}$ including determination of cause and plan of action for remedy. **Copy furnished to ConnDOT shall not include employees' names or Social Security Numbers.**
- 5) The daily sign in/out log of people working on the job site for the past month.
- 6) Submission of required monthly OSHA or CLINIC reporting forms.

Projects lasting less than one year will provide a project summary report at the close of lead-related work and projects lasting more than one year will provide an annual report.

The reports will include the following:

- 1) All occupational air and wipe sampling and other pertinent data gathered.
- 2) All blood lead level and zinc protoporphyrin data generated for workers and others on the site identified by name and Social Security Number and presented in chronological order, in a format showing job title/activity for each worker, and describing activities undertaken to limit exposures when elevated blood lead levels are identified, and the results of those activities. **Copy furnished to ConnDOT shall not include employees' names or Social Security Numbers.**
- 3) A listing of all workers who were medically removed by name and Social Security Numbers and resulting actions. **Copy furnished to ConnDOT shall not include employees name or Social Security Number.**
- 4) Unusual and/or interesting findings on the bridge project that you have discovered/evaluated/identified that would be valuable to your colleagues, CLINIC, and/or ConnDOT in the management and control of lead exposure on future bridge projects.
- 5) Summarize recommendations and comments that are designed to improve the capabilities of the "LHPP" to more efficiently and effectively control blood lead levels on ConnDOT bridge work.

Method of Measurement: The work under this item will not be measured for direct payment, but will be included in the Contract Lump Sum price.

This item will include all noted services, equipment, facilities, testing and other associated work for up to three (3) ConnDOT project representatives. LHPP services provided to any ConnDOT project representatives in excess of three (3) representatives will be measured for payment in accordance with Article 1.09.04 – “Extra and Cost-Plus Work.”

Basis of Payment: This work will be paid for at the Contract Lump Sum price for “Lead Health Protection Program (LHPP)”, which price shall include Lead Health Protection Program, written Lead Health Protection Program Procedures, submittals, reports, employee training, transportation, protective equipment, services of IH firm, cleaning, testing, medical testing, services of medical clinics, medical services and testing, laboratory services and testing, and all materials, tools, and labor incidental thereto.

There will be no direct payment for equipment, including respiratory equipment, blast hoods, air supply hoses, compressor, HEPA vacuum system, filtration, and other associated equipment. These costs shall be considered included in the Lump Sum cost of this item.

There will be no direct payment for hand-wash facility, decontamination facility and shuttle vehicle, including all material, equipment, labor, cleaning, sampling, testing, treatment and disposal of wastewater, utilities, maintenance, services, disposal, laundry, cost of CIH to perform wipe sampling, external illumination, trash removal and snow and ice removal, and work incidental thereto. These costs shall be considered included in the Lump Sum cost of this item.

The intent of these specifications is to provide reimbursement under the Lump Sum price for only those items listed. The costs to contractors and subcontractors of having their personnel attend any training, retraining or refresher courses, receive any testing or fitting of equipment, take any personal hygiene measures, time required for dress up and dress down and of any other activity under the Lead Health Protection Program which requires or entails attendance of contractors' or subcontractors' personnel will not be paid for under this item. Any and all such costs will be considered included in the general cost of the Contract.

ITEM #0605100A - ASHLAR STONE MASONRY

Work under this item shall conform to the requirements of Section 6.05.02 - Materials amended by adding the following: Lintels shall conform to ASTM A36 and shall be galvanized in accordance with ASTM A-123.

Article 6.05.03 - Construction Methods is hereby deleted, and replaced by the following:

1 - General: Granite ashlar masonry facing shall be constructed in the location and to the dimensions shown on the plans or as ordered, so as to produce the general effect shown on the plans. As an aid to determine the required appearance, the Contractor shall lay up a sample of wall under the direction of the Engineer. When approved, this sample shall be accepted as representing the appearance to be obtained in the construction. All stone shall be set by experienced and competent masons.

All stones shall be dressed to the required size and shape before being laid. Beds and joints of stones shall be rough finished for a depth of not less than 2 inches in from the arris lines, and the balance of the stone shall not fall off more than 1/4 of the minimum dimension of the piece. Stones shall be furnished with dowel holes in the top and bottom bedding surfaces as may be required.

Mortar shall be hand or machine mixed as may be directed by the Engineer. In the preparation of hand mixed mortar, the fine aggregate and cement (and lime, if used) shall be thoroughly mixed together in a clean, tight mortar box until the mixture is of uniform color, after which water shall be added in such quantity as to form a stiff paste. Machine mixed mortar shall be prepared in an approved mixer and shall be mixed not less than 1½ minutes. Mortar shall be used before obtaining initial set. Retempering of mortar will not be permitted.

Stones shall not be laid when the air temperature in the shade and away from artificial heat is 40°F or below and falling, except with the permission of the Engineer and subject to such conditions as he may impose. All stones shall be well bedded in freshly made mortar and settled in place with a suitable wooden maul before the setting of the mortar. Care shall be taken not to jar stones already laid. Beds and joints shall have maximum thickness of one inch. Face joints shall be properly pointed before the mortar becomes set. Face surfaces of stone shall not be smeared with mortar. In case any stone is moved or the joint broken, the stone shall be taken up, the mortar thoroughly cleaned from bed and joints, and the stone reset in fresh mortar.

2 - Cast-in-Place Structures: Ashlar facing shall be constructed in conjunction with concrete backing placed in successive layers or lifts as permitted by the Engineer. In general, course heights may vary from 2'-0" to 3'-2" with the higher courses on the bottom; but smaller sizes shall be used where called for on the plans.

Each stone shall be cleaned and thoroughly saturated with water before being set. The concrete backing shall not be placed until the masonry facing and any required dowels or ties

have been properly installed, and the backs of beds and joints parged with not less than inch of setting mortar. Concrete shall be placed after the parging mortar has set, but care must be taken to prevent any movement of the masonry already in place while placing and compacting the concrete. When required by the Engineer, the facing stone shall be supported by such bracing and formwork as may be necessary to prevent movement.

In general, horizontal construction joints produced by successive pours of the backing concrete shall be located not less than 6 inches below the top or above the bottom bed of any course of masonry.

3 - Precast Members: Ashlar facing shall be constructed on precast members by anchoring the stones with metal ties in preformed dovetail slots embedded in the precast members, and joining successive courses with vertical metal dowels.

The face of the precast member shall be saturated with water, and each facing stone shall be cleaned and thoroughly saturated with water before the stone is set. The first course shall be set in a bed of mortar on the outstanding leg of a structural angle lintel bolted to the precast member. The tops of the stones shall be anchored in place with dowels and dovetail ties. All the stones in any one course shall be set before beginning the next course. The space between the precast member and the stone facing shall be filled with mortar and thoroughly compacted before proceeding to the next course. Stones of succeeding courses shall be set on the projecting dowels of the previous course.

Article 6.05.04 - Method of Measurement is amended by addition of the following:

4 - Lintels: Metal lintels, including mounting bolts, paid for under item Ashlar Stone Masonry – Item 0605101A, will not be measured for payment.

5 - Metal Dovetail Slots: Metal dovetail slots shall be included in the cost of precast concrete members.

Article 6.05.05 - Basis of Payment is amended by addition of the following:

4 - Lintels, including mounting bolts, will be included in the cost of the Ashlar Stone Masonry – Item 0605101A

ITEM #0703008A - HEAVY RIPRAP

Description: Refer to Section 7.03 of the Standard Specifications.

Materials:

1-Stone: The stone for this work shall be the type called for on the plans and shall conform to the following gradation:

Particle Diameter	Particle Size (inches)
d ₁₀₀	42 max.
d ₈₅	27.5 – 32.5
d ₅₀	20 - 24
d ₁₅	13 – 18.5

Materials for this item shall consist of sound, tough, durable and angular rock, free from decomposed stones or other defects impairing its durability. The size of a stone as specified shall be its least dimension. Broken concrete or rounded stones shall not be acceptable.

2-Bedding: Refer to Section 7.03 of the Standard Specifications.

Construction Methods: Refer to Section 7.03 of the Standard Specifications.

Method of Measurement: Refer to Section 7.03 of the Standard Specifications.

Basis of Payment: Refer to Section 7.03 of the Standard Specifications.

Pay Item
Heavy Riprap

Pay Unit
c.y.

ITEM #0703030A - PLACEMENT OF CHANNEL BOULDER

Description: The work shall consist of furnishing and placing individual boulders within the limits of riprap as shown on the plans or as directed by the Engineer or DEEP Fisheries. The intent of the channel boulders is to create an unsymmetrical (uneven) streambank along the edge of the watercourse to enhance fish habitat. The riprap shall be measured and paid for under its particular pay item.

Quality Assurance: The Contractor shall notify the Engineer a minimum of 14 days prior to the placement of channel boulders so that their installation can be coordinated with DEEP Fisheries. The Engineer will then be responsible for direct communication with DEEP Fisheries. DEEP Fisheries shall be given the opportunity to be present during the placement of the channel boulders to provide direction as to the specific location of the boulders.

Materials:

1-Stone: The individual boulders shall have a diameter of approximately 3 to 4 feet. Boulders shall consist of sound, durable rock, resistant to the action of air and water. Either natural stone or rough, unhewn quarry stone may be used. The boulders shall generally be rounded with no sharp corners or edges as a result of cutting or crushing operations. Boulders with visible cracks or spalling will not be permitted. Boulders consisting of sandstone, shale, or other rock material prone to disintegration will not be permitted. The boulders shall be similar in mineral composition and color to the adjacent riprap.

2-Bedding: No bedding material shall be specifically installed for the channel boulders.

Construction Method:

- (a) The Contractor may use boulders salvaged from the project site, subject to acceptance by the Engineer or DEEP Fisheries. Boulders imported from an off-site source will be subject to inspection by the Engineer at the source, and shall not be brought to the job site prior to acceptance.
- (b) Boulders shall be installed at the general locations shown on the Plans, or as directed by the Engineer or DEEP Fisheries. Unless otherwise authorized, the Contractor shall not install the boulders unless the Engineer is present to observe the installation.
- (c) The placement of boulders shall be undertaken inside the limits of short term temporary flow diversion structures in conjunction with the placement of riprap. Additional short term temporary flow diversion structures, solely for the purpose of installing the boulders, will not be eligible for payment. Short term temporary flow diversion structures shall be paid under the contract unit price for "Structure Excavation – Earth (Complete)" and "Structure Excavation – Rock (Complete)".

- (d) The boulders shall not be dropped into place. They shall be installed in a manner that does not displace the adjacent riprap or riprap bedding nor cause damage/distortion of the underlying geotextile.
- (e) The boulders shall be integrated into the adjacent riprap so that the finished streambanks are adequately protected from riverine erosion and the riprap provides lateral support for the boulders. The Contractor shall adjust the placement of both items, as directed by the Engineer or DEEP Fisheries, to achieve both adequate protection of the streambanks and lateral support of the boulders.
- (f) Boulders shall be installed as generally shown on the Plans or as directed by the Engineer or DEEP Fisheries. The exposed surface of the in-place boulders shall extend approximately 6-15 inches above the finished grade of the adjacent riprap. Any notable gaps between two channel boulders shall be chinked with appropriate sized riprap to provide both adequate streambank erosion protection as well as lateral support for the boulders.
- (g) If in the opinion of either the Engineer or DEEP Fisheries, a particular boulder is too large or small for the hydraulic and habitat conditions at any location in the work area, the Contractor shall furnish and place an alternative boulder as directed.

Method of Measurement: This work will be measured for payment by the number of channel boulders installed as shown on the plans or as directed by the Engineer or DEEP Fisheries.

Basis of Payment: This item will be paid for at the contract unit price each for "Placement of Channel Boulder," complete in place, including all materials, equipment, tools, labor, fill, and excavations incidental thereto. Riprap will be measured and paid for under its particular pay item. Excavation, water handling and dewatering will be paid for under "Structure Excavation – Earth (Complete)" and "Structure Excavation – Rock (Complete)".

Pay Item	Pay Unit
Placement of Channel Boulder	ea.

ITEM NO. 0905002A REBUILD STONE WALL

This work shall conform to Section 9.05 “Stone Wall Fence” as supplemented and amended as follows:

Article 9.05.01 - Description:

Add the following:

The work for “Rebuild Stone Wall” shall include the removing, relocating and resetting of the existing rubble stones to the limits as shown on the Plan or directed by the Engineer to rebuild the stone wall.

Article 9.05.02 - Materials:

Add the following:

When relocating, the Contractor shall reuse any undamaged existing rubble stones within the Project limits, as approved by the Engineer to rebuild the stone wall. The Contractor shall use new rubble stones to replace any damaged or missing stones that can not be salvaged from other like stone walls being removed or reset within the Project limits. The new materials shall be equal to the existing material size and type and be approved by the Engineer.

Article 9.05.03 - Construction Methods:

Add the following before the first paragraph:

Prior to commencement of work, the Contractor and Engineer shall inventory the existing rubble stones within the Project limits to determine which materials are suitable for reuse.

Article 9.05.04 - Method of Measurement:

Add the following:

New materials will not be measured.

Article 9.05.04 - Basis of Payment:

After “Stone Wall Fence” in first sentence, add “and Rebuild Stone Wall.”
Before the word “materials” in first sentence, add “existing and new.”
Add the following to pay item table:

<u>Pay Item</u>	<u>Pay Unit</u>
Rebuild Stone Wall	l.f.

ITEM #0950005A - TURF ESTABLISHMENT

Work under this item shall conform to the requirements of Section 9.50 of the Standard Specifications Form 816, supplemented and amended as follows.

9.50.02 Materials: The materials for this work shall conform to the requirements of Section M.13 of the Standard Specifications Form 816 supplemented and amended as follows.

M.13.04 - Seed Mixtures: The grass seed mixtures shall conform to the following:

(a) Delete:

Colonial Bentgrass (*Agrostis tenuis*)
Birdsfoot Trefoil (*Lotus corniculatus*)
Perennial Ryegrass (*Lolium perenne*)

Add the following:

Species	Proportion by Weight (Mass)	Minimum Purity (percent)	Minimum Germination (percent)
Velvet Bentgrass (<i>Agrostis canina</i>)	5 (2.3)	98	85
Partridge Pea (<i>Chamaecrista fasciculata</i>)	10 (4.5)	80	70
Canada Wildrye (<i>Elymus canadensis</i>)	20 (9.1)	90	60

9.50.03 Construction Methods: Construction Methods shall be those established as agronomically acceptable and feasible as determined by the Engineer.

1. Preparation of Seedbed: Add the following:

Where topsoil is not required the seedbed shall be free from refuse, stumps, roots, brush, weeds, rocks, and stones over 1 1/4 inches (30 millimeters) in diameter. If "Out-of-Season" seeding is required than the seedbed will need to be prepared again prior to final turf establishment.

2. Seeding Season: Delete the following:

(b) "Out-of-Season" Seeding shall...reseeding until the turf stand conforms to 9.50.0-5.

Add the following:

(b) "Out-of-Season" seeding shall be done in accordance with section M.13.04 (b) "temporary" seeding and seeded at the rate of 50lbs/acre (56 kg/hectare). Turf establishment can only be performed during the seeding season or as approved by a member of the Office of Environmental Planning.

9.50.04 Method of Measurement: This work will be measured for payment by the number of square yards (square meters) of surface area of accepted established turf as specified or by the number of square yards (square meters) surface area of seeding actually covered and as specified.

9.50.05 Basis of Payment: This work will be paid for at the contract unit price per square yard (square meters) for "Turf Establishment", which price shall include all materials, maintenance, equipment, tools, labor, and work incidental thereto. Partial payment of up to 60% may be made for completed, but not accepted.

Pay Item

Turf Establishment

Pay Unit

s.y. (s.m.)

ITEM # 0969060A - CONSTRUCTION FIELD OFFICE, SMALL

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.

	Description:
150 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.
1 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:
1 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.
1 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.
1 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.
1 EA	Electronic office type printing calculators capable of addition, subtraction, multiplication and division with memory and a supply of printing paper.
1 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.
1 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.
1 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.
1 EA	Wastebaskets - 5 gal., including plastic waste bags.
1 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, Small”, 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, Small”.

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, Small	Month

ITEM NO. 971001A – 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":

JOHN STREET

The Contractor shall maintain and protect one lane of through traffic in each direction, and turning lanes at intersections, each lane on a paved travel path not less than 11 feet in width.

Excepted therefrom will be those periods, during the allowable periods, when the Contractor is actively working at which time the Contractor will be allowed to maintain and protect at least an alternating one-way traffic operation on a paved travel path not less than 12 feet in width.

During the allowable period, the Contractor will be allowed to close John Street from Sta. 14+50 to 20+00 to through traffic and detour traffic as shown on the Detour Plan contained herein.

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 travel path not less than 11 feet in width.

Excepted therefrom will be those periods, during the allowable periods, when the Contractor is actively working, at which time the Contractor will be allowed to maintain and protect at least an alternating one-way traffic operation on a paved travel path not less than 12 feet in width. The length of the alternating one-way traffic operation shall not exceed 300 feet.

RESIDENTIAL DRIVEWAYS

The Contractor shall maintain access to and egress from all commercial and residential driveways throughout the project limits. The Contractor will be allowed to close said driveways to perform the required work during those periods when the businesses are closed unless permission is granted from the business owner to close the driveway during business hours. If a temporary closure of a residential driveway is necessary, the Contractor shall coordinate with the owner to determine the time period of the closure.

Article 9.71.03 - Construction Method is supplemented as follows:

SIGNING

The Contractor shall maintain all existing overhead and side-mounted signs throughout the project limits during the duration of the project. The Contractor shall temporarily relocate

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. The temporary relocation of any existing signs and supports, and the furnishing, installation and removal of any temporary supports and foundations, shall be paid for under the item "Maintenance and Protection of Traffic."

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.

REQUIREMENTS FOR WINTER

The Contractor shall schedule a meeting with representatives of the Engineer, Maintenance, Town, and Traffic to determine what interim traffic control measures the Contractor must accomplish for the winter to provide safety to the motorist and permit adequate snow removal procedures.

The 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 restorations, 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.

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 20 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 may 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, Municipal Police, the Contractor (Project Superintendent) and the Traffic Control Subcontractor (if different than the prime Contractor) to review the contract requirements and discuss the Department’s procedures. Other work zone safety meetings during the course of the project should be scheduled as needed.
- 1.b) A Work Zone Safety Meeting Agenda, (see Section 5), 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.

SECTION 2. INSTALLING AND REMOVING TRAFFIC CONTROL PATTERNS

- 2.a) Lane Closures shall be installed beginning with the advanced warning signs and proceeding forward toward the work area.

- 2.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.
- 2.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.
- 2.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, State Police may use traffic slowing techniques, including 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 two TMAs and sign crew should continue to install/remove the pattern as described in Section 4c and traffic shall be allowed to resume their normal travel.
- 2.e) The Contractor must adhere to using the proper signs, placing the signs correctly, and ensuring the proper spacing of signs.
- 2.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.
- 2.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.
- 2.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 3. USE OF TRAFFIC DRUMS AND TRAFFIC CONES

- 7.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.

- 7.b) Traffic drums shall be used in place of traffic cones in traffic control patterns that are in effect for more than a 72-hour duration.
- 7.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.
- 7.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 4. GENERAL

- 8.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.
- 8.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. In the case of sudden equipment breakdowns, the pattern may be installed but the Contractor must provide replacement equipment within 24 hours.
- 8.c) Failure of the Contractor to have the required minimum number of signs and equipment, which results in the not being installed, shall not be a reason for a time extension.
- 8.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.

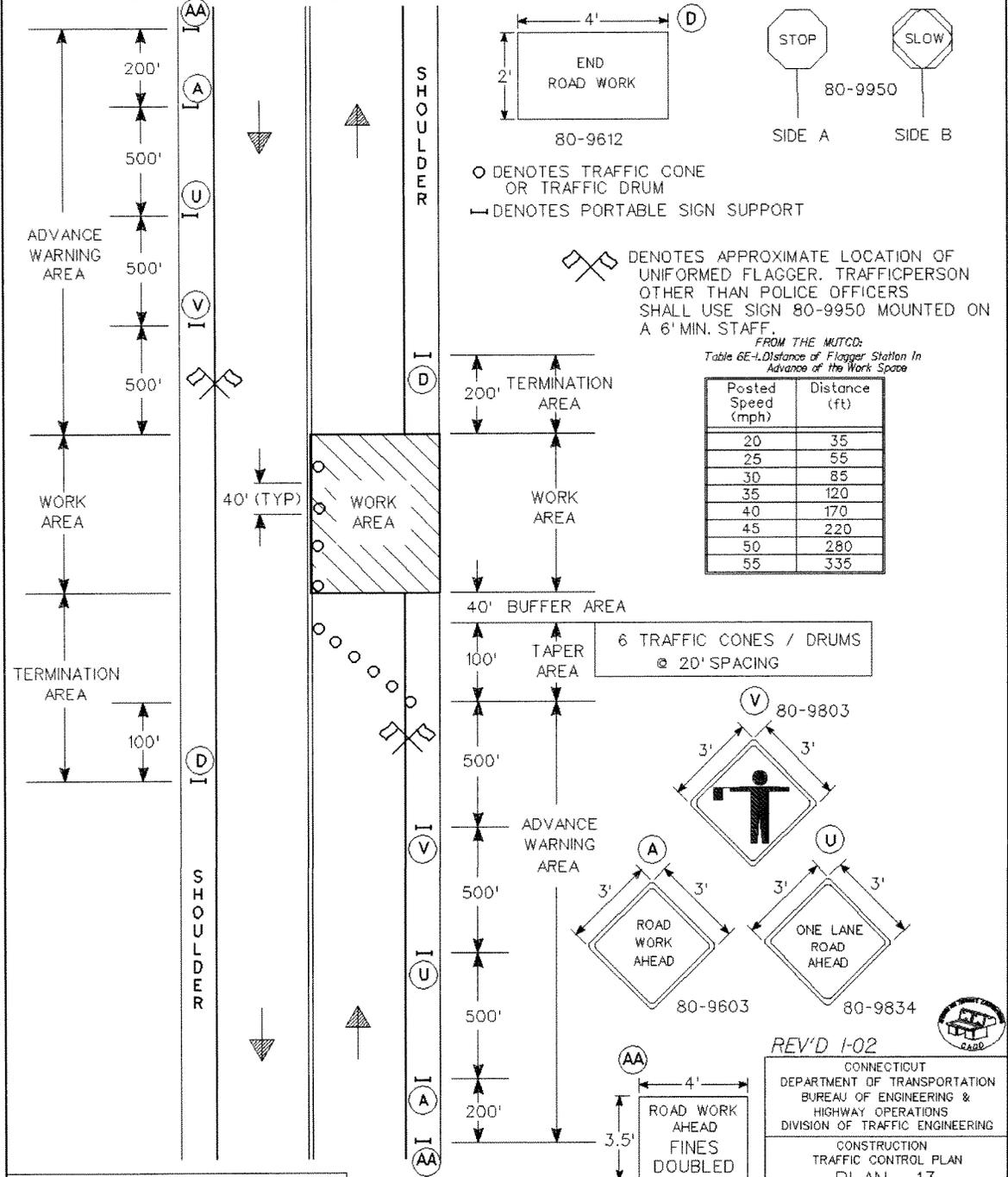
SECTION 5. WORK ZONE SAFETY MEETING AGENDA

- 1) Review Project scope of work and time.
- 2) Review Section 1.08, Prosecution and Progress of the Special Provisions.
- 3) Review Section 9.70, Trafficperson of the Specifications.
- 4) Review Section 9.71, Maintenance and Protection of Traffic of the Special Provisions, including "Work Zone Safety Procedures".
- 5) Review Contractor's schedule and method of operations.
- 6) Review areas of special concern: ramps, turning roadways, medians, lane drops, etc.
- 7) Open discussion of work zone questions and issues.

- 8) Discussion of review and approval process for changes in contract requirements as they relate to work zone areas.

WORK IN TRAVEL LANE AND SHOULDER TWO LANE HIGHWAY ALTERNATING ONE-WAY TRAFFIC OPERATIONS

SIGN FACE
98 SQ. FT (MIN)



FROM THE MUTCD:
Table 6E-1. Distance of Flagger Station In Advance of the Work Space

Posted Speed (mph)	Distance (ft)
20	35
25	55
30	85
35	120
40	170
45	220
50	280
55	335

SEE NOTES 1, 2, 5, 7, 8 & 10

REV'D 1-02

CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING &
HIGHWAY OPERATIONS
DIVISION OF TRAFFIC ENGINEERING

CONSTRUCTION
TRAFFIC CONTROL PLAN
PLAN 13

SHEET 1 OF 2 SCALE NONE

APPROVED J. Carey DATE 1-02
PRINCIPAL ENGINEER

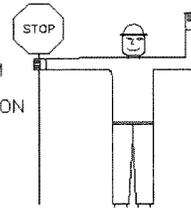
WORK IN TRAVEL LANE AND SHOULDER TWO LANE HIGHWAY ALTERNATING ONE-WAY TRAFFIC OPERATIONS

HAND SIGNAL METHODS TO BE USED BY UNIFORMED FLAGGERS

THE FOLLOWING METHODS FROM SECTION 6E.04 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 TYPICAL DETAIL SHEET ENTITLED "SIGNS FOR CONSTRUCTION AND PERMIT OPERATIONS" SHALL BE USED.

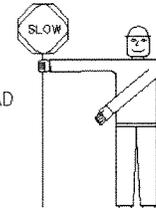
A. TO STOP TRAFFIC

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.



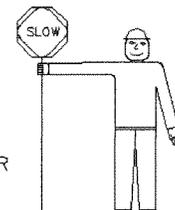
B. TO DIRECT TRAFFIC TO PROCEED

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.



SEE NOTES 1, 2, 5, 7, 8 & 10

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DIVISION OF TRAFFIC ENGINEERING

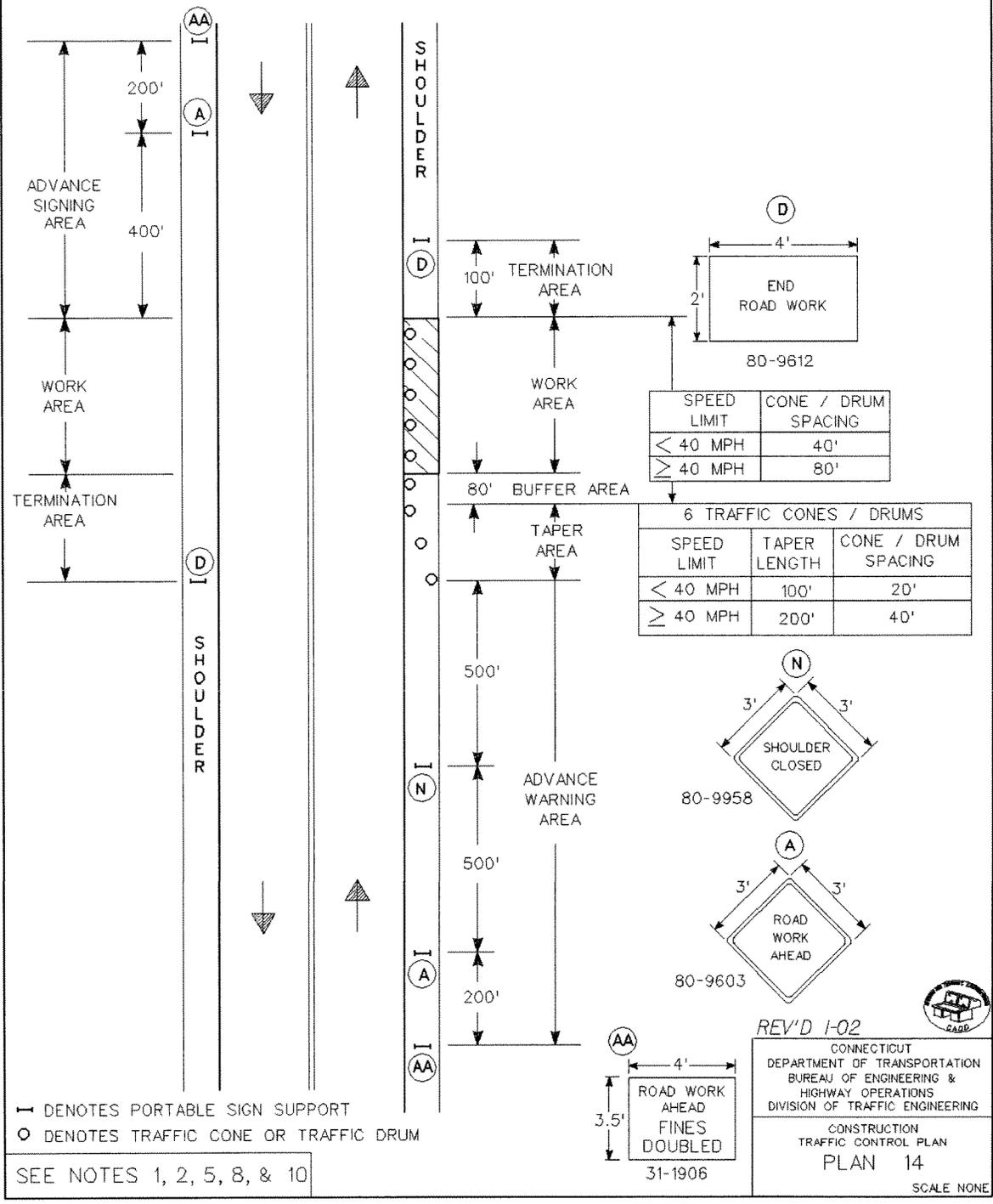
CONSTRUCTION
TRAFFIC CONTROL PLAN
PLAN 13

SHEET 2 OF 2 SCALE NONE

APPROVED J. Carey DATE 1-02
PRINCIPAL ENGINEER

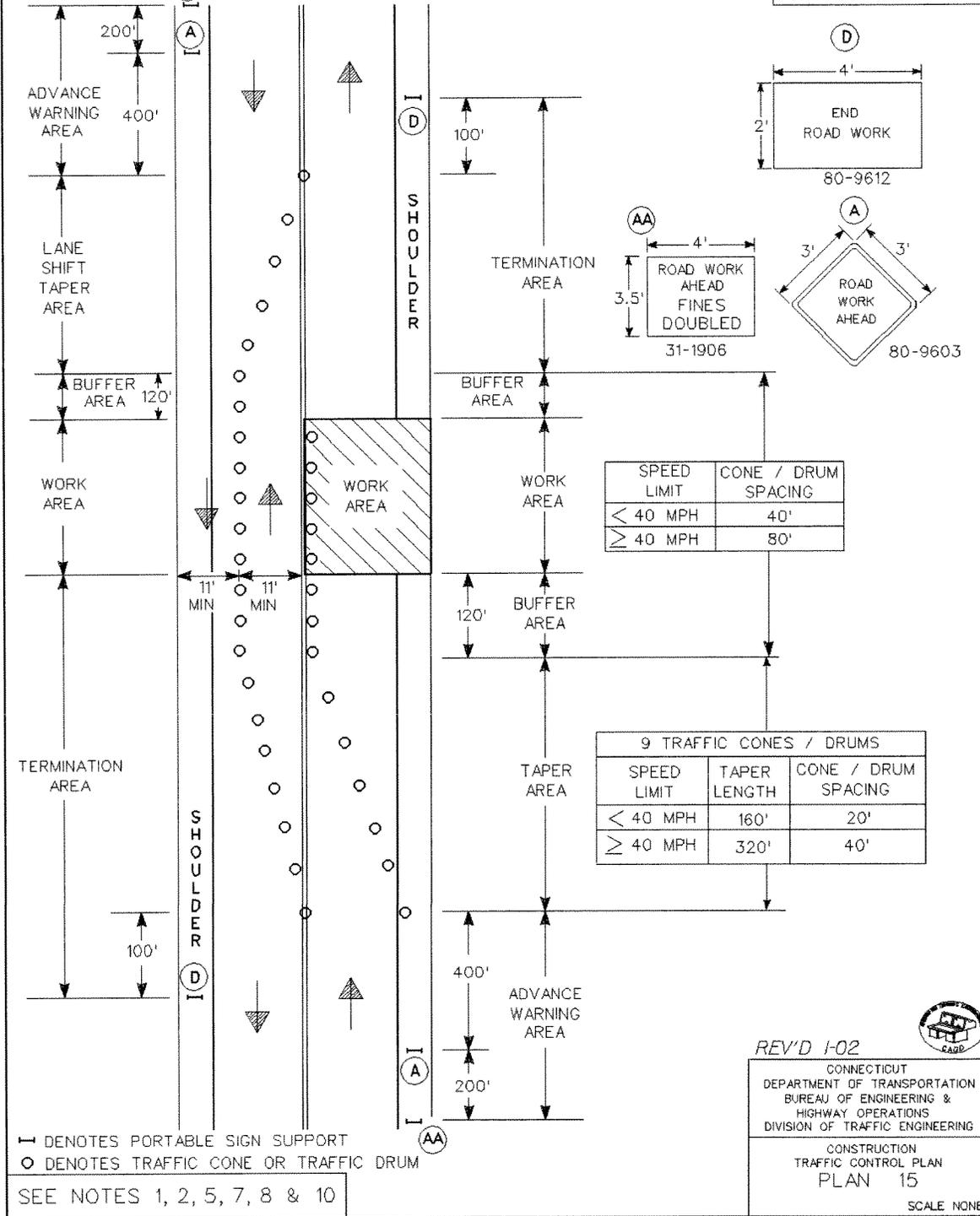
WORK IN SHOULDER - TWO LANE HIGHWAY

SIGN FACE
71 SQ. FT (MIN)



WORK IN TRAVEL LANE AND SHOULDER TWO LANE HIGHWAY

SIGN FACE
62 SQ. FT (MIN)



SPEED LIMIT	CONE / DRUM SPACING
< 40 MPH	40'
≥ 40 MPH	80'

9 TRAFFIC CONES / DRUMS		
SPEED LIMIT	TAPER LENGTH	CONE / DRUM SPACING
< 40 MPH	160'	20'
≥ 40 MPH	320'	40'

I DENOTES PORTABLE SIGN SUPPORT
 O DENOTES TRAFFIC CONE OR TRAFFIC DRUM

SEE NOTES 1, 2, 5, 7, 8 & 10

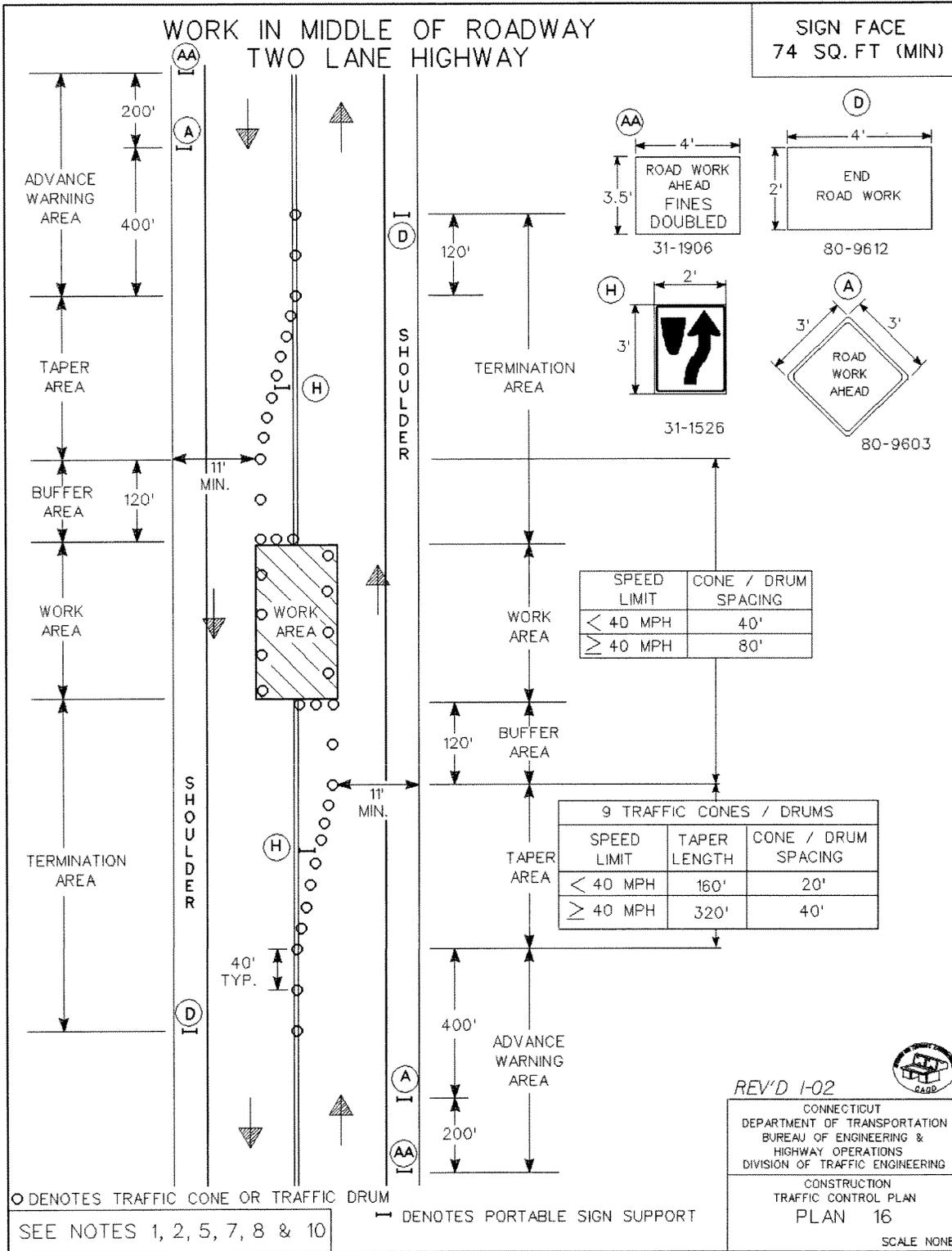
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CONSTRUCTION
 TRAFFIC CONTROL PLAN
 PLAN 15

SCALE NONE

APPROVED J. Carey DATE 1-02
PRINCIPAL ENGINEER



NOTES FOR TRAFFIC CONTROL PLANS

1. IF A TRAFFIC STOPPAGE OCCURS IN ADVANCE OF SIGN (A), THEN AN ADDITIONAL SIGN (A) SHALL BE INSTALLED IN ADVANCE OF THE STOPPAGE.
2. SIGNS (AA), (A) AND (D) SHOULD BE OMITTED WHEN THESE SIGNS HAVE ALREADY BEEN INSTALLED TO DESIGNATE A LARGER WORK ZONE THAN THE WORK ZONE THAT IS ENCOMPASSED ON THIS PLAN.
3. SEE TABLE #1 FOR ADJUSTMENT OF TAPERS IF NECESSARY.
4. A CHANGEABLE MESSAGE SIGN MAY BE UTILIZED ONE HALF TO ONE MILE IN ADVANCE OF THE LANE CLOSURE TAPER.
5. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 72 HOURS, THEN TRAFFIC DRUMS SHALL BE USED IN PLACE OF TRAFFIC CONES.
6. ANY LEGAL SPEED LIMIT SIGNS WITHIN THE LIMITS OF A ROADWAY / LANE CLOSURE AREA WILL BE COVERED WITH AN OPAQUE MATERIAL WHILE THE CLOSURE IS IN EFFECT AND UNCOVERED WHEN THE ROADWAY / LANE CLOSURE IS REOPENED TO ALL LANES OF TRAFFIC.
7. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN THE EXISTING CONFLICTING PAVEMENT MARKINGS SHALL BE ERADICATED OR COVERED AND TEMPORARY PAVEMENT MARKINGS THAT DEPICT THE PROPER TRAVEL PATHS SHALL BE INSTALLED.
8. DISTANCES BETWEEN SIGNS IN THE ADVANCE WARNING AREA MAY BE REDUCED TO 200' ON LOW SPEED URBAN ROADS (SPEED LIMIT < 40 MPH).
9. FOR LANE CLOSURES ONE (1) MILE OR LONGER, A "REDUCE SPEED TO 45 MPH" SIGN SHALL BE PLACED AT THE ONE MILE POINT AND AT EACH MILE THEREAFTER.
10. 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.
11. A CHANGEABLE MESSAGE SIGN SHALL BE INSTALLED ONE HALF TO ONE MILE IN ADVANCE OF THE LANE CLOSURE TAPER.

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CONNECTICUT
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HIGHWAY OPERATIONS
DIVISION OF TRAFFIC ENGINEERING

CONSTRUCTION
TRAFFIC CONTROL PLAN
NOTES

NOTES.DGN

Article 9.71.05 – Basis of Payment is supplemented by the following:

The contract lump sum price for “Maintenance and Protection of Traffic” shall also include temporarily relocating existing signs and sign supports as many times as deemed necessary and furnishing, installing, and removing temporary sign supports and foundations if necessary during construction of the project.

ITEM #974001A - 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 removed to the limits shown on the plans. 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.

Reinforcing steel shall be cut and removed as shown on the plans. Loose and small concrete fragments shall be cleaned from the reinforcing steel required to be left in place.

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 stream or onto adjacent traffic lanes.

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 #1220011A - CONSTRUCTION SIGNS – TYPE III REFLECTIVE SHEETING

Article 12.20.01 – Description: The Contractor shall furnish construction signs with Type III reflective sheeting and their required portable supports or metal sign posts that conform to the requirements of NCHRP Report 350 (TL-3) and to the signing requirements stated in Article 9.71 “Maintenance and Protection of Traffic,” as shown on the plans and/or as directed by the Engineer.

Article 12.20.02 – Materials: Prior to using the construction signs and their portable supports, the Contractor shall submit to the Engineer a copy of the Letter of Acceptance issued by the FHWA to the manufacturer documenting that the devices (both sign and portable support tested together) conform to NCHRP Report 350 (TL-3).

Portable sign supports shall be designed and fabricated so as to prevent signs from being blown over or displaced by the wind from passing vehicles. Portable sign supports shall be approved by the Engineer before they are used.

Mounting height of signs on portable sign supports shall be a minimum of 12 inch and a maximum of 24 inch, measured from the pavement to the bottom of the sign.

All sign faces shall be rigid and reflectorized. Reflective sheeting shall conform to the requirements of Article M.18.09.01 (Type III). Sheet aluminum sign blanks shall conform to the requirements of Article M.18.13. Metal sign posts shall conform to the requirements of Article M.18.14. Application of reflective sheeting, legends, symbols, and borders shall conform to the requirements specified by the reflective sheeting manufacturer. Attachments shall be provided so that the signs can be firmly attached to the portable sign supports or metal posts without causing damage to the signs.

The following types of construction signs shall not be used: mesh, non-rigid, roll-up.

The following portable sign support systems or equivalent systems that meet the above requirements may be used:

- Korman Model #SS548 flexible sign stand with composite aluminum sign substrate (APOLIC)
- Traffix “Little Buster” dual spring folding sign stand with corrugated polyethylene (10 mm thick) sign substrate (InteCel)

Article 12.20.03 – Construction Methods: Ineffective signs, as determined by the Engineer and in accordance with the ATSSA guidelines contained in “Quality Standards for Work Zone Traffic Control Devices”, shall be replaced by the Contractor at no cost to the State.

Signs and their portable supports or metal posts that are no longer required shall be removed from the project and shall remain the property of the Contractor.

Article 12.20.04 – Method of Measurement: Construction Signs - Type III Reflective Sheeting will be measured for payment by the number of square meters of sign face. Sign supports will not be measured for payment.

Article 12.20.05 – Basis of Payment: “Construction Signs – Type III Reflective Sheeting” required and used on the project will be paid for at the Contract unit price per square meter. This price shall include the furnishing and maintenance of the signs, portable sign supports, metal sign posts and all hardware. Each sign and support or posts will be paid for once, regardless of the number of times it is used.

Pay Item	Pay Unit
Construction Signs – Type III Reflective Sheeting	s.f.

**ITEM NO. 1803071A – TYPE B IMPACT ATTENUATION SYSTEM
(TANGENTIAL)**

Description: This item shall consist of furnishing and installing an impact attenuation system for use as a metal beam rail terminal where shown on the design plans, in accordance with the Manufacturer's details and specifications including reflective sheeting for delineation.

Performance Criteria: This attenuation system shall be a crash tested device having approval in writing from FHWA conforming to the requirements in National Cooperative Highway Research Program (NCHRP) Report 350.

Materials: The materials shall conform to the following requirements:

- 1) The material for the posts for this system shall be steel. All material shall meet the Manufacturer's specification for the latest version of a Tangential system chosen from the Department's Qualified Products List.
- 2) The Contractor shall submit a material certificate or certificate of compliance for each system supplied as defined in Article 1.06.07.
- 3) A Type III reflective sheeting shall be provided in conformance with Subarticle M18.09.01 and the attached detail.

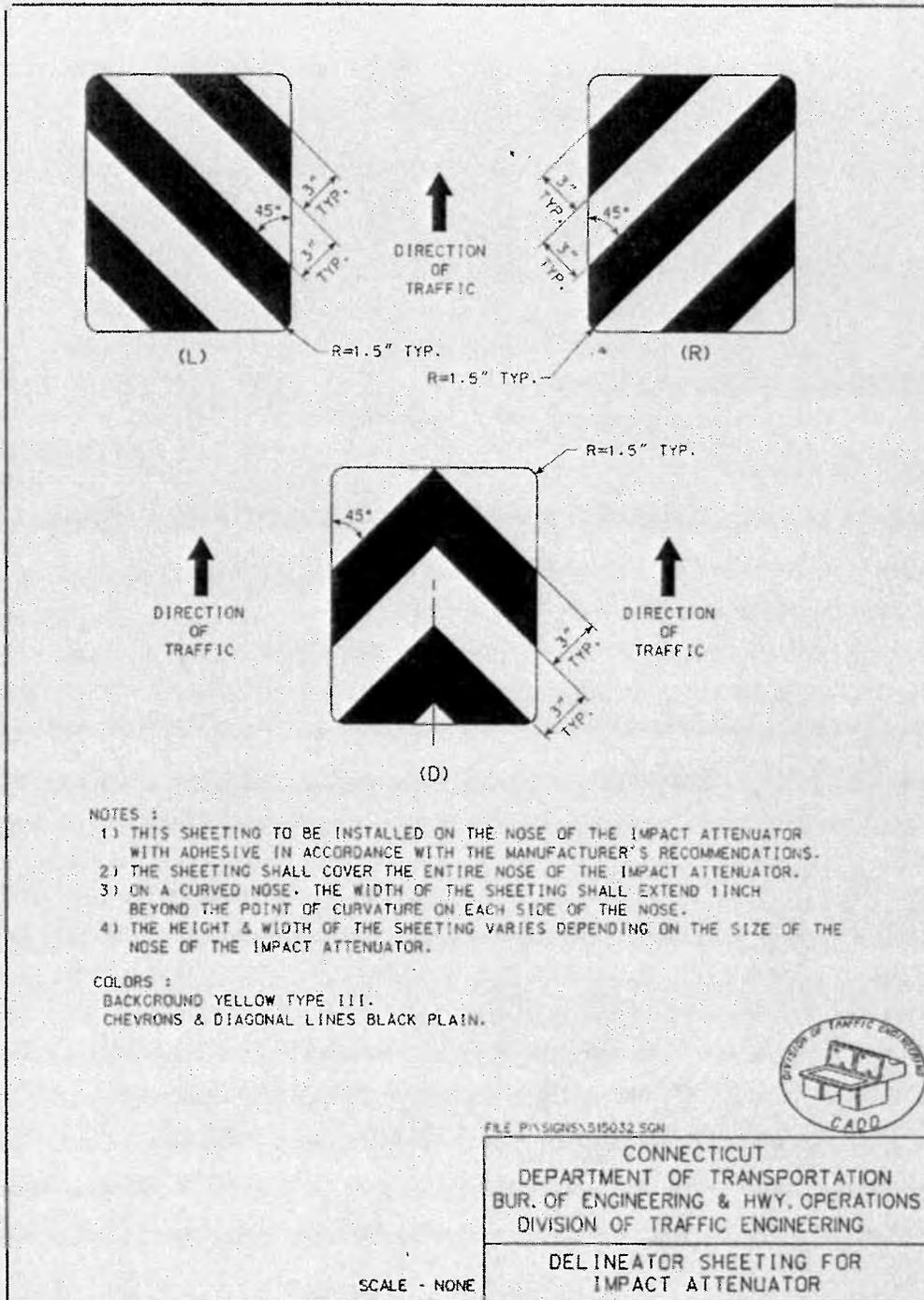
Construction Methods: The impact attenuation system shall be installed in a neat and workman like manner at the location(s) shown on the plans and constructed in conformance with the Manufacturer's details. The reflective sheeting shall be installed on the nose of the impact attenuation system.

Failure to comply: In the event that, in the judgment of the Engineer, the Impact Attenuation system is not maintained adequately and/or safely on any part of the project, or the Contractor does not move or relocate traffic control devices to meet construction requirements for the safety of the traveling public when directed to do so by the Engineer, on any day, the sum of \$1500.00 per day will be deducted from any money due the Contractor as a charge for failure to comply with this specification.

Method of Measurement: This work shall be measured for payment by the number of each system installed as shown on the plans, conforming to the details and specifications and as accepted by the Engineer.

Basis of Payment: The impact attenuation system will be paid for at the Contract unit price for each "Type B Impact Attenuation System (Tangential)" chosen from the Department's Qualified Products List. This price shall include all materials, excavation, transition section, reflective sheeting, site preparation, transportation, and removal of surplus material, equipment, tools and labor incidental to complete the installation.

Pay Item	Pay Unit
Type B Impact Attenuation System (Tangential)	ea.



SECTION 8
SUPPLEMENTAL SPECIFICATIONS
TO FORM 816
JULY 2010

NO TEXT THIS PAGE

State of Connecticut

Department of Transportation

SUPPLEMENTAL SPECIFICATIONS

TO

THE STANDARD SPECIFICATIONS

FOR

ROADS, BRIDGES AND INCIDENTAL CONSTRUCTION

FORM 816

2004

JULY 2010

NO TEXT THIS PAGE

July 2010

DIVISION I
GENERAL REQUIREMENTS AND COVENANTS

<u>SECTION</u>		<u>SPECIFICATION NUMBER</u>
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SECTION

**SPECIFICATION
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July 2010
STANDARD SPECIFICATIONS
FOR
ROADS, BRIDGES AND INCIDENTAL CONSTRUCTION
FORM 816

ERRATA

<u>PG.</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
iv	Table of Contents	11	Change "Guild" to "Guide"
4	1.01.01	8	After the end of the definition for "Plans," insert as a subset, "A. Standard Sheets – Standardized plans containing details approved by the Department and the FHWA, for construction of a given type on any project, included in contracts on an as-needed basis."
6	1.01.02	41	Change "Aluminum Association" to "Aluminum Association, Inc. (The)"
6	1.01.02	42	Delete "AAA – Aluminum Alloy Association"
7	1.01.02	1	Insert "AABC – Associated Air Balance Council"
7	1.01.02	1	Insert "AAMA – American Architectural Manufacturers Association"
7	1.01.02	12	Insert "ABMA – American Bearing Manufacturers Association"
7	1.01.02	12	Insert "ACGIH – American Council of Government Industrial Hygienists"
7	1.01.02	12	Change "American Concrete Institute" to "ACI International (American Concrete Institute)"
7	1.01.02	14	Insert "ADAAG – Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities"
7	1.01.02	16	Change "Associated General Contractors of America" to "Associated General Contractors of America (The)"
7	1.01.02	19	Insert "AI – Asphalt Institute"
7	1.01.02	19	Change "American Institute of Architects" to "American Institute of Architects (The)"
7	1.01.02	20	Delete "AIEE – American Institute of Electrical Engineers "
7	1.01.02	24	Delete "ALI – Associated Laboratories, Inc."
7	1.01.02	26	Change "American Lumber Standard Committee" to "American Lumber Standards Committee, Incorporated"
7	1.01.02	27	Change "Air Movement and Control Association" to "Air Movement and Control Association International, Inc."
7	1.01.02	31	Delete "AOEC – Area of Environmental Concern"
7	1.01.02	33	Change "The Engineered Wood Association" to "APA-The Engineered Wood Association"
7	1.01.02	37	Change "Air Conditioning" to "Air-Conditioning"
8	1.01.02	7	Change "Air Conditioning" to "Air-Conditioning"
8	1.01.02	8	Change "American Society of Mechanical Engineers" to "ASME International (The American Society of Mechanical Engineers International)"
8	1.01.02	18	Delete "ATA – American Transit Association"
8	1.01.02	20	Delete "AWG – American Wire Gauge"
8	1.01.02	22	Change "Wood-Preservers" to "Wood-Preservers' "
8	1.01.02	33	Delete "AZI – American Zinc Institute"
8	1.01.02	35	Change "Building Officials and Code Administrators International" to "BOCA International, Inc."

<u>PG.</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
8	1.01.02	38	Change "Library" to "Laboratory"
9	1.01.02	2	Change "CONNDOT" to "ConnDOT"
9	1.01.02	6	Delete "CPI – Clay Pipe Institute"
9	1.01.02	9	Delete "CS – Commercial Standard"
9	1.01.02	10	Change "Construction Specifications Institute" to "Construction Specifications Institute (The)"
9	1.01.02	12	Change "Tower" to "Technology"
9	1.01.02	17	Delete "DFPA – Douglas Fir Plywood Association"
9	1.01.02	19	Change "Department of Defense" to "Department of Defense Military Specifications and Standards"
9	1.01.02	21	Change "Association" to "Alliance"
9	1.01.02	23	Delete "U.S. Department of Transportation"
9	1.01.02	28	Delete "U.S. Department of Transportation"
9	1.01.02	30	Insert "FMG – FM Global"
9	1.01.02	31	Delete "U.S. Department of Transportation"
10	1.01.02	2	Delete "HASP – Health and Safety Plan"
10	1.01.02	3	Delete "HMA – Hot Mix Asphalt or Bituminous Concrete"
10	1.01.02	4	Delete "HPMA – Hardwood Plywood Manufacturers Association"
10	1.01.02	5	Insert "HPVA – Hardwood Plywood & Veneer Association"
10	1.01.02	9	Insert "ICC – International Code Council"
10	1.01.02	9	Change "Insulated Cable Engineers Association" to "Insulated Cable Engineers Association, Inc."
10	1.01.02	10	Change "Institute of Electrical and Electronics Engineers" to "Institute of Electrical and Electronics Engineers, Inc. (The)"
10	1.01.02	21	Change "Military Standardization Documents, U.S. Department of Defense" to "(MILSPEC) Military Specification and Standards"
10	1.01.02	24	Delete "MS – Military Specifications"
10	1.01.02	26	Change "Manufacturers Standardization Society of the Valve and Fittings Industry Inc." to "Manufacturers Standardization Society of The Valve and Fittings the Valve Industry Inc."
10	1.01.02	29	Change "National Association of Architectural Metal Manufacturers (The)" to "National Association of Architectural Metal Manufacturers"
10	1.01.02	31	Insert "NADCA – National Air Duct Cleaners Association"
10	1.01.02	34	Delete "NBS – National Bureau of Standards"
10	1.01.02	35	Delete "NC – National Course"
11	1.01.02	3	Delete "NCPRC – National Clay Pipe Research Corporation"
11	1.01.02	10	Change "International Electrical Testing Association" to "InterNational Testing Association"
11	1.01.02	12	Delete "NFS – NFS International"
11	1.01.02	13	Insert "NHLA – National Hardwood Lumber Association"
11	1.01.02	18	Insert "NLGA – National Lumber Grades Authority"
11	1.01.02	18	Delete "NLMA – National Lumber Manufacturers Association"
11	1.01.02	21	Insert "NSF – NSF International"
11	1.01.02	21	Change "National Terrazzo and Mosaic Association (The)" to "National Terrazzo and Mosaic Association, Inc."
11	1.01.02	26	Delete "PCC – Portland Cement Concrete"
11	1.01.02	28	Delete "PLP – Plastic Laminate Producers"
11	1.01.02	29	Delete "PS – Product Standard of NBS, U.S. Department of Commerce"
11	1.01.02	32	Delete "RLMI – Reflector and Lamp Manufacturers' Institute"

<u>PG.</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
11	1.01.02	35	Delete "SAWP – Society of American Wood Preservers"
11	1.01.02	36	Insert "SDI – Steel Deck Institute"
11	1.01.02	36	Insert "S.D.I. – Steel Door Institute"
11	1.01.02	37	Insert "SJI – Steel Joist Institute"
11	1.01.02	37	Insert "SMACNA – Sheet Metal and Air Conditioning Contractors' National Association"
11	1.01.02	37	Change "Southern Pine Inspection Bureau" to "Southern Pine Inspection Bureau (The)"
12	1.01.02	9	Change "Tile Council of America" to "Tile Council of America, Inc."
12	1.01.02	10	Insert "TIA – Telecommunications Industry Association"
12	1.01.02	10	Insert "TPI – Truss Plate Institute, Inc."
12	1.01.02	10	Delete "UBC – Uniform Building Code"
12	1.01.02	11	Change "Underwriters Laboratories, Inc." to "Underwriters Laboratories Inc."
12	1.01.02	12	Delete "UMTA – Urban Mass Transportation Administration, U.S. Department of Transportation"
12	1.01.02	14	Delete "UPC – Uniform Plumbing Code"
12	1.01.02	15	Insert "USGBC – U.S. Green Building Council"
12	1.01.02	16	Delete "USS – United States Standard"
12	1.01.02	17	Delete "VOC – Volatile Synthetic Organic Chemicals"
12	1.01.02	19	Delete "WCLA – West Coast Lumberman's Association"
12	1.01.02	20	Insert "WCSC – Window Covering Safety Council"
12	1.01.02	20	Delete "WSA – Temporary Waste Stockpile Area"
12	1.01.03	31	Insert "AOEC – Area of Environmental Concern"
12	1.01.03	31	Insert "AWG – American Wire Gauge"
13	1.01.03	16	Insert "HASP – Health and Safety Plan"
13	1.01.03	29	Insert "PCC – Portland Cement Concrete"
14	1.01.03	25	Insert "VOC – Volatile Organic Compound"
14	1.01.03	26	Insert "WSA – Temporary Waste Stockpile Area"
22	1.03.07	23	Change "\$1,000,000" to "\$2,000,000"
32	1.05.01	38	Change "Connecticut General Statutes" to "CGS"
45	1.05.15	29	Change "Department of Public Utility Control" to "DPUC"
105	1.20	29	Change "Workmen and Equipment" to "Personnel and Equipment"
105	1.20	31	Delete "Completion of Construction Work and"
107	1.20-1.02.13	15	Change "Americans with Disabilities Act Accessibility Guidelines" to "ADAAG"
108	1.20-1.04.01	26	Change "othewise" to "otherwise"
119	1.20-1.05.25	4	Change "Certificate of Compliance" to "C.O.C."
122	1.20-1.06.08	3	Change "Certificate of Compliance" to "C.O.C."
131	1.20-1.08.05	34	Change "Workmen and Equipment" to "Personnel and Equipment"
132	1.20-1.08.11	12	Change "Certificate of Compliance" to "C.O.C."
133	1.20-1.08.13	7	Delete "Completion of Construction Work and"
133	1.20-1.08.13	9	Change "Certificate of Compliance" to "C.O.C."
133	1.20-1.08.11	15	Change "Certificate of Compliance" to "C.O.C."
133	1.20-1.08.11	20	Change "Certificate of Compliance" to "C.O.C."
143	2.02.01	28	Insert ", swales" after "channels"
245	4.06.04	11	Change " Over weight (mass) Adjustments - " and replace with indented " Over weight (mass) Adjustments - " as a subsection of " 1. Bituminous Concrete Class () ".

<u>PG.</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
259	5.03.03	24	Change "Such requirements of Article 5.02.03 as are pertinent shall apply equally to this construction." To "All such plans prepared by the Contractor shall be considered working drawings and shall be submitted with engineering calculations to the Engineer for review in accordance with the requirements of Article 1.05.02."
270	5.08.02	4	Change "M.06.02-12" to "M.06.02-4 Welded Stud Shear Connectors"
271	5.09.02	39	Change "M.06.02-12" to "M.06.02-4 Welded Stud Shear Connectors"
284	5.14.03-12	12	Change "Article M.06.02-13" to "Subarticle 6.03.03 (a) Shop Fabrication Notice"
351	6.03.03	8	Change "MS MIL-C-11796B" to "MIL-C-11796B"
434	9.04.02	14	Change "Subarticle M.06.02-1" to "Article 6.03.02"
434	9.04.02	15	Change "M.06.02-9(d) for metal bridge rail (cast post—aluminum)." to "Malleable castings shall conform to the requirements of the specifications for malleable iron castings, ASTM A 47, Grade No. 32510 (22010). Ductile iron castings shall conform to the Specifications for Ductile Iron Castings, ASTM A 536, Grade 60-40-18 (414-276-18) unless otherwise specified. In addition to the specified test coupons, test specimens from parts integral with the castings, such as risers, shall be tested for castings having a weight (mass) of more than 1000 pounds (455 kilograms) to determine that the required quality is obtained in the castings in the finished condition."
452	9.14.02	2	Change "Subarticle M.06.02-8" to "ASTM A 53, Type E or S, Grade A, Schedule 40 Black Finish."
452	9.14.02	4	Change "Subarticle M.06.02-9(d) except that the grade shall be 32510" to "the specifications for malleable iron castings, ASTM A 47, Grade No. 32510 (22010). Ductile iron castings shall conform to the Specifications for Ductile Iron Castings, ASTM A 536, Grade 60-40-18 (414-276-18) unless otherwise specified. In addition to the specified test coupons, test specimens from parts integral with the castings, such as risers, shall be tested for castings having a weight (mass) of more than 1000 pounds (455 kilograms) to determine that the required quality is obtained in the castings in the finished condition."
496	9.70.01	37	Change "CDOT" to "ConnDOT"
577	12.01.03	7	Change "6.03.03-19" to "6.03.03-4 (f) High Strength Bolted Connections"
577	12.01.03	23	Change "Article 6.03.03-15" to "Subarticle 6.03.03-4(c) Bearings"
577	12.01.03	27	Change "Article 6.03.03-19 (c)(3)" to "Subarticle 6.03.03-4 (f) High Strength Bolted Connections Turn-of-Nut Installation Method"
604	18.00.02	7	Change "National Cooperative Highway Research Program (NCHRP)" to "NCHRP"
623	M.03.01	9	Change "Cement and Concrete Reference Laboratory" to "CCRL"
623	M.03.01	13	Change "Cement and Concrete Reference Laboratory" to "CCRL"
626	M.03.01	2	Change "Cement and Concrete Reference Laboratory" to "CCRL"
626	M.03.01	3	Change "NBS" to "NIST"
632	M.03.01	18	Change "Cement and Concrete Reference Laboratory" to "CCRL"
638	M.04.02	37	Change "Asphalt Institute's" to "AI's"

<u>PG.</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
711	M.10.02-1	17	Change "Subarticle M.06.02-1(b)" to "Article M.06.02"
720	M.10.08-3	2	Change "Subarticle M.06.02-1(b)" to "Article M.06.02"
735	M.13.03	22	Change "AOAC International" to "AOAC"
760	M.15.15	21	Change "non-fusible" to "fused"
780	M.16.08	41	Change "Americans With Disabilities Act (ADA)" to "ADA"
790	M.16.10	24	Change "Underwriter's Laboratory" to "UL"
800	M.17.01	19	Change "AAA 6061-T6" to "AA 6061-T6"
845	Index	6	Add page 133 to "Acceptance of Project"
846	Index	13	Add page 107 to "Bids: Consideration of"
847	Index	28	Add page 132 to "Cleaning Up, Final"
849	Index	25	Add page 107 to "Consideration of Bids"
849	Index	39	Add page 108 to "Contract: Intent of"
850	Index	3	Add page 133 to "Contractor's: Responsibility, Termination of the"
850	Index	13	Add page 114 to "Cooperation by Contractor"
850	Index	15	Add page 114 to "Coordination of Special Provisions, Plans, Supplemental Specifications and Standard Specifications and Other Contract Requirements"
850	Index	40	Add page 128 to "Cutting and Patching:"
852	Index	16	Add page 106 to "Examination of Plans, Specifications, Special Provisions and Site of Work"
852	Index	38	Insert "Facilities, Temporary...126"
853	Index	7	Add page 132 to "Final: Cleaning Up"
854	Index	35	Add page 115 to "Inspection"
855	Index	11	Add page 108 to "Intent of Contract"
855	Index	22	Add page 106 to "Knowledge of Applicable Laws"
855	Index	25	Add page 106 to "Laws: Knowledge of Applicable"
856	Index	27	Add page 120 to "Materials: Source of Supply and Quality"
856	Index	28	Add page 121 to "Materials: Storage of"
857	Index	33	Add page 133 to "Operation and Maintenance Manuals:"
857	Index	34	Change page 133 to 136 for "Equipment and Systems Maintenance Manual"
859	Index	2	Add page 131 to "Personnel and Equipment"
860	Index	6	Add page 114 to "Plans: Coordination of Special Provisions, Supplemental Specifications and Standard Specifications and Other Contract Requirements"
860	Index	7	Add page 106 to "Plans: Examination of"
860	Index	30	Change page 108 to 112 for "Product Data"
860	Index	31	Change page 108 to 112 for "Product Samples "
860	Index	32	Add page 124 to "Product Selection:"
861	Index	12	Add page 126 to "Prosecution of Work"
861	Index	38	Change page 115 to 135 for "Record Drawings"
863	Index	3	Add page 125 to "Sanitary Provisions"
863	Index	18	Insert "Services, Temporary...126"
863	Index	23	Add page 111 to "Shop Drawings"
864	Index	4	Add page 106 to "Site of Work, Examination of"
864	Index	12	Add page 120 to "Source of Supply and Quality"
864	Index	19	Add page 114 to "Special Provisions: Coordination of Plans, Supplemental Specifications and Standard Specifications and Other Contract Requirements"
864	Index	20	Add page 106 to "Special Provisions: Examination of"

<u>PG.</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
864	Index	26	Add page 114 to "Specifications: Coordination of Plans, Special Provisions and Other Contract Requirements"
864	Index	27	Add page 106 to "Specifications: Examination of"
864	Index	43	Add page 121 to "Storage"
865	Index	27	Delete page 108 from "Submittals: Shop Drawings"
865	Index	45	Insert "Temporary Utilities, Services, and Facilities...126"
866	Index	2	Add page 133 to "Termination of Contractor's Responsibility"
866	Index	23	Insert "Training...137"
866	Index	45	Add page 133 to "Utility Services"
867	Index	8	Insert "Warranties...121"
867	Index	24	Add page 126 to "Work: Prosecution of"

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.01
DEFINITIONS OF TERMS AND
PERMISSIBLE ABBREVIATIONS**

1.01.01 — Definitions:

Add the following definition:

SUBSTANTIAL COMPLETION: The date at which the performance of all work on the Project has been completed except minor or incidental items, final cleanup, work required under a warranty, and repair of unacceptable work, and provided the Engineer has determined that:

- A. The Project is safe and convenient for use by the public, and
- B. All traffic lanes including all safety appurtenances are in their final configuration, and
- C. Failure to complete the work and repairs excepted above does not result in the deterioration of other completed work; and provided further, that the value of work remaining to be performed, repairs, and cleanup is less than one percent (1%) of the estimated final Contract amount, and
- D. If applicable a Certificate of Compliance has been issued.

1.01.02 — Abbreviations, Publications, and Standards:

Delete the like-named abbreviations and replace it with the following abbreviations:

“**AA** – Aluminum Association, Inc. (The)
ALSC – American Lumber Standard Committee, Incorporated
AMCA – Air Movement and Control Association International, Inc.
AOSA – Association of Official Seed Analysts, Inc.
ASME – ASME International (The American Society of Mechanical Engineers International)
CTI – Cooling Technology Institute
EIA – Electronic Industries Alliance
ICEA – Insulated Cable Engineers Association, Inc.
IEEE – Institute of Electrical and Electronics Engineers, Inc. (The)
NTMA – National Terrazzo & Mosaic Association, Inc. (The)
TCA – Tile Council of America, Inc.”

Delete the Following abbreviations:

“**ADA** – Americans with Disabilities Act
AFPA – American Forest and Paper Association

BOCA – Building Officials and Code Administrators International
FM – Factory Mutual System
ICBO – International Conference of Building Officials
MIL – Military Standardization Documents, U.S Department of Defense
MS – Military Specifications
NWWDA – National Wood Window and Door Association
NFS – NFS International”

Add the following abbreviations:

“**ADAAG** – Americans with Disabilities Act (ADA)
AABC – Associated Air Balance Council
AAMA – American Architectural Manufacturers Association
ABMA – American Bearing Manufacturers Association
AF&PA – American Forest & Paper Association
AI – Asphalt Institute
BIA – Brick Industry Association (The)
CDA – Copper Development Association Inc.
CGA – Compressed Gas Association
FMG – FM Global
HI – Hydraulic Institute
HPVA – Hardwood Plywood & Veneer Association
ICC – International Code Council
ICC-ES – ICC Evaluation Service, Inc.
IEC – International Electrotechnical Commission
IGMA – Insulating Glass Manufacturers Alliance
ISO – International Organization for Standardization
MILSPEC – Military Specification and Standards
NADCA –National Air Duct Cleaners Association
NFRC – National Fenestration Rating Council
NHLA – National Hardwood Lumber Association
NSF – NSF International (National Sanitation Foundation International)
PDI – Plumbing & Drainage Institute
SDI – Steel Deck Institute *or*
- Steel Door Institute
SJI – Steel Joist Institute
SMACNA – Sheet Metal and Air Conditioning Contractors’ National Association
SPRI – Single Ply Roofing Industry
SWRI – Sealant, Waterproofing, & Restoration Institute
TIA/EIA – Telecommunications Industry Association/Electronic Industries Alliance
TRB – Transportation Research Board
UFAS – Uniform Federal Accessibility Standards
USGBC – U.S. Green Building Council
WDMA – Window & Door Manufacturers Association”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.05
CONTROL OF THE WORK**

Replace Article 1.05.08 – Vacant with the following:

1.05.08—SCHEDULES AND REPORTS:

When a project coordinator is not required by the Contract the following shall apply:

Baseline Bar Chart Construction Schedule: Within 20 calendar days after contract award the Contractor shall develop a comprehensive bar chart as a baseline schedule for the project. The bar chart schedule shall be submitted to the Engineer for approval and shall be based on the following guidelines:

1. The bar chart schedule shall contain a list of activities that represents the major activities of the project. At a minimum, this list should include a breakdown by individual structure or stage, including major components of each. The bar chart schedule shall contain sufficient detail to describe the progression of the work in a comprehensive manner. As a guide, 10 to 15 bar chart activities should be provided for each \$1 million of contract value. The following list is provided as an example only and is not meant to be all-inclusive or all-applicable:

General Activities Applicable to all projects

Project Constraints

- Winter shutdowns
- Environmental permits/application time of year restrictions
- Milestones
- Third Party approvals
- Long lead time items (procurement and fabrication of major elements)
- Adjacent Projects or work by others

Award

Notice to Proceed

Signing (Construction, temporary, permanent by location)

Mobilization

Permits as required

Field Office

Utility Relocations

Submittals/shop drawings/working drawings/product data

Construction of Waste Stock pile area

Clearing and Grubbing

Earthwork (Borrow, earth ex, rock ex etc.)

Traffic control items (including illumination and signalization)

Pavement markings

Roadway Construction (Breakdown into components)

Drainage (Breakdown into components)

Culverts
Plantings (including turf establishment)
Semi-final inspection
Final Cleanup

As required the following may supplement the activities listed above for the specific project types indicated:

a. For bridges and other structures, include major components such as abutments, wingwalls, piers, decks and retaining walls; further breakdown by footings, wall sections, parapets etc.

Temporary Earth Retention Systems
Cofferdam and Dewatering
Structure Excavation
Piles/test piles
Temporary Structures
Removal of Superstructure
Bearing Pads
Structural Steel (Breakdown by fabrication, delivery, installation, painting etc.)
Bridge deck

b. Multiple location projects such as traffic signal, incident management, lighting, planting and guiderail projects will be broken down first by location and then by operation. Other major activities of these types of projects should include, but are not limited to:

Installation of anchors
Driving posts
Foundations
Trenching and Backfilling
Installation of Span poles/mast arms
Installation of luminaries
Installation of cameras
Installation of VMS
Hanging heads
Sawcut loops
Energizing equipment

c. Facility Projects – Facilities construction shall reflect the same breakdown of the project as the schedule of values:

Division 2 – Existing Conditions
Division 3 – Concrete
Division 4 – Masonry
Division 5 – Metals

- Division 6 – Wood, Plastic, and Composites
- Division 7 – Thermal and Moisture Protection
- Division 8 – Openings
- Division 9 – Finishes
- Division 10 – Specialties
- Division 11 – Equipment
- Division 12 - Furnishings
- Division 13 – Special Construction
- Division 14 – Conveying Equipment
- Division 21 – Fire Suppression
- Division 22 – Plumbing
- Division 23 – Heating, Ventilating, and Air Conditioning
- Division 26 – Electrical
- Division 27 – Communications
- Division 28 – Electronic Safety and Security
- Division 31 – Earthwork
- Division 32 – Exterior Improvements
- Division 33 - Utilities

2. If the Engineer determines that additional detail is necessary, the Contractor shall provide it.

3. Each activity shall have a separate schedule bar. The schedule timeline shall be broken into weekly time periods with a vertical line to identify the first working day of each week.

4. The bar chart schedule shall show relationships among activities. The critical path for the Project shall be clearly defined on the schedule. The schedule shall show milestones for major elements of work, and shall be prepared on a sheet, or series of sheets of sufficient width to show data for the entire construction period.

5. If scheduling software is used to create the bar chart schedule, related reports such as a predecessor and successor report, a sort by total float, and a sort by early start shall also be submitted.

6. Project activities shall be scheduled to demonstrate that the construction completion date for the Project will occur prior to expiration of the Contract time. In addition, the schedule shall demonstrate conformance with any other dates stipulated in the Contract.

7. The Contractor is responsible to inform its subcontractor(s) and supplier(s) of the project schedule and any relevant updates.

8. There will be no direct payment for furnishing schedules, the cost thereof shall be considered as included in the general cost of the work.

9. For projects without a Mobilization item, 5% of the contract value will be withheld until such time as the Baseline Schedule is approved.

Monthly Updates: No later than the 10th day of each month, unless directed otherwise by the Engineer, the Contractor shall deliver to the Engineer three copies of the schedule to show the work actually accomplished during the preceding month, the actual time spent on each activity, and the estimated time needed to complete any

activity which has been started but not completed. Each time bar shall indicate, in 10% increments, the estimated percentage of that activity which remains to be completed. As the Project progresses, the Contractor shall place a contrasting mark in each bar to indicate the actual percentage of the activity that has been completed.

The monthly update shall include revisions of the schedule necessitated by revisions to the Project directed by the Engineer (including, but not limited to extra work), during the month preceding the update. Similarly, any changes of the schedule required due to changes in the Contractor's planning or progress shall also be included. The Engineer reserves the right to reject any such revisions. If the schedule revisions extend the contract completion date, due to extra or added work or delays beyond the control of the Contractor, the Contractor shall submit a request in writing for an extension of time in accordance with Article 1.08.08. This request shall be supported by an analysis of the schedules submitted previously.

Any schedule revisions shall be identified and explained in a cover letter accompanying the monthly update. The letter shall also describe in general terms the progress of the Project since the last schedule update and shall identify any items of special interest.

If the Contractor fails to provide monthly schedule updates, the Engineer has the right to hold 10% of the monthly estimated payment, or \$5,000, whichever is less, until such time as an update has been provided in accordance with this provision.

Biweekly Schedules: Each week, the Contractor shall submit to the Engineer a two week look-ahead schedule. This short-term schedule may be handwritten but shall clearly indicate all work planned for the following two week period.

Recovery Schedules: If the updated schedule indicates that the Project has fallen behind schedule, the Contractor shall either submit a time extension request in accordance with 1.08.08 or immediately institute steps acceptable to the Engineer to improve its progress of the Project. In such a case, the Contractor shall submit a recovery plan, as may be deemed necessary by the Engineer, to demonstrate the manner in which an acceptable rate of progress will be regained.

Add the following Article:

1.05.17 - WELDING

The Contractor shall ensure that all welding of materials permanently incorporated into the work, and welding of materials used temporarily during construction of the work is performed in accordance with the following codes:

- American Welding Society (AWS) Structural Welding Code – Steel – ANSI/AWS D1.1: Miscellaneous steel items that are statically loaded including but not limited to columns, and floor beams in buildings, railings, sign supports, cofferdams, tubular items, and modifications to existing statically loaded structures.
- AWS Structural Welding Code – Aluminum – AWS D1.2/D1.2M: Any aluminum structure or member including but not limited to brackets, light standards, and poles.

- AWS Structural Welding Code – Sheet Steel – AWS D1.3/D1.3M: Sheet steel and cold-formed members 0.18 in.(4.6 mm) or less in thickness used as, but not limited, to decking and stay-in-place forms.
- AWS Structural Welding Code – Reinforcing Steel – AWS D1.4/D1.4M: Steel material used in the reinforcement of cast-in-place or pre-cast Portland cement concrete elements including but not limited to bridge decks, catch basin components, walls, beams, deck units, and girders.
- AASHTO/AWS – Bridge Welding Code, AASHTO/AWS D1.5/D1.5M: Steel highway bridges and other dynamically loaded steel structures. Also includes sign supports, and any other fracture critical structure.

The edition governing the work shall be in effect on the date the Contract was advertised for solicitation of bids.

The Contractor is responsible to provide a Certified Welding Inspector in accordance with the above noted codes. The cost for this service is included in the general cost of the work.

All welders shall be certified by the Engineer in accordance with Section 6.03.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.08
PROSECUTION AND PROGRESS**

Article 1.08.01 – Transfer of Work or Contract:

Replace the last paragraph with the following:

The Contractor shall not sublet, sell, transfer, assign, or otherwise dispose of the Contract or any portion thereof, or of the work provided for therein, or of its right, title, or interest therein, to any individual or entity without the written consent of the Commissioner. No payment will be made for such work until written consent is provided by the Commissioner.

Article 1.08.07 – Determination of Contract Time:

Replace the fifth paragraph with the following:

The total elapsed time in calendar days, computed as described above, from the commencement date specified in the Engineer's "Notice to Proceed" to the "Substantial Completion" date specified in the Engineer's "Notice of Substantial Completion" shall be considered as the time used in the performance of the Contract work.

Article 1.08.09 – Failure to Complete Work on Time:

Replace the second paragraph with the following:

If the last day of the initial Contract time or the initial Contract date determined for Substantial Completion is before December 1 in the given year, liquidated damages as specified in the Contract shall be assessed against the Contractor per calendar day (including any days during a winter shutdown period) from that day until the date on which the Project is substantially completed.

1.08.12—Final Inspection:

Replace the first paragraph with the following:

If the Engineer determines that the work may be substantially complete, a Semi Final Inspection will be held as soon as practical. After the Semi Final Inspection is held and the Engineer determines that the requirements for Substantial Completion have been satisfied the Engineer will prepare a "Notice of Substantial Completion".

When the Contractor has completed all work listed in the "Notice of Substantial Completion" the Contractor shall prepare a written notice requesting a Final Inspection and a "Certificate of Acceptance of Work". The Engineer will hold an Inspection of the Project as soon as practical after the Engineer determines that the Project may be completed. If the Engineer deems the Project complete, said inspection shall constitute the Final Inspection, and the Engineer will notify the Contractor in writing that the Final Inspection has been performed.

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.09
MEASUREMENT AND PAYMENT

Article 1.09.04 – Extra and Cost-Plus Work

Delete the word “bonding” under section (a) Labor, (3).

Delete existing section (e) and replace with the following:

(e) Administrative Expense: When extra work on a cost-plus basis is performed by an authorized subcontractor, the Department will pay the Contractor an additional 7.5% for that work; such payment will be in addition to the percentage payments described in (a), (b), (c) and (d) above, as a reimbursement for the Contractor's administrative expense in connection with such work. Approval of such additional payments will be given only after the Contractor provides to the Engineer receipted invoices for all relevant costs.

Change Section designation for Miscellaneous from:

(f) Miscellaneous to: (g) Miscellaneous

Add the following as (f):

(f) Bonding Costs: For bonding on the total cost of the cost-plus work including administrative expenses as outlined in (e) above, the Contractor shall receive its actual cost. The Contractor shall provide to the Engineer documentation, satisfactory to the Engineer in form and substance, of all such costs.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.10
ENVIRONMENTAL COMPLIANCE**

Add the following Article:

1.10.08 – VEHICLE EMISSIONS

All motor vehicles and/or construction equipment (both on-highway and non-road) shall comply with all pertinent State and Federal regulations relative to exhaust emission controls and safety.

The Contractor shall establish staging zones for vehicles that are waiting to load or unload at the contract area. Such zones shall be located where the emissions from the vehicles will have minimum impact on abutters and the general public.

Idling of delivery trucks, dump trucks, and other equipment shall not be permitted in excess of 3 minutes during periods of non-activity except as allowed by the Regulations of Connecticut State Agencies Section 22a-174-18(b)(3)(c):

No mobile source engine shall be allowed “to operate for more than three (3) consecutive minutes when the mobile source is not in motion, except as follows:

- (i) When a mobile source is forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control,
- (ii) When it is necessary to operate defrosting, heating or cooling equipment to ensure the safety or health of the driver or passengers,
- (iii) When it is necessary to operate auxiliary equipment that is located in or on the mobile source to accomplish the intended use of the mobile source,
- (iv) To bring the mobile source to the manufacturer’s recommended operating temperature,
- (v) When the outdoor temperature is below twenty degrees Fahrenheit (20 degrees F) [negative seven degrees Celsius (-7 degrees C)],
- (vi) When the mobile source is undergoing maintenance that requires such mobile source be operated for more than three (3) consecutive minutes, or
- (vii) When a mobile source is in queue to be inspected by U.S. military personnel prior to gaining access to a U.S. military installation.”

All work shall be conducted to ensure that no harmful effects are caused to adjacent sensitive receptors. Sensitive receptors include but are not limited to hospitals, schools, daycare facilities, elderly housing and convalescent facilities. Engine exhaust shall be located away from fresh air intakes, air conditioners, and windows.

A Vehicle Emissions Mitigation plan will be required for areas where extensive work will be performed within (less than 50 feet (15 meters)) to sensitive receptors. No work will proceed until a sequence of construction and a Vehicle Emissions Mitigation plan is submitted in writing to the Engineer for review and all comments are addressed in a manner acceptable to the Engineer. The mitigation plan must address the control of vehicle emissions from all vehicles and construction equipment.

Any costs associated with this "Vehicle Emissions" article shall be included in the general cost of the Contract. In addition, there shall be no time granted to the contractor for compliance with this notice. The contractor's compliance with this notice and any associated regulations shall not be grounds for claims as outlined in Section 1.11 – "Claims".

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.11
CLAIMS**

Add the following Section:

1.11.01 – General: When filing a formal claim under Section 4-61 (referred to as “Section 4-61” below) of the C.G.S. (as revised), either as a lawsuit in the Superior Court or as a demand for arbitration, the Contractor must follow the procedures and comply with the requirements set forth in this Section of the Specifications. This Section does not, unless so specified, govern informal claims for additional compensation which the Contractor may bring before the Department. The Contractor should understand, however, that the Department may need, before the Department can resolve such a claim, the same kinds of documentation and other substantiation that it requires under this Section. It is the intent of the Department to compensate the Contractor for actual increased costs caused by or arising from acts or omissions on the part of the Department that violate legal or contractual duties owed to the Contractor by the Department.

1.11.02 – Notice of Claim: Whenever the Contractor intends to file a formal claim against the Department under Section 4-61, seeking compensation for additional costs, the Contractor shall notify the Commissioner in writing (in strict compliance with Section 4-61) of the details of said claim. Such written notice shall contain all pertinent information described in Article 1.11.05 below.

Once formal notice of a claim under C.G.S. Section 4-61 (b) (as revised) has been given to the Commissioner, the claimant may not change the claim in any way, in either concept or monetary amount, (1) without filing a new notice of claim and demand for arbitration to reflect any such change and (2) without the minimum period of six months after filing of the new demand commencing again and running before any hearing on the merits of the claim may be held. The only exception to this limitation will be for damages that continue to accrue after submission of the notice, in ways described and anticipated in the notice.

1.11.03 – Record Keeping: The Contractor shall keep daily records of all costs incurred in connection with its construction-related activities on behalf of the Department. These daily records shall identify each aspect of the Project affected by matters related to any claim for additional compensation that the Contractor has filed, intends to file, or has reason to believe that it may file against the Department; the specific Project locations where Project work has been so affected; the number of people working on the affected aspects of the Project at the pertinent time(s); and the types and number of pieces of equipment on the Project site at the pertinent time(s). If possible, any potential or anticipated effect on the Project’s progress or schedule which may result in a claim by the Contractor should also be noted contemporaneously with the cause of the effect, or as soon thereafter as possible.

1.11.04 – Claim Compensation: The payment of any claim, or any portion thereof, that is deemed valid by the Engineer shall be made in accordance with the following provisions of this Article:

(a) Compensable Items: The liability of the Department for claims will be limited to the following specifically-identified items of cost, insofar as they have not otherwise been paid for by the Department, and insofar as they were caused solely by the actions or omissions of the Department or its agents (except that with regard to payment for extra work, the Department will pay to the Contractor the mark-ups provided for in Article 1.04.05.):

- (1) Additional Project-site labor expenses.
- (2) Additional costs for materials.
- (3) Additional, unabsorbed Project-site overhead (**e.g.**, for mobilization and demobilization).
- (4) Additional costs for active equipment.
- (5) For each day of Project delay or suspension caused solely by actions or omissions of the Department, either
 - (i) an additional ten percent (10%) of the total amount of the costs identified in Subarticles (1) through (4) above; except that if the delay or suspension period prevented the Contractor from incurring enough Project costs under Subarticles (1) through (4) during that period to require a payment by the Department that would be greater than the payment described in subparagraph (ii) below, then the payment for affected home office overhead and profit shall instead be made in the following *per diem* amount:
 - (ii) six percent (6%) of the original total Contract amount divided by the original number of days of Contract time.Payment under either (i) or (ii) hereof shall be deemed to be complete and mutually-satisfactory compensation for any unabsorbed home office overhead and any profit related to the period of delay or suspension.
- (6) Additional equipment costs. Only actual equipment costs shall be used in the calculation of any compensation to be made in response to claims for additional Project compensation. Actual equipment costs shall be based upon records kept in the normal course of business and in accordance with generally-accepted accounting principles. Under no circumstances shall Blue Book or other guide or rental rates be used for this purpose (unless the Contractor had to rent the equipment from an unrelated party, in which case the actual rental charges paid by the Contractor, so long as they are reasonable, shall be used). Idle equipment, for instance, shall be paid for based only on its actual cost to the Contractor.
- (7) Subcontractor costs limited to, and determined in accordance with, Subarticles (1), (2), (3), (4), and (5) above and applicable statutory and case law. Such subcontractor costs may be paid for by the Department only (a) in the context of an informal claims settlement or (b) if the Contractor has itself paid or legally-assumed, present unconditional liability for those subcontractor costs.

(b) Non-Compensable Items: The Department will have no liability for the following specifically-identified non-compensable items:

- (1) Profit, in excess of that provided for herein.
- (2) Loss of anticipated profit.
- (3) Loss of bidding opportunities.
- (4) Reduction of bidding capacity.
- (5) Home office overhead in excess of that provided for in Article 1.11.04(a)(5) hereof.
- (6) Attorneys fees, claims preparation expenses, or other costs of claims proceedings or resolution.
- (7) Any other consequential or indirect expenses or costs, such as tort damages, or any other form of expense or damages not provided for in these Specifications or elsewhere in the Contract.

1.11.05 – Required Claim Documentation: All claims shall be submitted in writing to the Commissioner, and shall be sufficient in detail to enable the Engineer to ascertain the basis and the amount of each claim, and to investigate and evaluate each claim in detail. As a minimum, the Contractor must provide the following information for each and every claim and sub-claim asserted:

- (a) A detailed factual statement of the claim, with all dates, locations and items of work pertinent to the claim.
- (b) A statement of whether each requested additional amount of compensation or extension of time is based on provisions of the Contract or on an alleged breach of the Contract. Each supporting or breached Contract provision and a statement of the reasons why each such provision supports the claim, must be specifically identified or explained.
- (c) Excerpts from manuals or other texts which are standard in the industry, if available, that support the Contractor's claim.
- (d) The details of the circumstances that gave rise to the claim.
- (e) The date(s) on which any and all events resulting in the claim occurred, and the date(s) on which conditions resulting in the claim first became evident to the Contractor.
- (f) Specific identification of any pertinent document, and detailed description of the substance of any material oral communication, relating to the substance of such claim.
- (g) If an extension of time is sought, the specific dates and number of days for which it is sought, and the basis or bases for the extension sought. A critical path method, bar chart, or other type of graphical schedule that supports the extension must be submitted.

- (h) When submitting any claim over \$50,000, the Contractor shall certify in writing, under oath and in accordance with the formalities required by the contract, as to the following:
- (1) That supporting data is accurate and complete to the Contractors best knowledge and belief;
 - (2) That the amount of the dispute and the dispute itself accurately reflects what the Contractor in good faith believes to be the Departments liability;
 - (3) The certification shall be executed by:
 - a. If the Contractor is an individual, the certification shall be executed by that individual.
 - b. If the Contractor is not an individual, the certification shall be executed by a senior company official in charge at the Contractor's plant or location involved or an officer or general partner of the Contractor having overall responsibility for the conduct of the Contractors affairs.

1.11.06 – Auditing of Claims: All claims filed against the Department shall be subject to audit by the Department or its agents at any time following the filing of such claim. The Contractor and its subcontractors and suppliers shall cooperate fully with the Department's auditors. Failure of the Contractor, its subcontractors, or its suppliers to maintain and retain sufficient records to allow the Department or its agents to fully evaluate the claim shall constitute a waiver of any portion of such claim that cannot be verified by specific, adequate, contemporaneous records, and shall bar recovery on any claim or any portion of a claim for which such verification is not produced. Without limiting the foregoing requirements, and as a minimum, the Contractor shall make available to the Department and its agents the following documents in connection with any claim that the Contractor submits:

- (1) Daily time sheets and foreman's daily reports.
- (2) Union agreements, if any.
- (3) Insurance, welfare, and benefits records.
- (4) Payroll register.
- (5) Earnings records.
- (6) Payroll tax returns.
- (7) Records of property tax payments.
- (8) Material invoices, purchase orders, and all material and supply acquisition contracts.
- (9) Materials cost distribution worksheets.
- (10) Equipment records (list of company equipment, rates, etc.).
- (11) Vendor rental agreements
- (12) Subcontractor invoices to the Contractor, and the Contractor's certificates of payments to subcontractors.
- (13) Subcontractor payment certificates.
- (14) Canceled checks (payroll and vendors).
- (15) Job cost reports.
- (16) Job payroll ledger.

- (17) General ledger, general journal (if used), and all subsidiary ledgers and journals, together with all supporting documentation pertinent to entries made in these ledgers and journals.
- (18) Cash disbursements journals.
- (19) Financial statements for all years reflecting the operations on the Project.
- (20) Income tax returns for all years reflecting the operations on the Project.
- (21) Depreciation records on all company equipment, whether such records are maintained by the company involved, its accountant, or others.
- (22) If a source other than depreciation records is used to develop costs for the Contractor's internal purposes in establishing the actual cost of owning and operating equipment, all such other source documents.
- (23) All documents which reflect the Contractor's actual profit and overhead during the years that the Project was being performed, and for each of the five years prior to the commencement of the Project.
- (24) All documents related to the preparation of the Contractor's bid, including the final calculations on which the bid was based.
- (25) All documents which relate to the claim or to any sub-claim, together with all documents that support the amount of damages as to each claim or sub-claim.
- (26) Worksheets used to prepare the claim, which indicate the cost components of each item of the claim, including but not limited to the pertinent costs of labor, benefits and insurance, materials, equipment, and subcontractors' damages, as well as all documents which establish the relevant time periods, individuals involved, and the Project hours and the rates for the individuals.
- (27) The name, function, and pertinent activity of each Contractor's or subcontractor's official, or employee involved in or knowledgeable about events that give rise to, or facts that relate to, the claim.
- (28) The amount(s) of additional compensation sought and a break-down of the amount(s) into the categories specified as payable under Article 1.11.04 above.
- (29) The name, function, and pertinent activity of each Department official, employee or agent involved in or knowledgeable about events that give rise to, or facts that relate to, the claim.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.20
GENERAL CLAUSES FOR FACILITIES CONSTRUCTION**

1.20-1.00 – General:

Delete the last sentence of the first paragraph and replace with the following:

“Facilities Construction is defined as the type of construction that requires the issuance of a Certificate of Compliance (C.O.C.) by the State Building Inspector or his authorized representative at the completion of a project, and includes site work considered ancillary to this type of construction.”

Add the following article:

1.20-1.01.01—Definitions:

OWNER: Where used herein, it is synonymous with Department or State.

1.20-1.02.04 – Examination of Plans, Specifications, Special Provisions and Site of Work:

Delete the first sentence of the first paragraph and replace with the following:

“CSI-formatted specifications are organized into Divisions and Sections based on the CSI’s “MasterFormat” numbering system.”

1.20-1.02.13 – Knowledge of Applicable Laws:

Delete Items 1 through 9 in their entirety and replace with the following:

1. “The 2003 International Building Code with the State Building Code, including latest Connecticut Supplement and Amendments.
2. The 2003 International Plumbing Code.
3. The 2003 International Mechanical Code.
4. The 2003 International Existing Building Code.
5. The 2006 International Energy Conservation Code.
6. The 2005 NFPA 70 National Electrical Code.
7. The 2003 ICC/ANSI A117.1.

8. The Fire Safety Code, including latest Connecticut Supplement and Amendments.
9. The 2003 International Fire Code.
10. The 2003 NFPA 1 Uniform Fire Code.
11. The 2003 NFPA 101 Life Safety Code.”

Add the following as the new last paragraph:

“All work to be performed by the Contractor shall comply with the “Americans with Disabilities Act Accessibility Guidelines.”

1.20-1.03.01 – Consideration of Bids:

Delete the entire article and replace with the following:

“The apparent low bidder shall submit to the Manager of Contracts a Schedule of Values within 14 days after bid opening. Any other Contractor that the Department may subsequently designate as the apparent lowest bidder shall make the aforesaid submission within 14 days from the date on which the Department notifies said Contractor that it has become the apparent lowest bidder. If, however, the Department deems it necessary for such a subsequently designated Contractor to make said submission within a shorter period of time, the Contractor shall make the submission within the time designated by the Department.

The total in the Schedule of Values shall equal the bid dollar amount for the Major Lump Sum Item (MLSI).

The Schedule of Values shall be divided into “Line Items” listed separately for each CSI Section of the Special Provisions. An additional line item for “Mobilization” may be incorporated into the Schedule of Values; however, this item may not exceed 10% of the value of the MLSI. The “Mobilization” line item will also include costs associated with “General Conditions” and “Insurance/Bonding.” Where requested by the Department, the Contractor shall break down the line items further into more specific line items.

In the event that this Contract is terminated or a portion of this Contract is deleted for any reason or in any way allowable by law under this Contract after the apparent low bidder has been awarded the Contract, the Schedule of Values will not be used for estimating payment due the Contractor for work completed prior to such termination of the Contract or deletion of work thereunder. In the case of Contract termination, payment shall be made in accordance with Article 1.05.14.”

1.20-1.05.02--Shop Drawings, Product Data, Product Samples and Quality Assurance Submittals

Delete the last sentence of the first paragraph and replace with the following:

“All facsimiles or other electronic documents from the Contractor shall be followed by an official transmittal.”

Delete the third paragraph and replace with the following:

“The Contractor shall number each submittal consecutively: When resubmitting a “Revise and Resubmit” or “Rejected” submittal, the Contractor shall label the transmittal with the original submittal number followed by a letter to designate the additional submission. All submittals shall be numbered conforming to the following examples:”

In column B of line 001, line 001a, and line 001b of the table in subsection 1, replace “07511” with “075110.”

Add the following to the end of the first paragraph of subsection 2:

“The Department reserves the right to return partial submittals unreviewed to the Contractor.”

Revise the third paragraph of subsection 2 to read:

“The Contractor shall allow at least 60 calendar days for review of any submittal requiring approval by FAA, FTA, any railroad, DEP, U.S. Coast Guard, Army Corps of Engineers, or any other outside agency.”

Delete the third and fourth paragraphs of subsection 3 and replace with the following:

“The Designer will not review submittals and the Engineer will not process payment estimates until the initial submittal schedule has been provided. Any delays in construction due to the Contractor's failure to provide a submittal schedule shall be the responsibility of the Contractor.

The Contractor must update its submittal schedule at least once a month, and distribute and post each updated schedule in the manner described above. The Engineer reserves the right not to process payment estimates without a recently updated submittal schedule on file.”

Replace the first sentence of the first paragraph of subsection 4 with the following:

“Shop Drawings consist of fabrication and installation drawings, roughing-in and setting drawings, schedules, patterns, templates and similar drawings, and wiring diagrams showing field-installed wiring, including power, signal, and control wiring.”

Replace the second paragraph of subsection 4 with the following:

“Shop drawings shall include the following information: Contract number, Project description, number and title of the drawing, date of drawing, revision number, name of Contractor and subcontractor submitting drawings, dimensions, identification of products, shopwork manufacturing instructions, design calculations, statement of compliance with Contractual standards, notation of dimensions established by field measurement, relationship to adjoining construction clearly indicated, seal and signature of a professional engineer if specified, and any other information required by individual Contract provisions.”

Replace the first sentence of the first paragraph of subsection 5 with the following:

“Product data consist of printed information such as manufacturer’s product specifications, manufacturer’s installation instructions, manufacturer’s catalog cuts, standard color charts, wiring diagrams showing factory-installed wiring, printed performance curves, operational range diagrams, and mill reports.”

Replace the first sentence of the first paragraph of subsection 7 with the following:

“Quality assurance submittals consist of qualification data, design data, certifications, manufacturer’s instructions, manufacturer’s field reports, test reports, Material Safety Data Sheets (MSDSs), and other quality assurance information required by individual Contract provisions.”

1.20-1.05.04—Coordination of Special Provisions, Plans, Supplemental Specifications and Standard Specifications and Other Contract Requirements:

Delete the first and second paragraphs and replace with the following:

“Industry Standards: Each entity engaged in construction of the Contract shall be familiar with industry standards applicable to that entity’s construction activities. If printed standards have been established by organizations referenced in Article 1.01.02 or in the Contract, the Contractor shall obtain copies of said standards directly from the publication source.

Unless the Special Provisions include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Special Provisions to the extent referenced. Such standards are made a part of the Contract by reference.”

Add the following article:

1.20-1.05.08—Schedules and Reports:

Daily Construction Reports: The Contractor shall assist the Engineer in the preparation of a daily construction report, by ensuring that each of the Contractor’s employees and subcontractors working on the Project site on a given day signs the Engineer’s sign-in sheet for that day; and by keeping and providing to the Engineer its own daily list of employees and subcontractors who worked on the Project site on that day.

Add the following article:

1.20-1.05.23—Requests for Information (RFIs):

The Contractor shall forward all RFIs to the Engineer in writing (facsimile or other electronic document) for review. The Engineer will forward the RFI to the Designer for review. Upon receipt of an RFI, the Designer will attempt to determine if additional information is required from the Contractor to respond to the RFI, and request said information from the Engineer.

All other RFIs will be responded to within 10 calendar days of receipt by the Designer.

1.20-1.05.24--Project Meetings:

Delete the third paragraph under subsection 1.

Delete the second paragraph under subsection 2 and replace with the following:

“The meeting participants shall review progress of other construction activities and preparations for the particular activity under consideration, including requirements of Contract documents, related requests for interpretations, related construction orders, purchases, deliveries, submittals, review of mockups, possible conflicts, compatibility problems, time schedules, weather limitations, manufacturer’s written recommendations, warranty requirements, compatibility of materials, acceptability of substrates, temporary facilities and controls, space and access limitations, regulations of authorities having jurisdiction, testing and inspecting requirements, installation procedures coordination with other work, required performance results, protection of adjacent work, and protection of construction and personnel.”

Delete the second, third and fourth paragraph under subsection 3 and replace with the following:

“The Contractor shall provide the Engineer with a detailed agenda for the proposed

meeting, specifying what topics will be covered. In addition to representatives of the Engineer, each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall attend these meetings. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Project.

At each progress meeting, the participants shall (1) review items of significance that could affect progress; (2) discuss topics appropriate to the current status of the Project; (3) review progress since the last meeting; (4) determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to the Contractor's Construction Schedule; (5) determine how to expedite any Project work that may be behind schedule; (6) discuss whether or not schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract time; and (7) review the present and future needs of each entity represented at the meeting, including such items as interface requirements, time, sequences, deliveries, off-site fabrication problems, access, site utilization, temporary facilities and controls, hours of work, hazards and risks, housekeeping, quality and work standards, status of correction of deficient items, field observations, requests for interpretations, status of proposal requests, pending changes, status of construction orders, and documentation of information for payment requests. The Engineer will distribute copies of minutes of the meeting to the Designer and the Contractor. The Contractor shall distribute copies to parties who were or should have been at the meeting."

Delete article 1.20-1.05.25—Schedules and Reports in its entirety

1.20-1.06.08 - Warranties:

Delete the eighth and ninth paragraph and replace with the following:

"The Contractor shall:

(a) Bind warranties in heavy-duty, commercial-quality, durable 3-ring vinyl-covered loose-leaf binders, thick enough to accommodate the contents, and sized to receive 8 1/2-inch x 11-inch paper (216-millimeter x 279-millimeter) paper.

(b) Identify the binder's contents on the binder's front and spine with the typed or printed title "WARRANTIES," the Project title or name, and the name of the Contractor.

(c) Provide a heavy paper divider with a tab for each separate warranty.

(d) Mark the tab to identify the related product or installation.

(e) Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the Contractor or pertinent subcontractor.

(f) Furnish to the Department a written warranty for all Project work accompanied by a cover letter with the following contents:

[Addressed to:]

Commissioner of Transportation
Department of Transportation
P.O. Box 317546
Newington, Connecticut 06131-7546

Project Title and Number

[We] hereby warrant all materials and workmanship for all work performed under this Contract for a period of one (1) year from [date of issuance of C.O.C.] against failures of workmanship and materials in accordance with the Contract. Furthermore, as a condition of this warranty, [we] agree to have in place all insurance coverage identified in the Contract for the performance of any warranty work.

[Signature:] [Name of authorized signatory]
[Title]

(g) Submit to the Engineer, upon completion of installation of materials or assemblies that are required to have either a flame-rating or a fire-endurance hourly rating, a detailed letter certifying that the required rating has been attained.

Upon determination by the Engineer that Project work covered by a warranty has failed, the Contractor shall replace or rebuild the work to an acceptable condition complying with Contract requirements. The Contractor is responsible for the cost of replacing or rebuilding defective construction or components and those which may have needed to be damaged or removed in order to cure the defective work including costs of material, equipment, labor, and material disposal, regardless of whether or not the State has benefited from use of the work through a portion of its anticipated useful service life. The Contractor shall respond to the Project Site when Project work covered by a warranty has failed within 3 calendar days, unless in the Engineer's opinion said failure is deemed to be an emergency, in which case the Contractor shall respond to the Project Site as directed by the Engineer."

1.20-1.08.03—Prosecution of Work:

Under subsection '3. Cutting and Patching,' delete the heading 'B. Protection of Structural Elements' and replace with the following:

"B. Protection:"

Move the existing first and second paragraphs to under the following subparagraph:

"1. Structural Elements:"

Add the following after the first paragraph under B:

“2. Operational Elements: The Contractor shall not cut and patch operating elements and related components in a manner that results in their reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

3. Miscellaneous Elements: The Contractor shall not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.”

Add the following after subsection 3:

“4. Selective Demolition:

A. Definitions:

Remove: The Contractor shall detach materials from existing construction and legally dispose or recycle them off-site, unless indicated to be removed and salvaged or removed and reinstalled. Except for materials indicated to be reused, salvaged,

reinstalled, or otherwise indicated to remain Engineer's property, demolished materials shall become Contractor's property and shall be removed from the Project Site.

Remove and Salvage: The Contractor shall detach materials from existing construction and deliver them to Engineer. The Engineer reserves the right to identify other materials for salvage during the course of demolition.

Remove and Reinstall: The Contractor shall detach materials from existing construction, prepare them for reuse, and reinstall them where indicated.

Existing to Remain: Existing materials of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

B. Approval Process:

The Contractor shall submit pre-demolition photographs to the Engineer prior to the commencement of Project work to show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations.

Well in advance of performing any selective demolition on the Project, the Contractor shall submit to the Engineer a proposal describing the procedures that the Contractor intends to use for same.

The Contractor shall include the following information, as applicable, in its proposal: (1) detailed sequence of selective demolition and removal work with starting and ending dates for each activity while ensuring that the Engineer's on-site operations are not disrupted; (2) interruption of utility services; (3) coordination for shutoff, capping, and continuation of utility services; (4) use of elevators and stairs; (5) locations of temporary partitions and means of egress; (6) coordination of Engineer's continuing occupancy of

portions of existing building and of Engineer's partial occupancy of completed Project work; and (7) means of protection for items to remain and items in path of waste removal from building.

The Contractor shall comply with (1) governing EPA notification regulations before beginning selective demolition; (2) hauling and disposal regulations of authorities having jurisdiction; (3) ANSI A10.6; and (4) NFPA 241.

The Engineer will conduct a Pre-Demolition Meeting at the Project site in accordance with Article 1.20-1.05.24. Said meeting will review the methods and procedures related to selective demolition including, but not limited to, the following: (1) an inspection and discussion of the condition of construction to be selectively demolished; (2) a review of the structural load limitations of the existing structure; (3) a review and finalization of the

selective demolition schedule and a verification of the availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays; (4) a review of requirements of Project work performed by other trades that rely on substrates exposed by selective demolition operations; and (5) a review of areas where existing construction is to remain and requires protection.

C. Repair Materials:

The Contractor shall comply with Article 1.20-1.08.03 subsection 3E for repair materials and shall comply with material and installation requirements specified in other Contract provisions.

D. Examination:

The Contractor shall (1) verify that utilities have been disconnected and capped; (2) survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required; (3) inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged; (4) investigate and measure the nature and extent of unanticipated mechanical, electrical, or structural elements that conflict with intended function or design and submit a written report to

Engineer; and (5) perform surveys as the Project work progresses to detect hazards resulting from selective demolition activities.

E. Utility Services:

The Contractor shall (1) maintain existing utility services indicated to remain and protect them against damage during selective demolition operations; (2) not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by the Engineer; (3) provide temporary services during interruptions to existing utilities, as acceptable to Engineer; (4) provide at least 3 calendar days notice to the Engineer if shutdown of service is required during changeover; and (5) locate, identify, disconnect,

and seal or cap off indicated utilities serving areas to be selectively demolished. The Contractor shall arrange to shut off indicated utilities with utility companies. If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition the Contractor shall provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building. The Contractor shall cut off pipe or conduit in walls or partitions to be removed and shall cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

The Contractor shall refer to other Contract provisions for shutting off, disconnecting, removing, and sealing or capping utilities. The Contractor shall not start selective demolition work until utility disconnecting and sealing have been completed and verified by the Engineer in writing.

F. Preparation:

The Contractor shall conduct selective demolition and debris-removal operations to ensure minimum interference with adjacent occupied and used facilities on the Project site. The Contractor shall not disrupt the Owner's operations without the Engineer's permission. The Contractor shall protect existing site improvements, appurtenances, and landscaping to remain.

The Contractor shall provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain. The Contractor shall provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas. The Contractor shall protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations. The Contractor shall cover and protect furniture, furnishings, and equipment that have not been removed.

The Contractor shall provide temporary enclosures for protection of existing building

and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. The Contractor shall provide temporary weathertight enclosure for building exterior. Where heating is needed and permanent enclosure is not complete, the Contractor shall provide insulated temporary enclosures and shall coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.

The Contractor shall erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

The Contractor shall provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished. The Contractor shall strengthen or add new supports when required during progress of selective demolition.

G. Pollution Controls:

The Contractor shall comply with governing regulations pertaining to environmental protection.

The Contractor shall not use water when it may create a hazardous or objectionable condition such as ice, flooding, or pollution.

The Contractor shall remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas. The Contractor shall remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

The Contractor shall clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. The Contractor shall return adjacent areas to condition existing before selective demolition operations began.

H. Performance:

The Contractor shall not use explosives for demolition purposes.

The Contractor shall demolish and remove existing construction only to the extent required by new construction and as indicated. The Contractor shall (1) proceed with selective demolition systematically; (2) neatly cut openings and holes plumb, square, and true to dimensions required; (3) use cutting methods least likely to damage

remaining or adjoining construction; (4) use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces; (5) temporarily cover openings to remain; (6) cut or drill from the

exposed or finished side into concealed surfaces to avoid marring existing finished surfaces; (7) not use cutting torches until work area is cleared of flammable materials; (8) verify condition and contents of concealed spaces such as duct and pipe interiors before starting flame-cutting operations; (9) maintain fire watch and portable fire-suppression devices during flame-cutting operations; (10) maintain adequate ventilation when using cutting torches; (11) remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site; (12) remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation; (13) locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing; and (14) dispose of demolished items and materials promptly.

The Contractor shall comply with the Engineer's requirements for using and protecting walkways, building entries, and other building facilities during selective demolition operations.

The Contractor shall demolish and remove foundations and other below grade structures completely unless otherwise indicated on the plans. The Contractor shall fill below grade areas and voids resulting from demolition of structures with granular fill materials. Prior to placement of fill materials, the Contractor shall ensure that the areas to be filled are free of standing water, frost, frozen material, trash, and debris. After fill placement and compaction, grade surface to meet adjacent contours and provide flow

to surface drainage structures. Backfilling and grading related to demolition is included in the Major Lump Sum Item (MLSI) for the Project. There will be no separate payment for this backfilling and grading.

The Contractor shall (1) demolish concrete in sections; (2) cut concrete at junctures with construction to remain to the depth shown on the Contract plans and at regular intervals using power-driven saw; and (3) remove concrete between saw cuts.

The Contractor shall (1) demolish masonry in small sections; (2) cut masonry at junctures with construction to remain using power-driven saw; and (3) remove masonry between saw cuts.

The Contractor shall (1) saw-cut perimeter of concrete slabs-on-grade to be demolished as shown on the Contract plans; and (2) break up and remove concrete slabs-on-grade.

The Contractor shall (1) remove floor coverings and adhesive according to recommendations in RFCI-WP and its Addendum; and (2) remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.

The Contractor shall (1) only remove existing roofing in one day to the extent that it can

be covered by new roofing; and (2) refer to other Contract provisions for new roofing requirements.

The Contractor shall remove air conditioning equipment without releasing refrigerants.

I. Reuse of Building Elements:

The Contractor shall not demolish building elements beyond what is indicated on the plans without the Engineer's approval.

J. Removed and Salvaged Materials:

Unless otherwise directed by the Engineer, the Contractor shall (1) store materials in a secure area until delivery to the owner; (2) transport materials to the owner's storage area off-site; and (3) protect materials from damage during transport and storage.

K. Removed and Reinstalled Materials:

Unless otherwise directed by the Engineer, the Contractor shall (1) clean and repair materials to functional condition adequate for intended reuse; (2) paint equipment to match the color of new equipment; (3) protect materials from damage during transport and storage; and (4) reinstall items in locations indicated complying with installation requirements for new materials and equipment and providing connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

L. Existing Materials to Remain:

The Contractor shall protect construction indicated to remain against damage and soiling during selective demolition.

The Contractor shall drain piping and cap or plug piping with the same or a compatible piping material for piping to be abandoned in place.

The Contractor shall cap or plug ducts with the same or a compatible ductwork material for ducts to be abandoned in place.

The Contractor shall cut and remove concealed conduits and wiring to be abandoned in place 2-inches (50-mm) below the surface of the adjacent construction, cap the conduit end, and patch the surface to match the existing finish. The Contractor shall cut existing conduits installed in concrete slabs to be abandoned in place flush with the top of the slab and fill conduit end with a minimum of 4-inches (100-mm) of concrete.

M. Patching and Repairing:

The Contractor shall comply with Article 1.20-1.08.03 subsection 3H for patching and

repairing damage to adjacent construction caused by selective demolition operations.

N. Disposal of Demolished Materials:

The Contractor shall (1) not allow demolished materials to accumulate or be sold on the Project Site; (2) not burn demolished materials on the Project Site; and (3) promptly and legally dispose or recycle demolished materials off the Project Site.”

1.20-1.08.05--Personnel and Equipment:

Replace “FM with “FMG” in subsection (a)

Add the following article:

“1.20-1.08.12--Semi-Final and Final Inspections:

1. Semi-Final Inspection: Before requesting the Semi-Final Inspection, the Contractor shall show 100% completion for all Project work claimed as complete. The Contractor shall submit final test/adjust/balance records including the final air and water balance report. For all incomplete Project work, the Contractor shall prepare its own “Punch List” of the incomplete items and reasons the work is not complete. The Contractor shall submit final test/adjust/balance records including the final air and water balance report.

On receipt of a Contractor request for inspection, the Engineer will proceed with inspection or notify the Contractor of unfulfilled requirements. The Engineer will prepare a “Punch List” of unfilled, substandard, or incomplete items. During this inspection, the Contractor shall have all technicians necessary to demonstrate the complete operation of all systems on-site. Examples of such systems include, but are not limited to, the following: boiler, HVAC, fire alarm, and building automation. The Engineer will advise the Contractor of the construction that must be completed or corrected before the issuance of the C.O.C. Results of the completed inspection will form the basis of requirements for the Final Inspection. The Engineer reserves the right to issue the C.O.C. after the Semi-Final Inspection if there are no Building Code or Fire Code compliance issues or any major “Punch List” items.

2. Final Inspection: Before requesting Final Inspection for issuance of the C.O.C., the Contractor shall: (1) submit specific warranties, maintenance service agreements, final certifications and similar documents; (2) submit Record Drawings, Record Specifications, operations and maintenance manuals, final project photographs, property surveys, and similar final record information; (3) deliver spare parts; (4) make final changeover of permanent locks and deliver the keys to the Engineer; (5) complete start-up testing of systems; (6) train the owner's operation and maintenance personnel; (7) discontinue or change over and remove temporary facilities from the Project Site, along with construction tools, mock-ups, and similar elements; (8) complete final

cleaning requirements, including touch-up painting; (9) touch-up and otherwise repair and restore marred exposed finishes to eliminate visual defects; (10) submit a certified copy of the Engineer's "Punch List" of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Engineer; (11) submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Final Inspection, or when the Engineer took possession of and responsibility for corresponding elements of the Project work; and (12) install permanent electrical service. The Contractor shall

install permanent electrical service prior to Semi-Final Inspection if requested by the Engineer, or if necessary for the Engineer or Contractor to perform testing of building and other related systems and equipment to certify acceptance and completion of Project work. The Contractor shall submit all outstanding items or unacceptable submissions from the Semi-Final Inspection, or other outstanding items required for submittal, prior to the Final Inspection.

On receipt of a Contractor request for inspection, the Engineer will proceed with inspection and notify the Contractor of unfulfilled requirements."

1.20 – 1.08.13 – Termination of the Contractor's Responsibility:

Add subsection 3 as follows:

"3. Insurance Coverage: The Contractor shall have in place all insurance coverage identified in Article 1.03.07 for the performance of any warranty work."

1.20-1.08.14--Acceptance of Project:

Add the following to subsection 2 under the heading "Equipment and Systems Maintenance Manual:"

"(j) Copies of maintenance agreements with service agent name and telephone number."

Add the following paragraph in subsection 3 after the second paragraph:

"The Contractor shall provide a syllabus prior to the training to ensure that the appropriate owner's operation and maintenance personnel are in attendance."

Delete the last paragraph and replace with the following:

The Contractor shall submit to the Engineer for approval, a qualified commercial videographer to videotape the training sessions. The videographer shall be a firm or an individual of established reputation that has been regularly engaged as a professional videographer for not less than 3 years.

The Contractor shall video record each training session and provide said video in DVD format to the Engineer for the owner's future use."

Add the following section:

"1.20-1.09.06—Partial Payments:

With each payment request under the MLSI, the Contractor shall submit AIA Form G702 (Application and Certificate of Payment) and Form G703 (Continuation Sheet). The Contractor is not required to obtain the Architect's signature on Form G702. Once approved by the Engineer, the Forms G702 and G703 become the basis of payment under the MLSI."

Add the following section:

"1.20-9.75.04—Method of Measurement:

Mobilization as defined in Article 1.20-1.03.01 will be paid in the manner described hereinafter; however, the determination of the total contract price earned shall not include the amount of mobilization earned during the period covered by the current monthly estimate – but shall include amounts previously earned and certified for payment:

1. When the first payment estimate is made, 25 percent of the "Mobilization" line item will be certified for payment.
2. When the Baseline Schedule, as specified under Section 1.05.08, is accepted, 50 percent of the "Mobilization" line item, minus any previous payments, will be certified for payment.
3. When 10 percent of the total original contract price is earned and the Baseline Schedule, as specified under Section 1.05.08, is accepted, 75 percent of the "Mobilization" line item, minus any previous payments, will be certified for payment.
4. When 30 percent of the total original contract price is earned and the Baseline Schedule, as specified under Section 1.05.08, is accepted, 100 percent of the "Mobilization" line item, minus any previous payments, will be certified for payment."

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 2.02
ROADWAY EXCAVATION, FORMATION OF
EMBANKMENT AND DISPOSAL OF
SURPLUS MATERIAL**

2.02.04 – Method of Measurement:

Second to last Paragraph - replace the last sentence with the following:

“Bituminous parking areas are considered as bituminous concrete pavement.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 2.05
TRENCH EXCAVATION**

Delete the entire Section and replace with the following:

2.05.01--Description:

Paragraph 2 - Delete the only sentence and replace with the following:

2) The removal of stormwater drainage structures, stormwater pipes and appurtenances beyond the limits of the roadway and structure excavation.

Sub article 2 - Rock in Trench - Delete the only sentence and replace with the following:

(2) Rock, insofar as it applies to trench excavation, shall be defined as rock in definite ledge formation, boulders, or portions of boulders, cement masonry structures, concrete structures, reinforced concrete pipe, Portland cement concrete pavement or base, of 1/2 cubic yard (0.5 cubic meters) or more in volume, removed as indicated or directed from within the payment lines for trench excavation.

2.05.05 -Basis of Payment

Paragraph 13 - Delete the entire sentence "There will be no direct payment for the plugging of existing pipes....." and replace with the following:

There will be no direct Payment for the plugging of existing pipes, removal and disposal of metal or plastic pipes or for the breaking up of floors in drainage structures being abandoned. The cost shall be included in the contract unit prices of the drainage and excavation items.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 3.04
PROCESSED AGGREGATE BASE**

Delete the entire Section and replace with the following:

3.04.01--Description: The base shall consist of a foundation constructed on the prepared subbase or subgrade in accordance with these specifications and in conformity with the lines, grades, compacted thickness and typical cross-section as shown on the plans.

3.04.02--Materials: All materials for this work shall conform to the requirements of Article M.05.01.

3.04.03--Construction Methods: Only one type of coarse aggregate shall be used on a project unless otherwise permitted by the Engineer.

Prior to placing the processed aggregate base, the prepared subbase or subgrade shall be maintained true to line and grade, for a minimum distance of 200 feet (60 meters) in advance of the work. None of the aggregate courses shall be placed more than 500 feet (150 meters) ahead of the compaction and binding operation on that particular course.

The processed aggregate base shall be spread uniformly by a method approved by the Engineer. The thickness of each course shall not be more than 4 inches (100 millimeters) after compaction, unless otherwise ordered.

After the aggregate is spread, it shall be thoroughly compacted and bound by use of equipment specifically manufactured for that purpose. Rollers shall deliver a ground pressure of not less than 300 pounds per lineal inch (52.5 newtons/millimeter) of contact width and shall have a weight (mass) not less than 10 tons (9100 kilograms). Vibratory units shall have a static weight (mass) of not less than 4 tons (3650 kilograms). Water may be used during the compaction and binding operation and shall be applied from an approved watering device. The compacting and binding operation shall begin at the outside edges, overlapping the shoulders for a distance of not less than 6 inches (150 millimeters) and progress towards the middle, parallel with the centerline of the pavement. The work shall cover the entire surface of the course with uniform overlapping of each preceding track or pass. Areas of super-elevation and special cross slope shall be compacted by beginning at the lowest edge and proceeding towards the higher edge, unless otherwise directed by the Engineer. The compacting and binding operation shall be continued until the voids in the aggregates have been reduced to provide a firm and uniform surface satisfactory to the Engineer. The amount of compactive effort shall in no case shall be less than four (4) complete passes of the compacting and binding operations. All aggregate shall be completely compacted and bound at the end of each day's work or when traffic is to be permitted to operate on the

road. The dry density of each layer of processed aggregate base after compaction shall not be less than 95 percent of the dry density for that material when tested in accordance with AASHTO T180, Method D.

Should the subbase or subgrade material become churned up or mixed with the processed aggregate base at any time, the Contractor shall, without additional compensation remove the mixture. The Contractor shall add new subbase material, if required, and reshape and recompact the subbase in accordance with the requirements of Article 2.12.03. New aggregate material shall be added, compacted and bound, as hereinbefore specified, to match the surrounding surface.

Any surface irregularities which develop during, or after work on each course, shall be corrected by loosening material already in place and removing or adding aggregate as required. The entire area, including the surrounding surface, shall be re-compacted and rebound until it is brought to a firm and uniform surface satisfactory to the Engineer.

3.04.04--Method of Measurement: Processed Aggregate Base will be measured horizontally in-place after final grading and compaction. Materials placed beyond the horizontal limits indicated on the plans will not be measured for payment.

The total thickness shall be as indicated on the plans, or as ordered by the Engineer and within a tolerance of minus three-fourths of an inch ($-\frac{3}{4}$ "") to plus one-half inch ($+\frac{1}{2}$ "") (-19 millimeters to +13 millimeters).

Measurements to determine the thickness will be taken by the Engineer at intervals of 500 feet (150 meters) or less, along lanes, and shall be considered representative of the lane. For the purpose of these measurements, a shoulder will be considered a lane.

If a thickness measurement is taken and found deficient, the Engineer will take such additional measurements as he considers necessary to determine the longitudinal limits of the deficiency. Areas not within allowable tolerances shall be corrected, as ordered by the Engineer, without additional compensation to the Contractor.

3.04.05--Basis of Payment: This work will be paid for at the contract unit price per cubic yard for "Processed Aggregate Base", complete in place, which price shall include all materials, tools, equipment and work incidental thereto.

Pay Item	Pay Unit
Processed Aggregate Base	c.y. (cu. m)

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 4.01
CONCRETE PAVEMENT**

Article 4.01.03-A. Composition:

Add the following new paragraph before the last paragraph:

“The temperature of the concrete at the time of placement shall not be less than 60° F (15.5° C) or greater than 90° F (32° C). For pumped concrete, the temperature shall be determined at the placement end of the pump line. The temperature of the concrete shall be determined in accordance with ASTM C1064.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 5.14
PRESTRESSED CONCRETE MEMBERS**

Article 5.14.03 – Construction Methods:

Change the last sentence of 5.14.03-16 – Methods and Equipment to read:

“The results of this investigation, including computations, shall be submitted to the Engineer.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 6.01
CONCRETE FOR STRUCTURES**

Article 6.01.02 – Materials:

Add the following:

Material for stay-in-place metal forms shall be made of zinc-coated (galvanized) steel sheet conforming to ASTM Specification A653, Structural Steel (SS) Grade 33 through 80 (ASTM Specification A653M, Structural Steel (SS) Grade 250 through 550). The minimum gage thickness shall be 20 gage. Coating weight shall conform to ASTM A924, Class G235 (ASTM A924M, Class Z700) and shall otherwise meet all requirements relevant to steel stay-in-place metal forms and the placing of concrete as specified herein and as noted on the contract drawings.

Material for the form supports shall be fabricated from the same material and conform to the same material requirements as the forms themselves or they shall be fabricated from structural steel conforming to the requirements of ASTM A36 (ASTM A36M) which shall be hot-dip galvanized in accordance with ASTM A123 (ASTM A123M).

Lightweight filler material shall be as recommended by the form's manufacturer.

Subarticle 6.01.03 – 3, Forms:

Add the following:

Stay-in-Place Metal Form System:

Stay-in-place metal forms shall have a minimum depth of form valley equal to two inches (50 millimeters). The forms shall have closed tapered ends. Lightweight filler material shall be used in the form valleys.

The metal forms shall be designed on the basis of dead load of the form, reinforcement and the plastic concrete, including the additional weight of concrete due to the deflection of the metal forms, plus 50 pounds per square foot (2.40 kilopascals) for construction loads. The allowable stress in the corrugated form and the accessories shall not be greater than 0.725 times the yield strength of the furnished material and the allowable stress shall not exceed 36,000 psi (250 megapascal). The span for design and deflection shall be the clear distance between edges of the beams or girders less two inches (50 millimeters) and shall be measured parallel to the form flutes. Maximum deflection of the forms under the weight of the plastic concrete, reinforcement, and forms shall not exceed 1/180 of the form span or 0.5 inches (13 millimeters), whichever is less. The permissible form camber shall be based on the actual dead load condition. Camber shall not be used to compensate for deflection in excess of the foregoing limits.

Form support angles shall be designed as a cantilever. The horizontal leg of the form's support angle shall not be greater than 3 inches (75 millimeters).

Before fabricating any material, the Contractor shall submit working drawings to the Engineer for review in accordance with Article 1.05.02-2, Working Drawings. These drawings shall include the proposed method of form construction, erection plans including weld procedure(s), material lists, material designation, gage of all materials, and the details of corrugation. Also, copies of the form design computations shall be submitted with the working drawings.

Form supports shall be used and no stay-in-place metal forms shall be placed over or be directly supported by the top flanges of beams or girders. The form supports may be supported by or be attached to the top flanges. Stay-in-place metal forms shall not be used in bays where longitudinal slab construction joints are located. Stay-in-place metal forms shall not be used under cantilevered slabs such as the overhang outside of fascia members.

Welding to the top flanges of steel beams and girders is not allowed in the areas where the top flanges are in tension, or as indicated on the plans. Alternate installation procedures shall be submitted addressing this condition.

Drilling of holes in prestressed concrete beams or the use of power-actuated tools on the prestressed concrete beams for fastening of the form supports to the prestressed concrete beams will not be permitted. No welding will be permitted on the reinforcing steel in the prestressed units.

All edges of openings cut for drains, pipes, and similar appurtenances shall be independently supported around the entire periphery of the opening.

All fabricated stay-in-place metal forms shall be unloaded, stored, and handled in such a manner as to preclude damage to the forms. Damaged material shall be replaced at no additional cost. Any exposed form or form support metal where the galvanized coating has been damaged, shall be thoroughly cleaned, wire brushed, then coated with two coats of a zinc dust-zinc oxide primer, FS No. TT-P-641d, Type II, as directed by the Engineer.

All fabricated stay-in-place metal forms shall be stored at the project site at least four inches (100 millimeters) above the ground on platforms, skids or other suitable supports and shall be protected against corrosion and damage.

Forms shall be installed from the topside in accordance with the manufacturer's placing plans, recommended details, and printed instructions. Forms shall be constructed to the lines, grades, shapes, and dimensions shown on the plans, unless otherwise directed by the Engineer. Form supports shall ensure that forms retain their correct dimensions and positions during use at all times. Form supports shall provide vertical adjustment to maintain design slab thickness at the crest of corrugation, to compensate for variations in camber of beams and girders, and to allow for deflections.

Field cutting of form sheet metal shall be made by a steel cutting saw. Supports, closures and cut-outs shall be cut with shears or saw. No flame cutting will be permitted.

All welding shall be accomplished by Connecticut certified welders in accordance with Subarticle 6.03.03 – 6, Welding.

The steel form supports shall be placed in direct contact with the flange of stringer or floor beam flanges and attached by bolts, clips, welding where permitted, or other approved means. Form sheets shall not be permitted to rest directly on the top of the stringer or floor beam flanges. Forms shall be securely fastened to form supports with self-drilling fasteners and shall have a minimum bearing length of one inch (25 millimeters) at each end.

In the areas where the form sheets lap, the form sheets shall be securely fastened to one another by fasteners at a maximum spacing of eighteen inches (450 millimeters). The ends of the form sheets shall be securely attached to the support angles with fasteners at a maximum spacing of eighteen inches (450 millimeters) or two corrugation widths, whichever is less. Welding of forms to supports is not allowed.

The depth of the concrete slab shall be as shown on the plans and the corrugated forms shall be placed so that the top of the corrugation will coincide with the bottom of the deck slab. No part of the forms or their supports shall protrude into the slab. All reinforcement in the bottom reinforcement mat shall have a minimum concrete cover of one inch (25 millimeters) unless noted otherwise on the plans.

The completed stay-in-place metal form system shall be sufficiently tight to prevent leakage of mortar or concrete.

Where forms or their installation are unsatisfactory in the opinion of the Engineer, either before or during placement of the concrete, the Contractor shall correct the defects before proceeding with the construction work. The cost of such corrective work shall be at the sole expense of the Contractor.

There will be no direct payment for the cost of the forms and form supports, or any material, tools, equipment, or labor incidental thereto, but the cost shall be considered included in the contract unit price per cubic yard (cu. m) for "Class 'F' Concrete".

Article 6.01.03-8. Placing Concrete:

Add the following new paragraph after the first paragraph:

"The temperature of the concrete at the time of placement shall not be less than 60° F (15.5° C) or greater than 90° F (32° C). For pumped concrete, the temperature shall be determined at the placement end of the pump line. The temperature of the concrete shall be determined in accordance with ASTM C1064."

Subarticle 6.01.03 – 9, Concrete for Bridge Decks:

Add the following:

Screed and runway supports shall not be located on any stay-in-place metal form sheets, form supports or reinforcing steel.

Concrete shall not be placed on the forms to a depth greater than twelve inches (300 millimeters) above the top of the forms. Concrete shall not be dropped more than three feet (1 meter) above the top of the forms, beams or girders.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 6.03
STRUCTURAL STEEL**

Delete the entire section and replace it with the following:

**SECTION 6.03
STRUCTURAL STEEL**

Description: Work under this item shall consist of furnishing, fabricating, transporting, storing, handling and erecting of structural steel of the type and size designated, as shown on the plans, as directed by the Engineer and in accordance with these specifications.

All work except as stated in the following paragraph shall conform to the requirements of the AASHTO LRFD Bridge Construction Specifications and the ANSI/AASHTO/AWS D1.5 – Bridge Welding Code.

All work subject to railroad loading shall conform to AREMA and the ANSI/AASHTO/AWS D1.5 – Bridge Welding Code.

Materials: The materials for this work shall conform to the requirements of Section M.06.

Materials for this work shall be stored off the ground before, during, and after fabrication. It shall be kept free from dirt, grease and other contaminants and shall be reasonably protected from corrosion. In addition, weathering steel shall be stored as to allow free drainage and promote the development of the oxide coating and a uniform appearance.

Construction Methods:

1. Pre-qualification:

(a) Fabricators producing material for Department projects under this item are required to have as a minimum, an active AISC Certification for Simple Steel Bridges. For fabrication of material for use on bridges other than un-spliced rolled beam bridges, AISC Major Steel Bridge Certification is required. If so noted on the plans, additional AISC endorsement for fabrication of fracture critical members is also required.

(b) Field Welders: Prior to working on material for Department projects under this specification, all field welders, field welding operators, and field tackers must possess a valid welder certification card issued by the Department's Division of Materials Testing. If such person has not been engaged in welding operations on a Department project or

project acceptable to the Department within a period of six months, or if he cannot produce an approved welding certificate dated within the previous twelve months from a welding agency acceptable to the Engineer, he shall be required to re-qualify through examination. The Engineer may require re-qualification of anyone whose quality of work he questions.

2. Submittals:

(a) Shop Drawings: Prior to any fabrication, the Contractor shall submit shop drawings in accordance with Article 1.05.02-3 to the Engineer for review and approval. Shop drawings shall include a cambering procedure and diagram. In the case of trusses, the Contractor is responsible for calculation of the camber (lengthening and shortening) of all truss members.

(b) Shop Schedule: The Contractor shall submit a detailed shop fabrication schedule to the Engineer for review within 30 days of the notice to proceed unless otherwise agreed to by the Engineer. At a minimum the schedule shall include the start date, milestone dates, and completion date. Any significant changes shall be brought to the attention of the Engineer immediately.

(c) Welding Procedures: Prior to start of fabrication, all weld procedures shall be submitted to the Engineer for review and approval.

(d) Working Drawings for Falsework and Erection of Structural Steel: Prior to erecting any steel fabricated under this specification, the Contractor shall submit drawings and supporting calculations, including erection stresses, in accordance with Article 1.05.02-2 to the Engineer. The design of temporary supports and falsework shall conform to the *AASHTO Specifications*, the *AASHTO Guide Design Specifications for Bridge Temporary Works* or any other standard acceptable to the Engineer. Falsework shall be of sufficient rigidity and strength to safely support all loads imposed and to produce in the finished structure the lines and grades indicated in the contract documents. The submittal shall include at a minimum:

- Title block with contract number, project identification number (PIN), town, and structure number and name.
- Plan of the work area showing support structures, roads, railroad tracks, Federal and State regulated areas as depicted on the plans, utilities or any other information relative to erection.
- A detailed narrative describing the erection sequence for main members and secondary members (cross frames, diaphragms, lateral bracing, portals, etc.), noting use of holding cranes or temporary supports, falsework, or bents.
- Delivery location of each girder.
- Location of each crane for each pick.
- Capacity chart for each crane and boom length used in the work.
- The capacity of the crane and of all lifting and connecting devices shall be adequate for the total pick load including spreaders and other materials. In the area of railroads and navigable waterways, the capacity shall be as required by Amtrak, Metro North, U.S. Coast Guard or other regulatory authorities. No picks shall be

allowed over vehicular or pedestrian traffic unless otherwise noted on the plans or permitted by the Engineer.

- Pick point location(s) on each member.
- Lifting weight of each member (including clamps, spreader beams, etc.)
- Lift and setting radius for each pick (or maximum lift radius).
- Description of lifting devices or other connecting equipment.
- Girder tie-down details or other method of stabilizing erected girders.
- Bolting requirements, including the minimum number of bolts and erection pins required to stabilize members during the erection sequence.
- Blocking details for stabilizing members supported on expansion bearings and on bearings that do not limit movement in the transverse direction.
- The method and location for temporary supports for field spliced or curved girders, including shoring, false work, holding cranes, guys, etc. The Engineer will review, but not approve details of temporary supports. The design, erection, and stability of these supports shall be the sole responsibility of the Contractor.
- Offsets necessary to adjust expansion bearings during erection to provide for temperature variance and dead load rotation.

The following notes shall be placed on the Erection Drawings:

- Cranes shall be operated in accordance with the Connecticut Department of Public Safety regulations.
- The Contractor shall be responsible for verifying the weight of each lift and for insuring the stability of each member during all phases of erection.
- Members shall be subject to only light drifting to align holes. Any drifting that results in distortion of the member or damage to the holes will be cause for rejection of the member.
- Field reaming of holes shall not be performed unless required by the Contract Drawing or approved by the Engineer.

The Contractor shall submit these documents to the Engineer at least 60 calendar days in advance of their proposed use. If the proposed method of erection requires additional members or modifications to the existing members of the structure, such additions and modifications shall be made by the Contractor at no expense to the State.

3. Shop Fabrication: Unless otherwise shown on the plans or indicated in the Special Provisions, Structural Steel shall be fabricated in accordance with the AASHTO LRFD Bridge Construction Specifications, amended as follows:

(a) Notification: The Contractor shall submit written notification to both the Engineer and the Director of Research and Materials Testing not less than 30 calendar days prior to start of fabrication. No material shall be manufactured or worked in the shop before the Engineer has been so notified. The notification shall include the name and location of the fabrication shop where the work will be done so that arrangements can be made for an audit of the facility and the assignment of a Department Quality Assurance inspector.

(b) Camber: All members shall be cambered prior to heat curving and painting. Rolled beams shall be heat cambered by methods approved by the Engineer. Plate girders shall be cambered by cutting the web to the prescribed shape with allowances for shrinkage due to cutting, welding, and heat curving. The fabricator is responsible to determine what allowances should be made. Rolled, plate-rolled, or fabricated sections shall be cambered to the total amount shown on the plans and within the camber deviation tolerances permitted for welded beams and girders, as indicated in the ANSI/AASHTO/AWS D1.5 Bridge Welding Code. The Contractor must submit to the Engineer for approval, a plan for corrective action if the actual camber is not within tolerance.

(c) Welding: Unless otherwise indicated on the plans or specifications, all work shall be performed in accordance with ANSI/AASHTO/AWS D1.5 – Bridge Welding Code.

(d) Preassembly of Field Connections: Field connections of main members of continuous beams, plate girders, bents, towers, rigid frames, trusses and arches shall be preassembled prior to erection as necessary to verify the geometry of the completed structure or unit and to verify or prepare field splices. The Contractor shall propose an appropriate method of preassembly for review and comment by the Engineer. The method and details of preassembly shall be consistent with the erection procedures shown on the working drawings and camber diagrams. As a minimum, the preassembly procedure shall consist of assembling three contiguous panels accurately adjusted for line and camber. Successive assemblies shall consist of at least one section or panel of the previous assembly plus two or more sections or panels added at the advancing end. In the case of structures longer than 150 feet (45 meters), each assembly shall not be less than 150 feet (45 meters) long regardless of the length of individual continuous panels or section. All falsework, tools, machinery and appliances, including drift pins and bolts necessary for the expeditious handling of the work shall be provided by the Contractor at no cost to the State.

(e) Inspection: The Contractor shall furnish facilities for the inspection of material and workmanship in the shop by the Engineer. The Engineer and his representative shall be allowed free access to the necessary parts of the premises.

The Engineer will provide Quality Assurance (QA) inspection at the fabrication shop to assure that all applicable Quality Control plans and inspections are adequately adhered to and maintained by the Contractor during all phases of the fabrication. A thorough inspection of a random selection of elements at the fabrication shop may serve as the basis of this assurance.

Prior to shipment to the project, each individual piece of structural steel shall be stamped or marked in a clear and permanent fashion by a representative of the fabricators' Quality Control (QC) Department to indicate complete final inspection by the fabricator and conformance to the project specifications for that piece. The stamp or mark must be dated. A Materials Certificate in accordance with Article 1.06.07 may be used in lieu of individual stamps or markings, for all material in a single shipment. The Materials Certificate must list each piece within the shipment and accompany the shipment to the project site.

Following the final inspection by the fabricator's QC personnel, the Engineer may select pieces of structural steel for re-inspection by the Department's QA inspector. Should non-conforming pieces be identified, all similar pieces must be re-inspected by the fabricator and repair procedure(s) submitted to the Engineer for approval. Repairs will be made at the Contractor's expense.

The pieces selected for re-inspection and found to be in conformance, or adequately repaired pieces, may be stamped or marked by the QA inspector. Such markings indicate the Engineer takes no exception to the pieces being sent to the project site. Such marking does not indicate acceptance or approval of the material by the Engineer.

Following delivery to the project site, the Engineer will perform a visual inspection of all material to verify shipping documents, fabricator markings, and that there was no damage to the material or coatings during transportation and handling.

The Engineer is not responsible for approving or accepting any fabricated materials prior to final erection and assembly at the project site.

(f) Nondestructive Testing: All nondestructive testing of structural steel and welding shall be performed as designated on the plans and in the project specifications. Such testing shall be performed by personnel approved by the Engineer.

Personnel performing Radiographic, Ultrasonic or Magnetic Particle testing shall be certified as a NDT Level II technician in accordance with the American Society for Non Destructive Testing (ASNT), Recommended Practice SNT-TC-1A.

Nondestructive testing shall be performed in accordance with the procedures and standards set forth in the AASHTO/AWS D1.5, Bridge Welding Code. The Department reserves the right to perform additional testing as determined by the Engineer.

All nondestructive testing shall be witnessed by an authorized representative of the Department. Certified reports of all tests shall be submitted to the Materials Testing Division for examination. Each certified report shall identify the structure, member, and location of weld or welds tested. Each report shall also list the length and location of any defective welds and include information on the corrective action taken and results of all retests of repaired welds.

Should the Engineer require nondestructive testing on welds not designated in the contract, the cost of such inspection shall be borne by the Contractor if the testing indicates that any weld is defective. If the testing indicates the weld to be satisfactory, the actual cost of such inspection will be paid by the Department.

(g) Marking: Each member shall be identified with an erection mark corresponding with the member identification mark on the approved shop drawings. Identification marks shall be impressed into the member with a low stress stamp in a location in accordance with standard industry practice.

(h) Shipping, Handling, Storage and Receiving: The Contractor shall make all arrangements necessary to properly load, transport, unload, handle and store all material. The Contractor shall furnish to the Engineer copies of all shipping statements. The weight (mass) of the individual members shall be shown on the statements. Members having a weight (mass) of more than 3 tons (2700 kilograms) shall have the weight (mass) marked thereon. All material shall be unloaded promptly upon delivery. The Contractor shall be responsible for any demurrage charges. Damage to any material during transportation, improper storage, faulty erection, or undocumented fabrication errors may be cause for rejection of said material at the project site. Top lateral bracing should be installed in tub girders prior to shipping and erection of the field pieces. All costs associated with any corrective action will be borne by the Contractor.

4. Field Erection: A meeting shall be held on site prior to any erection of structural steel. The Contractor shall name the person responsible for the steel erection work and provide copies of all crane operator licenses. Proposed equipment, rigging, timetable and methods shall be proposed at this meeting.

(a) Falsework: Any temporary work shall be constructed in conformance with the working drawings. The Contractor shall verify that the quality of materials and work employed are consistent with their design.

All girders shall be stabilized with falsework, temporary braces, or holding cranes until a sufficient number of adjacent girders are erected with all diaphragms and cross frames connected to provide necessary lateral support as shown in the erecting diagrams.

Adjustment shall be provided in the falsework and other temporary supports so that the temporary elevation of the structural steel provided by the falsework is consistent with the deflections that will occur as the structure is completed. The elevation of falsework shall be such as to support the girders at the cambered no-load elevation. Unloading of temporary supports should be performed such that all temporary supports at each cross section are unloaded uniformly. Unless specifically permitted by the Engineer, welding of falsework support brackets to structural steel is not allowed.

Unless erected by the cantilever method, truss spans shall be erected on blocking. The blocking shall be left in place until the tension chord splices are fully bolted and all other truss connections pinned and bolted and the proper geometric shape is achieved.

(b) Anchorages: Anchor bolts and similar materials which are to be placed during the erection of the structural steel shall be carefully and accurately set to the requirements of Article 6.01.03.

(c) Bearings: Bearing plates shall have a full and uniform bearing upon the substructure masonry. Bearing plates shall be placed upon bearing areas which are finished according to the requirements of Article 6.01.03.

Prefabricated pads conforming to the requirements of Article M-12.01 shall be installed unless specifically noted otherwise on the contract plans.

Each piece shall be the same size as the bearing plate it is to support and the holes to accommodate the anchor bolts shall be clearly and accurately punched before setting the pad in place.

In placing expansion bearings, due consideration shall be given to the temperature at the time of erection and stage construction requirements. The nuts of anchor bolts at expansion bearings shall be adjusted to permit the free movement of the span.

(d) Field Assembly: Members and components shall be accurately assembled as shown on the plans and any match marks shall be followed. The material shall be carefully handled so that no components will be bent, broken or otherwise damaged.

Hammering which will injure or distort the members is not permitted. Bearing surfaces and surfaces to be in permanent contact shall be cleaned before the members are assembled.

Cylindrical erection pins shall be 1/32 inch (0.8 mm) larger than the nominal diameter of the holes.

Splices and field connections of main stress carrying members shall be made with a minimum of 50% of the holes filled and tightened with high strength bolts before the lifting system is released. The bolts shall be installed uniformly throughout the connection. Lateral stability must be maintained until the deck is placed.

The Contractor shall ensure that girders are stable throughout the erection process. The stage of completeness of the bolted connections shall be considered when evaluating the strength and stability of the steel during erection. For Closed Box and Tub Girders the Contractor shall ensure that the cross- section shape of each box is maintained during erection. Top lateral bracing should be installed in tub girders prior to shipping and erection of the field pieces.

(e) Welded Connections:

Unless otherwise shown on the plans or indicated by the special provisions, welding of structural steel shall be done in accordance with "ANSI/AASHTO/AWS D1.5 Bridge Welding Code."

The Contractor's welding and inspection procedures for each type of field weld and field tacking must be submitted to the Engineer on the form designated by the Department. All procedures must be approved by the Materials Testing Division prior to any work and must be adhered to at all times.

Quality control is the responsibility of the Contractor. The Contractor must provide an AWS Certified Welding Inspector (CWI) in accordance with AWS D1.5. The CWI must be qualified and certified in accordance with the provisions of AWS QC1, *Standard for Qualification and Certification of Welding Inspectors*.

The CWI shall make visual inspection of all welds. The Contractor will perform magnetic particle inspection, ultrasonic testing inspection, or radiographic testing inspection of field welds when required on the plans or special provisions. Each test may be witnessed by an authorized representative of the Engineer.

Welds or sections of welds containing imperfections determined to be unacceptable by either the CWI or the Engineer shall be removed and re-welded by the Contractor at their expense. Welds so removed and replaced shall be re-inspected by the CWI. All costs for re-inspection or testing of such welds shall be borne by the Contractor.

(f) High Strength Bolted Connections:

The assembly of structural connections using ASTM A 325/ A 325M or ASTM A 490/A 490M high-strength bolts shall be installed so as to develop the minimum required bolt tension specified in Table A. The Manufacturer's certified test report; including the rotational capacity test results **must** accompany the fastener assemblies. Fastener Assemblies delivered without the certified reports will be rejected.

Bolts, nuts and washers from each rotational-capacity lot shall be shipped in the same container. If there is only one production lot number for each size of nut and washer, the nuts and washers may be shipped in separate containers. Each container shall be permanently marked with the rotational-capacity lot number such that identification will be possible at any stage prior to installation. Assemblies of bolts, nuts and washers shall be installed from the same rotational-capacity lot. Pins, small parts and packages of bolts, washers, and nuts shall be shipped in boxes, crates, kegs, or barrels. A list and description of the contained materials shall be plainly marked on the outside of each shipping container.

Bolted Parts: All material within the grip of the bolt shall be steel; there shall be no compressible material, such as gaskets or insulation, within the grip. Bolted steel shall fit solidly together after the bolts are tensioned. The length of the bolts shall be such that the end of the bolt will be flush with or outside of the face of the nut when properly installed.

Surface Conditions: At the time of assembly, all connection surfaces, including surfaces adjacent to the bolt head and nut, shall be free of scale, except tight mill scale, and shall be free of dirt or other foreign material. Burrs that would prevent solid seating of the connected parts in the snug tight condition shall be removed.

Paint is permitted on the faying surface, including slip critical connections, only when shown on the plans. The faying surfaces of slip-critical connections shall meet the requirements of the following paragraphs, as applicable:

- Connections specified to have un-coated faying surfaces: any paint, including any inadvertent over spray, shall be excluded from areas closer than one bolt diameter, but not less than 1.0 in. (25 mm), from the edge of any hole and all areas within the bolt pattern.
- Connections specified to have painted faying surfaces: shall be blast cleaned and coated in accordance with Section 6.04, and shall not be assembled until the coating system has been properly cured.

- Connections specified to have galvanized faying surfaces: shall be hot-dip galvanized in accordance with ASTM A 123/A 123M, and shall subsequently be roughened by means of hand wire brushing. Power wire brushing is not permitted.

Installation: At the pre-erection meeting, the Contractor shall inform the Engineer of their planned method of tensioning high strength bolts. Acceptable methods are: Turn-of-Nut, Calibrated Wrench or Direct Tension Indicator.

Fastener Assemblies:

A "fastener assembly" is defined as a bolt, a nut, and a washer. Only complete fastener assemblies of appropriately assigned lot numbers shall be installed.

Fastener assemblies shall be stored in an area protected from dirt and moisture. Only as many fastener assemblies as are anticipated to be installed and tensioned during a work shift shall be taken from protected storage. Fastener assemblies not used shall be returned to protected storage at the end of the shift. Prior to installation, fastener assemblies shall not be cleaned of lubricant. Fastener assemblies which accumulate rust or dirt resulting from site conditions shall be cleaned, relubricated and tested for rotational-capacity prior to installation. All galvanized nuts shall be lubricated with a lubricant containing a visible dye. Plain bolts must be oily to the touch when delivered and installed. Lubricant shall be removed prior to painting.

All bolts shall have a hardened washer under the turned element (nut or bolt head). All hardened washers shall conform to the requirements of ASTM F 436/F 436M.

Where necessary, washers may be clipped on one side to a point not closer than 7/8 of the bolt diameter from the center of the washer. Circular and beveled washers, when used adjacent to direct tension indicator washers shall not be clipped. Direct tension indicator washers shall not be clipped.

Bolt Tension Measuring Device: The Contractor shall provide a calibrated bolt tension measuring device (a Skidmore-Wilhelm calibrator (Skidmore) or other acceptable bolt tension indicating device) at all times when, and at all locations where high-strength fasteners are being installed and tensioned. The tension measuring device (Skidmore) shall be calibrated by an approved testing agency at least annually. The Skidmore shall be used to perform the rotational-capacity test of the fastener assemblies. The Skidmore will also be used to substantiate (1) the suitability of the fastener assembly to satisfy the requirements of Table A, including lubrication as required, (2) calibration of the installation wrenches, if applicable, and (3) the understanding and proper use by the contractor of the selected method of tensioning to be used.

Complete fastener assemblies shall be installed in properly aligned holes and then tensioned by the Turn-of-Nut, Calibrated Wrench or Direct Tension Indicator method to the minimum tension specified in Table A. Tensioning may be done by turning the bolt while the nut is prevented from rotating when it is impractical to turn the nut. Impact wrenches, if

used, shall be of adequate capacity and sufficiently supplied with air to perform the required tensioning of each bolt in approximately 10 seconds.

Bolts shall be installed in all holes of the connection and the connection brought to a snug condition. Snug is defined as having all the plies of the connection in firm contact. Snugging shall progress systematically from the most rigid part of the connection to the free edges. The bolts of the connection shall then be tightened in a similar manner as necessary until the connection is properly tensioned.

Nuts shall be located, whenever practical, on the side of the connection which will not be visible from the traveled way.

Unless otherwise approved by the Engineer fastener assemblies shall be brought to full tension immediately following snugging.

Fully tensioned fastener assemblies shall not be reused. Retightening previously tensioned bolts which may have been loosened by the tensioning of adjacent bolts shall not be considered as reuse.

Rotational-Capacity Tests: In addition to the certified test reports, on site Rotational-capacity tests may be required by the Engineer. This test shall be performed by the Contractor at the location where the fasteners are installed and tensioned. When performed in the field, the procedure shall conform to the requirements of ASTM A 325/ A 325M Appendix A-1.

Turn-of-Nut Installation Method:

At the start of the work, the Contractor shall demonstrate that the procedure used by the bolting crew to develop a snug condition and to control the turns from a snug condition develops the tension required in Table A. To verify their procedure, the Contractor shall test a representative sample of not less than three complete fastener assemblies of each diameter, length and grade to be used in the work. This shall be performed at the start of work using a Skidmore. Periodic retesting shall be performed when ordered by the Engineer.

After snugging the connection, the applicable amount of rotation specified in Table B shall be achieved. During the tensioning operation there shall be no rotation of the part not turned by the wrench. Tensioning shall progress systematically from the most rigid part of the connection to its free edges.

Calibrated Wrench Installation Method:

Calibrated wrench method may be used only when the installation wrenches are properly calibrated daily, or as determined by the Engineer. Standard torques determined from tables or from formulas which are assumed to relate torque to tension **shall not** be acceptable.

The Contractor shall demonstrate to the Engineer periodically that all equipment and wrenches are providing a torque which has been calibrated to produce the minimum tension specified in Table A. The installation procedures shall be verified periodically, as determined by the Engineer, for each bolt diameter, length and grade using the fastener assemblies that are being installed in the work. This verification testing shall be accomplished in a Skidmore by tensioning three complete fastener assemblies of each diameter, length and grade from those being installed with a hardened washer under the element turned.

When significant difference is noted in the surface condition of the bolts, threads, nuts or washers, as determined by the Engineer, wrenches shall be recalibrated. The Contractor shall verify during the installation of the assembled steel work that the wrench adjustment selected by the calibration does not produce a nut or bolt head rotation from snug greater than that permitted in Table B. If manual torque wrenches are used, nuts shall be turned in the tensioning direction when torque is measured.

When calibrated wrenches are used to install and tension bolts in a connection, bolts shall be installed with hardened washers under the element turned to tension the bolts. Once the connection has been snugged, the bolts shall be tensioned using the calibrated wrench. Tensioning shall progress systematically from the most rigid part of the connection to its free edges. A calibrated torque wrench shall be used to "touch up" previously tensioned bolts which may have been relaxed as a result of the subsequent tensioning of adjacent bolts until all bolts are tensioned to the prescribed amount.

Direct Tension Indicator Installation Method:

When Direct Tension Indicators (DTIs) meeting the requirements of Section M.06 are used with high-strength bolts to indicate bolt tension, they shall be subjected to the verification testing described below and installed in accordance with the method specified below. Unless otherwise approved by the Engineer, the DTIs shall be installed under the head of the bolt and the nut turned to tension the bolt. The Manufacturer's recommendations shall be followed for the proper orientation of the DTI and additional washers, if any, required for the correct use of the DTI. Installation of a DTI under the turned element may be permitted if a washer is used to separate the turned element from the DTI.

Verification: Verification testing shall be performed in a Skidmore. A special flat insert shall be used in place of the normal bolt head holding insert. Three verification tests shall be required for each combination of fastener assembly rotational-capacity lot, DTI lot, and DTI position relative to the turned element (bolt head or nut) to be used on the project. The fastener assembly shall be installed in the tension-measuring device with the DTI located in the same position as in the work. The element intended to be stationary (bolt or nut) shall be restrained from rotation.

The verification tests shall be conducted in two stages. The bolt nut and DTI assembly shall be installed in a manner so that at least three and preferably not more than five threads are located between the bearing face of the nut and the bolt head. The bolt shall be tensioned first to the load equal to that listed in Table C

under Verification Tension for the grade and diameter of the bolt. If an impact wrench is used, the tension developed using the impact wrench shall be no more than two-thirds of the required tension. Subsequently, a manual wrench shall be used to attain the required tension. The number of refusals of the 0.005-in. (0.125-mm) tapered feeler gage in the spaces between the protrusions shall be recorded. The number of refusals for uncoated DTIs under the stationary or turned element, or coated DTIs under the stationary element, shall not exceed the number listed under Maximum Verification Refusals in Table C for the grade and diameter of bolt used. The maximum number of verification refusals for coated DTIs (galvanized, painted, or epoxy-coated), when used under the turned element, shall be no more than the number of spaces on the DTI less one. The DTI lot shall be rejected if the number of refusals exceeds the values in the table or, for coated DTIs if the gage is refused in all spaces.

After the number of refusals is recorded at the verification load, the bolt shall be further tensioned until the 0.005-in (0.125-mm) feeler gage is refused at all the spaces and a visible gap exists in at least one space. The load at this condition shall be recorded and the bolt removed from the tension-measuring device. The nut shall be able to be run down by hand for the complete thread length of the bolt excluding thread run-out. If the nut cannot be run down for this thread length, the DTI lot shall be rejected unless the load recorded is less than 95 percent of the average load measured in the rotational capacity test of the fastener lot as specified previously in "Rotational-Capacity Tests."

If the bolt is too short to be tested in the calibration device, the DTI lot shall be verified on a long bolt in a calibrator to determine the number of refusals at the verification tension listed in Table C. The number of refusals shall not exceed the values listed under maximum verification refusals in Table C. Another DTI from the same lot shall then be verified with the short bolt in a convenient hole in the work. The bolt shall be tensioned until the 0.005-in. (0.125-mm) feeler gage is refused in all spaces and a visible gap exists in at least one space. The bolt shall then be removed from the tension-measuring device and the nut shall be able to be run down by hand for the complete thread length of the bolt excluding thread run-out. The DTI lot shall be rejected if the nut cannot be run down this thread length.

Installation: Installation of fastener assemblies using DTIs shall be performed in two stages. The stationary element shall be held against rotation during each stage of the installation. The connection shall be first snugged with bolts installed in all holes of the connection and tensioned sufficiently to bring all the plies of the connection into firm contact. The number of spaces in which a 0.005-in. (0.125-mm) feeler gage is refused in the DTI after snugging shall not exceed those listed under maximum verification refusals in Table C. If the number exceeds the values in the table, the fastener assembly shall be removed and another DTI installed and snugged.

For uncoated DTIs used under a stationary or turned element and for coated DTIs used under a stationary element, the bolts shall be further tensioned until the number of refusals of the 0.005-in. (0.125-mm) feeler gage shall be equal or greater than the number listed under Minimum Installation Refusals in Table C. If the bolt is

tensioned so that no visible gap in any space remains, the bolt and DTI shall be removed and replaced by a new properly tensioned bolt and DTI.

When coated DTIs (galvanized, painted or epoxy coated) are used under a turned element, the 0.005-in (0.125-mm) feeler gage shall be refused in all spaces.

Inspection:

The Contractor shall provide all the material, equipment, tools and labor necessary for the inspection of the bolted connections. Access to the bolted parts and fastener assemblies, both before and after the fasteners are installed and tensioned, shall be provided.

The Contractor is responsible for Quality Control (QC). The Contractor shall review this specification with its project personnel prior to performing the work. The Contractor shall verify the proper markings, surface conditions and storage of fastener assemblies. The Contractor shall inspect the faying surfaces of connections for compliance with the plans and specifications. The Contractor shall provide to the Engineer a copy of their written QC report for each shift of the calibration or verification testing specified. This report shall confirm that the selected procedure is properly used and that the fastener assemblies installed meet the tensions specified in Table A. The Contractor shall monitor the installation of fasteners in the work to assure that the selected procedure, as demonstrated in the initial testing to provide the specified tension, is routinely and properly applied.

The Contractor, in the presence of the Engineer, shall inspect the tensioned bolts using an inspection torque wrench, as defined below. If direct tension indicator devices are used, the appropriate feeler gauge will be used. Inspection tests shall be performed within 24 hours of bolt tensioning to prevent possible loss of lubrication or corrosion influence on tensioning torque.

The inspection torque wrench shall be calibrated as follows. Three bolts of the same grade, size, and condition as those under inspection shall be placed individually in a device calibrated to measure bolt tension. This calibration operation shall be done at least once each inspection day. There shall be a washer under the part turned in torquing each bolt. In the calibrated device, each bolt shall be tightened by any convenient means to the specified tension. The inspection wrench shall then be applied to the tensioned bolt to determine the torque required to turn the nut or head five degrees in the tightening direction. The average of the torque required for all three bolts shall be defined as the job-inspection torque.

Twenty-five percent, but a minimum of two, of the tensioned bolts shall be selected by the Engineer for inspection in each connection. (The Engineer may reduce the number of bolts tested at a connection to 10% based on the Contractor's past performance and splice location.) The job-inspection torque shall then be applied to each selected assembly with the inspection torque wrench turned in the tightening direction. If all inspected bolt heads or nuts do not turn, the bolts in the connection shall be considered to be properly tensioned. If the torque turns one or more bolt heads or nuts, the job-inspection torque shall then be applied to **all** bolts in the connection or to the satisfaction of the Engineer. Any bolt whose head or nut turns shall be re-tensioned and re-inspected. The Contractor

may, however, re-tension all the bolts in the connection with the inspection torque wrench and resubmit it for inspection, so long as the bolts are not over-tensioned or damaged by this action.

(g) Field Corrections and Misfits: Reaming of bolt holes during erection shall be permitted only with approval of the Engineer. No excessive forces shall be applied to any member to provide for proper alignment of the bolt holes.

The correction of minor misfits involving minor amounts of reaming, cutting, grinding and chipping shall be considered a legitimate part of the erection. However, any error in the shop fabrication or deformation resulting from handling and transportation may be cause for rejection. The Contractor shall be responsible for all misfits, errors and damage and shall make the necessary corrections and replacements.

TABLE A (Metric)
Minimum Bolt Tension in Kilonewtons*

Bolt Size	ASTM A 325M	ASTM A 490M
M16	91	114
M20	142	179
M22	176	221
M24	205	257
M27	267	334
M30	326	408
M36	475	595

*Equal to 70% of specified minimum tensile strength of bolts (as specified in ASTM Specifications for tests of full-size A 325M and A 490M bolts with metric coarse threads series ANSI B1.13M, loaded in axial tension) rounded to the nearest kilonewton.

Table A (English)
Minimum Bolt Tension in kips*

Bolt Size (Inches)	ASTM A 325	ASTM A 490
5/8	19	24
3/4	28	35
7/8	39	49
1	51	64
1 1/8	56	80
1 1/4	71	102
1 3/8	85	121
1 1/2	103	148

*Equal to 70% of specified minimum tensile strength of bolts (as specified in ASTM Specifications for tests of full-size A 325 and A 490 bolts with UNC threads, loaded in axial tension) rounded to the nearest kip.

TABLE B (English and Metric)
Nut Rotation from the Snug Condition
Geometry^{a,b,c} of Outer Faces of Bolted Parts

Bolt Length (measured from underside of head to end of bolt)	Both Faces Normal to Bolt Axis	One Face Normal to Bolt Axis and Other Face Sloped Not More Than 1:20, Bevel Washer Not Used	Both Faces Sloped Not More Than 1:20 From Normal to Bolt Axis, Bevel Washer Not Used
Up to and including 4 diameters	1/3 turn	1/2 turn	2/3 turn
Over 4 diameters but not exceeding 8 diameters	1/2 turn	2/3 turn	5/6 turn
Over 8 diameters but not exceeding 12 diameters	2/3 turn	5/6 turn	1 turn

(a) Nut rotation, as used in Table B, shall be taken as relative to the bolt, regardless of the element (nut or bolt) being turned. For bolts installed by 1/2 turn and less, the tolerance should be plus or minus 30 degrees; for bolts installed by 2/3 turn and more, the tolerance should be plus or minus 45 degrees.

To determine the nut rotation for installation and inspection of the fasteners, the nut and the end of the bolt or the head of the bolt and the adjacent steel shall be match marked.

(b) The values, given in Table B, shall be applicable only to connections in which all material within grip of the bolt is steel.

(c) No research work has been performed by the Research Council Riveted and Bolted Structural Joints to establish the turn-of-nut procedure when bolt lengths exceed 12 diameters. For situations in which the bolt length, measured from the underside of the head to the end of the bolt, exceeds 12 diameters, the required rotation shall be determined by actual tests in a suitable tension device simulating the actual conditions.

TABLE C (Metric)

Bolt Dia. (in.)	Verification Tension		Maximum Verification Refusals		DTI Spaces		Minimum Installation Refusals	
	A325	A490	Type 8.8	Type 10.9	Type 8.8	Type 10.9	Type 8.8	Type 10.9
M16	96	120	1	1	4	4	2	2
M20	149	188	2	2	5	6	3	3
M22	185	232	2	2	5	6	3	3
M24	215	270	2	2	5	6	3	3
M27	280	351	2	3	6	7	3	4
M30	342	428	3	3	7	8	4	4
M36	499	625	3	4	8	9	4	5

TABLE C (English)

Bolt Dia. (in.)	Verification Tension		Maximum Verification Refusals		DTI Spaces		Minimum Installation Refusals	
	A325	A490	325	490	325	490	325	490
5/8	20	25	1	2	4	5	2	3
¾	29	37	2	2	5	6	3	3
7/8	41	51	2	2	5	6	3	3
1	54	67	2	3	6	7	3	4
1 1/8	59	84	2	3	6	7	3	4
1¼	75	107	3	3	7	8	4	4
1 3/8	89	127	3	3	7	8	4	4
1½	108	155	3	4	8	9	4	5

Method of Measurement: Payment under this item will be at the contract lump sum price per each complete bridge structure or shall be based on the net weight (mass) of metal in the fabricated structure, whichever method appears on the proposal form.

When payment is based on a lump sum basis, the work, including anchor bolts, steel bearings and plates will not be measured for payment. Bearing plates welded to the girder are included in the price of the structural steel and bearing plates bonded to the bearings are included in the price of the bearing.

When payment is based on the net weight (mass) of metal in the fabricated structure, it shall be computed as described below.

The weight (mass) of the metal works to be paid for under the item of structural steel shall be computed on the basis of the net finished dimensions of the parts as shown on the shop drawings, deducting for copes, cuts, clips and all open holes, except bolt holes, and on the following basis:

1. The weights (masses) of rolled shapes shall be computed on the basis of their nominal weights (masses) per foot (meter), as shown in the shop drawings or listed in handbooks.

The weight (mass) of plates shall be computed on the basis of the nominal weight (mass) for their width and thickness as shown on the shop drawings.

2. The weight (mass) of temporary erection bolts, shop and field paint, galvanization, boxes, crates and other containers used for shipping, and materials used for supporting members during transportation and erection, shall not be included.

3. The weight (mass) of all high strength bolts, nuts, and washers shall be included on the basis of the following weights (masses):

Weight per 100			
Nominal diameter of H.S. bolt (inch)	Bolthead, nut, 1 washer and stickthrough (lbs)	Nominal diameter of H.S. bolt (mm)	Bolthead, nut, 1 washer and stickthrough (kg)
1/2	22	16	17
5/8	33	20	26
3/4	55	22	39
7/8	84	24	50
1	120	27	60
1 1/8	169	30	73
1 1/4	216	36	122

4. The weight (mass) of weld metal shall be computed on the basis of the theoretical volume from plan dimensions of the welds.

Size of fillet in Inches (mm)		Weight of weld in pounds per foot (kg per meter)	
3/16	(5)	0.08	(0.119)
1/4	(6)	0.14	(0.208)
5/16	(8)	0.22	(0.327)
3/8	(9.5)	0.30	(0.446)
1/2	(13)	0.55	(0.818)
5/8	(16)	0.80	(1.190)
3/4	(19)	1.10	(1.636)
7/8	(22)	1.50	(2.231)
1	(25)	2.00	(2.974)

5. The weight (mass) of steel shims, filler plates and anchor bolts shall be measured for payment.

When the pay item "Materials for Structural Steel (Site No.)" is included in the Contract, payment for furnishing of the raw steel material for the plates and shape material only, excluding any markup, based on the net weight (mass) required, and the payment will be made under the estimated item "Materials for Structural Steel (Site No.)". The overruns or wastage shall not exceed ten per cent for straight girders and fifteen per cent for curved girders. All other work specified in this section for the bridge will be deemed paid for under the lump sum price. In the absence of the pay item "Materials for Structural Steel (Site No.)", the cost of the raw material is included in the Lump Sum payment for this item, "Structural Steel (Site No.)".

Basis of Payment: The structural steel, incorporated in the completed and accepted structure, will be paid for at the contract lump sum price for "Structural Steel (Site No.)," or at the contract unit price per hundred weight (kilogram) for "Structural Steel," whichever is indicated in the contract documents.

Payment for either method shall be for structural steel, complete in place, which price shall include quality control, furnishing, fabricating, transporting, storing, erecting, welding, surface preparation and all materials including fastener assemblies, steel bearing assemblies and anchor bolts, equipment, tools and labor incidental thereto.

When the pay item "Materials for Structural Steel (Site No.)" is included in the Contract, payment for furnishing of the raw steel material for the plates and shape material only,

excluding any markup, based on the net weight (mass) required, and the payment will be made under the estimated item "Materials for Structural Steel (Site No.)". All remaining work including, but not limited to, preparation of shop drawings, fabricating, transporting, storage and handling, erecting, surface preparation and all materials, equipment, tools and labor incidental thereto, will be paid for under "Structural Steel (Site No.)".

In the absence of the pay item "Materials for Structural Steel (Site No.)", the cost of the raw material is included in the Lump Sum payment for this item, "Structural Steel (Site No.)". All remaining work including, but not limited to, preparation of shop drawings, fabricating, transporting, storage and handling, erecting, surface preparation and all materials, equipment, tools and labor incidental thereto, will be paid for under "Structural Steel (Site No.)".

No direct payment will be made for setting anchor bolts, preparing bearing areas, furnishing and placing materials under bearings. No direct payment will be made for non destructive testing as shown on the plans.

<u>Pay Item</u>	<u>Pay Unit</u>
Structural Steel (Site No.)	l.s. (l.s.)
Structural Steel	cwt. (kg)

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 6.12
CONCRETE CYLINDER CURING BOX**

Delete the entire section and replace with it the following:

6.12.01 –Description: This item shall consist of furnishing a box for curing concrete test cylinders. The box shall be commercially available and manufactured specifically for curing concrete test cylinders. The box will remain the property of the Contractor at the conclusion of the project. The box shall be delivered to a location on the project as directed by the Engineer.

6.12.02 – Materials: A catalog cut listing detailed specifications of the box and operating instructions from the manufacturer must be submitted to the Engineer. The box and its components shall be constructed of non-corroding materials and shall be capable of storing a minimum of 18 test cylinders, 6" X 12" (152 mm X 305 mm) stored vertically with the lid closed. The lid must be watertight when closed and hinged in the back with security latches on the front that can be padlocked. The box must be capable of holding water to a maximum level of one inch above test cylinders placed in the box vertically. A drain hole must be provided in a wall of the box to allow manual drainage of the water that exceeds this level. A drain hole must also be provided at the bottom of the box so that it can be manually emptied. The temperature of the water must be controlled by heating and cooling device capable of maintaining the temperature of the water within a range of 60 to 80° F, +/- 2 °F (15.5 to 26.7 °C, +/- 1 °C) within an outside ambient air temperature range of -10 to 120 ° F (-23.3 to 49 °C). The heating and cooling device must be positioned to allow free circulation of air and water around the cylinders and be rated at 120 volts and 15 amps. A rack must be provided within the box to support the cylinders above the pool of temperature controlled water. The device must be thermostatically controlled with a digital readout that is capable of displaying the high/low water temperature within the box since the last reading was taken.

6.12.03 - Construction Methods: The Contractor shall maintain the curing box in working order and shall provide all necessary electrical service and water so that the curing box can be used properly during the entire course of the project. Any curing box that is not operating properly, as determined by the Engineer, shall be replaced within 24 hours by the Contractor at no expense to the State. The Engineer reserves the right to prohibit placement of fresh concrete on the project until a curing box acceptable to the Engineer is operational on the project site.

6.12.04 - Method of Measurement: The furnishing of the concrete test cylinder curing box will be measured for payment by the number of boxes delivered by the Contractor and accepted by the Engineer.

6.12.05 – Basis of Payment: This item will be paid for at the contract unit price each for “Concrete Cylinder Curing Box” ordered and accepted on the project, which price shall include all submittals, material, tools, equipment, and labor incidental thereto. The price shall also include all maintenance and operating costs related to the curing box for the duration of the project.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 6.51
CULVERTS**

6.51.02 – Materials:

In the 2nd paragraph replace “Gravel fill” with “Granular fill”.

6.51.03 – Construction Methods:

In the 8th paragraph replace “gravel fill” with “granular fill”.

Delete the 13th paragraph, “Bituminous fiber and ... as the pipe.”

6.51.04 – Methods of Measurement:

In the 7th paragraph replace “Gravel Fill” with “Granular Fill”.

6.51.05 – Basis of Payment:

In the 8th paragraph replace “Gravel Fill” with “Granular Fill”.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 7.02
PILES**

Article 7.02.05- Basis of Payment:

In the first sentence of the first paragraph of Section "2. Timber Piles" change "Furnishing Timber Piles Foot (Meter Length) and Furnishing Treated Timber Piles Foot (Meter Length)" to "Furnishing (Type) Timber Piles (Foot (Meter) Length)".

In the first sentence of the last paragraph of Section "2. Timber Piles" change "Driving Timber Piles" and "Driving Treated Timber Piles " to "Driving (Type) Timber Piles".

Under Pay Items:

Delete:

<u>Pay Item</u>	<u>Pay Unit</u>
Furnishing (Type) Piles (Lengths)	lb. (kg)

Add:

<u>Pay Item</u>	<u>Pay Unit</u>
Furnishing (Type) Timber Piles (Length)	ea. (ea)
Furnishing Steel Piles	lb. (kg)
Furnishing (Type) Prestressed Concrete Piles	l.f. (m)
Cast-in-Place Concrete Piles	l.f. (m)

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 8.22
TEMPORARY PRECAST CONCRETE BARRIER CURB**

Article 8.22.04 – Method of Measurement:

Add the following sentence to the end of the second paragraph:

“Relocation of Temporary Precast Concrete Barrier Curb for access to the work area or for the convenience of the Contractor shall be considered incidental to Maintenance and Protection of Traffic and will not be measured for payment.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.10
METAL BEAM RAIL**

Article 9.10.04 – Method of Measurement

Subarticle 1 – Metal Beam Rail (Type)

Delete the only sentence and replace with the following:

The length of metal beam rail measured for payment will be the number of linear feet (meters) of accepted rail of the type or designation installed, including radius rail other than Curved Guide Rail Treatment, measured along the top of rail between centers of end posts in each continuous section.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.18
THREE CABLE GUIDE RAILING
(I-BEAM POSTS) AND ANCHORAGES**

9.18.03 – Construction Methods:

In the 10th paragraph, replace “MIL” with “MILSPEC.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.22
BITUMINOUS CONCRETE SIDEWALK
BITUMINOUS CONCRETE DRIVEWAY**

9.22.03 – Construction Methods:

Replace the first paragraph with the following:

“1. Excavation: Excavation, including saw cutting, removal of any existing sidewalk, or driveway, shall be made to the required depth below the finished grade, as shown on the plans or as directed by the Engineer. All soft and yielding material shall be removed and replaced with suitable material.”

9.22.05 – Basis of Payment:

Replace the only paragraph with the following:

“This work will be paid for at the contract unit price per square yard (square meter) for "Bituminous Concrete Sidewalk" or "Bituminous Concrete Driveway," as the case may be, complete in place, which price shall include all saw cutting, excavation as specified above, backfill, disposal of surplus material, gravel or reclaimed miscellaneous aggregate base, and all equipment, tools, labor and materials incidental thereto.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.44
TOPSOIL**

Add the following paragraph to the beginning of article 9.44.03 – Construction Methods:

“The Contractor shall notify the Engineer of the location of the topsoil at least 15 calendar days prior to delivery. The topsoil and its source shall be inspected and approved by the Engineer before the material is delivered to the project. Any material delivered to the project, which does not meet specifications or which has become mixed with undue amounts of subsoil during any operation at the source or during placing and spreading, will be rejected and shall be replaced by the Contractor with acceptable material.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.49
FURNISHING, PLANTING and MULCHING
TREES, SHRUBS, VINES and GROUND COVER PLANTS**

9.49.03 – Construction Methods:

Replace subsection 5. Pits with the following:

“5. Pits: The pit diameters shall be twice the diameter of the root-spread or container diameters, and shall be 2- inches (50 millimeters) less than the height of the rootball measured from the bottom of the ball to the root collar. (i. e. A 12-inch (300 millimeters) measurement between the root collar and the bottom of the rootball will require a 10-inch (250 millimeters) deep pit). Any excavation in excess of that required shall be replaced with planting soil and compacted to the satisfaction of the Engineer.”

Add the following sentence to subsection 6. Obstructions Below Ground:

“If removal of obstructions results in a deeper hole than needed for planting, backfill material shall be added and compacted to the satisfaction of the Engineer.”

Replace subsection 7. Preparation of Backfill with the following:

“7. **Backfill:** Backfill shall conform to M.13.01-1 Planting Soil.”

Replace subsection 8. Setting Plants with the following:

“8. **Setting Plants:** All plants shall be plumb and at a level that is 2-inches (50 millimeters) higher than the surrounding ground. Backfill material for all plants shall be thoroughly and properly settled by firming or tamping. Thorough watering shall accompany backfilling. Saucers capable of holding water shall be formed at individual plants (exclusive of plant beds) by placing ridges of planting soil around each, or as directed by the Engineer.

a. Balled and Burlapped plants: Plants shall be handled in such manner so that the soil will not be loosened from the roots inside of the ball. Carefully place the plant into the prepared pits and backfill with planting soil to one - half the depth of the pit, thoroughly tamp to the satisfaction of the Engineer around the ball. Fill the remaining area of the pit with water. Once water has completely drained, loosen the burlap and peel down the top one third. If wire baskets are used, cut and bend down the top third of the basket. Roots that have been wrapped around the ball within the burlap shall be straightened and the remainder of the pit filled with planting soil tamped to ensure that no air pockets remain.

b. Container Grown Plants: Carefully remove the plant from the container over the prepared pits. Gently loosen the soil and straighten all roots as naturally as possible. Place into the bottom of the pit. Backfill with planting soil to one - half the depth of the pit. Thoroughly tamp to the satisfaction of the Engineer. Fill remaining area of the pit with water. Once water has completely drained fill the remainder of the pit with planting soil tamped to ensure that no air pockets remain.

c. Bare-roots Plants: Carefully spread roots as naturally as possible and place into the bottom of the pit. All broken or frayed roots shall be cleanly cut off. Backfill with planting soil to one - half the depth of the pit. Thoroughly tamp to the satisfaction of the Engineer. Fill remaining area of the pit with water. Once water has completely drained fill the remainder of the pit with planting soil tamped to ensure that no air pockets remain.”

Replace subsection 10. Watering with the following:

“10. Watering: All plants shall be watered upon setting and as many times thereafter as conditions warrant.

The following is a guide for minimum requirements:

Trees:

2 ½” Caliper and less – Fifteen (15) gallons each.

3” to 5” Caliper – Twenty (20) gallon each.

5 ½” Caliper and above – Twenty-five (25) gallon each.

Shrubs:

24” and less – Six (6) gallon each.

More than 24”- Ten (10) gallon each.

Vines, Perennials, and Ornamental Grasses – Three (3) gallons each.

Groundcovers and Bulbs – Two (2) gallons per square foot.

Water shall be applied at a controlled rate and in such a manner to ensure that the water reaches the root zone (saucer) of the plant or plant bed and does not run off to adjacent areas. Watering shall be applied in a manner that does not dislodge plants, erode soil or mulch, or cause damage to saucer.

The Contractor may use slow-release, drip irrigation bags for watering in accordance with manufacturer’s instructions. The use of these portable/temporary irrigation bags will require the approval of the Engineer.

Overhead hydro-seeder spray nozzles shall not be used as watering devices.”

Replace subsection 17. Establishment Period with the following:

“17. One-Year Establishment Period: All plant material shall be subject to a One-Year Establishment Period. During this time, the Contractor shall use currently accepted horticultural practices to keep all plant material installed in a healthy, vigorous growing condition at the date of final acceptance. The date of final

acceptance shall be one full calendar year following the satisfactory completion of the planting activities as confirmed by the Engineer.

An inspection will be held one year from the date of installation with the Contractor, Engineer, and Landscape Designer to determine the acceptability of the plant establishment. An inventory of losses and rejected materials will be made and corrective and necessary clean up measures will be determined at the plant inspection.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.75
MOBILIZATION**

9.75.04 – Method of Measurement:

Delete the entire section and replace with the following:

This work will be measured for payment in the manner described hereinafter; however, the determination of the total contract price earned shall not include the amount of mobilization earned during the period covered by the current monthly estimate- but shall include amounts previously earned and certified for payment:

1. When the first payment estimate is made, 25 percent of the lump sum bid price for this item or 2.5 percent of the total original contract price, whichever is less, shall be certified for payment.
2. When the Baseline Schedule, as specified under Section 1.05.08, is accepted, 50 percent of the lump sum bid price or 5 percent of the total original contract price, whichever is less, minus any previous payments, will be certified for payment.
3. When 10 percent of the total original contract price is earned and the Baseline Schedule, as specified under Section 1.05.08, is accepted, 75 percent of the lump sum price of this item or 7.5 percent of the total original contract price, whichever is less, minus any previous payments, will be certified for payment.
4. When 30 percent of the total original contract price is earned and the Baseline Schedule, as specified under Section 1.05.08, is accepted, 100 percent of the lump sum price of this item or 10 percent of the total original contract price, whichever is less, minus any previous payments, will be certified for payment.

Upon completion of all work on the project, payment of any amount bid for mobilization in excess of 10 percent of the original contract amount will be paid.

Nothing herein shall be construed to limit or preclude partial payments otherwise provided for by the contract.

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 10.01
TRENCHING AND BACKFILLING

Article 10.01.01- Description:

In the only sentence of the first paragraph after "...satisfactory..." add the following: "clean-up and".

In the only sentence of the second paragraph after "...reconstruction of..." add the following: "bituminous, concrete and granite curbing,".

Article 10.01.05- Basis of Payment:

In the only sentence of the second paragraph after "...mulching..." add the following: "clean-up and". After "...installing..." add the word "curbing,".

At the end of the third paragraph, add the following: "In the absence of a "Rock in Trench Excavation" item, the work will be compensated as extra work."

In the only sentence of the sixth paragraph, after ..."...unit price for 'Concrete Sidewalk'..." add the following: "or as extra work, if no unit price has been established."

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 10.10
CONCRETE HANDHOLE**

Article 10.10.05 – Basis of Payment

Remove the words “ground wire”.

At the end of the paragraph add the following sentence:

The ground wire (bonding wire) is included in the Contract unit price under Section 10.08 – Electrical Conduit.

Add the word “Cover” to the end of the pay item “Cast Iron Handhole”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 11.13
CONTROL CABLE**

11.13.03 – Construction Methods:

In the 1st paragraph of subsection 2 replace “MIL” with “MILSPEC.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 12.10
EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS**

12.10.03 (2) – Procedures:

Insert the following after the sixth paragraph:

The epoxy shall be uniformly applied to the surface to be marked to ensure a wet film thickness of the applied epoxy, without glass beads, of 20 mils +/- 1 mil (500 um +/- 25 um).

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.06
METALS**

Article M.06.01 – Reinforcing Steel:**Subarticle 1. Bar Reinforcement:**

Delete the third paragraph and replace it with:

“Epoxy coated bar reinforcement shall conform to the requirements of ASTM A 615/A 615M, Grade 60 (420) and shall be epoxy coated to the requirements of ASTM A 775/A 775M. All field repairs of the epoxy coating shall conform to the requirements of ASTM D 3963/D 3963M.”

Article M.06.02—Structural Steel and Other Structural Materials:

Delete the entire article and replace it with the following:

Article M.06.02—Structural Steel: The materials for this work shall conform to the following requirements:

1. Structural Steel:

Structural steel for bridges shall conform to the designation shown on the plans. Unless otherwise indicated in the plans or specifications, structural steel for non-bridge related members or components shall conform to ASTM A709/A709M, Grade 36 (250).

All surfaces of steel plates and shapes used in the fabrication of bridge girders shall be blast cleaned and visually inspected by the Contractor prior to any fabrication or preparation for fabrication. Blast cleaning shall conform to the requirements of SSPC-SP-6-Commercial Blast.

All steel plates and shapes used in the fabrication of bridge girders shall be substantially free from pitting and gouges, regardless of the cause. Substantially free is defined as:

- The measured surface area of all pits and gouges regardless of depth represent less than 1% of the surface area of the plate or shape.
- No pit or gouge greater than 1/32 (0.08mm) inch deep.
- No pit or gouge closer than six inches (15.25 cm) from another.

Any repair of plates or shapes will be performed in accordance with ASTM A6/A 6M.

2. Anchor Bolts:

Unless otherwise designated on the plans, anchor bolts, including suitable nuts and washers, shall conform to the following requirements:

Anchor bolt assemblies shall conform to the requirements of ASTM F1554, Grade 36 (250). All components of the bolt assembly shall be galvanized in conformance with ASTM A 153/A 153M.

Certified Test Reports and Material Samples: The Contractor shall submit notarized copies of Certified Test Reports in conformance with Article 1.06.07. Prior to incorporation into the work, the Contractor shall submit samples of the anchor bolt assemblies to the Engineer for testing in accordance with the latest edition of the "Schedule of Minimum Requirements for Acceptance Testing". One sample shall be submitted for each diameter, material designation, grade or coating of anchor bolt assembly.

3. High Strength Bolts: High strength bolts, including suitable nuts and hardened washers, shall conform to the following requirements:

- a) High strength bolts shall conform to ASTM A325 or ASTM A490 as shown on the plans. High-strength bolts used with coated steel shall be mechanically galvanized, unless otherwise specified. High-strength bolts used with uncoated weathering grades of steel shall be Type 3.

Nuts for ASTM A325 bolts shall conform to ASTM A563, grades DH, DH3, C, C3 and D. Where galvanized high-strength bolts are used, the nuts shall be galvanized, heat treated grade DH or DH3. Where Type 3 high-strength bolts are used, the nuts shall be grade C3 or DH3.

Nuts for ASTM A490 bolts shall conform to the requirements of ASTM A563, grades DH and DH3. Where Type 3 high-strength bolts are used, the nuts shall be grade DH3.

All galvanized nuts shall be lubricated with a lubricant containing a visible dye of any color that contrasts with the color of the galvanizing. Black bolts must be oily to the touch when delivered and installed.

Circular flat and square or rectangular beveled, hardened steel washers shall conform to ASTM F436. Unless otherwise specified, galvanized washers shall be furnished when galvanized high-strength bolts are specified, and washers with atmospheric corrosion resistance and weathering characteristics shall be furnished when Type 3 high-strength bolts are specified.

Compressible-washer-type direct tension indicator washers, used in conjunction with high strength bolts, shall conform to ASTM F959. Where galvanized high-strength bolts are used, the washers shall be galvanized in accordance with ASTM B695, Class 50. Where Type 3 high-strength bolts are used, the washers shall be galvanized in accordance with ASTM B695, Class 50 and coated with epoxy.

- b) Identifying Marks:** ASTM A325 for bolts and the specifications referenced therein for nuts require that bolts and nuts manufactured to the specification be identified by specific markings on the top of the bolt head and on one face of the nut. Head markings must identify the grade by the symbol "A325", the manufacturer and the type, if Type 2 or 3. Nut markings must identify the grade, the manufacturer and if Type 3, the type. Markings on direct tension indicators must identify the manufacturer and Type "325". Other washer markings must identify the manufacturer and if Type 3, the type.

ASTM A490 for bolts and the specifications reference therein for nuts require that bolts and nuts manufactured to the specifications be identified by specific markings on the top of the bolt head and on one face of the nut. Head markings must identify the grade by the symbol "A490", the manufacturer and the type, if Type 2 or 3. Nut markings must identify the grade, the manufacturer and if Type 3, the type. Markings on direct tension indicators must identify the manufacturer and Type "490". Other washer markings must identify the manufacturer and if Type 3, the type.

- c) Dimensions:** Bolt and nuts dimensions shall conform to the requirements for Heavy Hexagon Structural Bolts and for Heavy Semi-Finished Hexagon Nuts given in ANSI Standard B18.2.1 and B18.2.2, respectively.
- d) Galvanized Bolts:** Galvanized bolts shall conform to ASTM A325, Type 1. The bolts shall be hot-dip galvanized in accordance with ASTM A153, Class C or mechanically galvanized in accordance with ASTM B695, Class 50. Bolts, nuts, and washers of any assembly shall be galvanized by the same process. The nuts shall be overtapped to the minimum amount required for the fastener assembly, and shall be lubricated with a lubricant containing a visible dye so a visual check can be made for the lubricant at the time of field installation. Galvanized bolts shall be tension tested after galvanizing. ASTM A 490 bolts shall not be galvanized.
- e) Test Requirements:** The maximum hardness of A325 bolts 1" or less in diameter shall be 33 HRC.

Plain, ungalvanized nuts shall have a minimum hardness of 89 HRB.

Proof load tests, in accordance with the requirements of ASTM F606 Method 1, shall be required for the bolts. Wedge tests of full-size bolts are required in accordance with Section 8.3 of ASTM A325. Galvanized bolts shall be wedge tested after galvanizing. Proof load tests of ASTM A563 are required for nuts. Proof load tests for nuts used with galvanized bolts shall be performed after galvanizing, overtapping and lubricating.

Rotational-capacity tests are required and shall be performed on all plain or galvanized (after galvanizing) bolt, nut and washer assemblies by the manufacturer or distributor prior to shipping and by the Contractor at the job site.

The thickness of galvanizing on bolts, nuts and washers shall be measured. On bolts, it shall be measured on the wrench flats or on top of the bolt head, and on nuts it shall be measured on the wrench flats.

f) Certified Test Reports and Materials Certificates: The Contractor shall submit notarized copies of Certified Test Reports and Materials Certificates in conformance with Article 1.06.07 for fastener assemblies. In addition the Certified Test Reports and Materials Certificates shall include the following:

- a. Mill test reports shall indicate the place where the material was melted and manufactured.
- b. Test reports for proof load tests, wedge tests, and rotational-capacity tests shall indicate where the tests were performed, date of tests, location of where the components were manufactured and lot numbers.
- c. The test report for galvanized components shall indicate the thickness of the galvanizing.

g) Material Samples: Prior to incorporation into the work, the Contractor shall submit samples of the bolt assemblies to the Engineer for testing in accordance with the latest edition of the "Schedule of Minimum Requirements for Acceptance Testing". Samples shall be submitted for each diameter, length, material designation, grade, coating and manufacturer of bolt assembly.

4. Welded Stud Shear Connectors:

a) Materials: Stud shear connectors shall conform to the requirements of ASTM A 108, cold-drawn bar, Grades 1015, 1018 or 1020, either semi- or fully-killed. If flux-retaining caps are used, the steel for the caps shall be of a low carbon grade suitable for welding and shall comply with ASTM A 109.

Stud shear connectors shall be of a design suitable for electrically end-welding to steel with automatically timed stud welding equipment. The studs shall be of the sizes and dimensions noted on the plans. Flux for welding shall be furnished with each stud, either attached to the end of the stud or combined with the arc shield for automatic application in the welding operation. Each stud shall be furnished with a disposable ferrule of sufficient strength to remain intact during the welding operation and not crumble or break; it shall not be detrimental to the weld or create excessive slag.

Tensile properties, as determined by tests of bar stock after drawing or of finished studs, shall conform to the following requirements in which the yield strength is as determined by the 0.2% offset method:

Tensile strength (min.)	60,000 psi (415 megapascals)
Yield strength (min.)	50,000 psi (345 megapascals)
Elongation (min.)	20% in 2 inches (50 millimeters)
Reduction of area (min.)	50%

- b) **Test Methods:** Tensile properties shall be determined in accordance with the applicable sections of ASTM A 370. Tensile tests of finished studs shall be made on studs welded to test plates using a test fixture similar to that shown in Figure 7.2 of the current AASHTO/AWS D1.5 – Bridge Welding Code. If fracture occurs outside of the middle half of the gage length, the test shall be repeated.
- c) **Finish:** Finished studs shall be of uniform quality and condition, free from injurious laps, fins, seams, cracks, twists, bends or other injurious defects. Finish shall be as produced by cold-drawing, cold-rolling or machining.
- d) **Certified Test Reports and Materials Certificates:** The Contractor shall submit a certified copy of the in-plant quality control test report in conformance with Article 1.06.07. The Contractor shall submit a Materials Certificate in conformance with Article 1.06.07 for the welded studs.
- e) **Sample Materials for Testing:** Prior to incorporation into the work, the Contractor shall submit samples of the stud shear connectors to the Engineer for testing in accordance with the latest edition of the "Schedule of Minimum Requirements for Acceptance Testing". One sample shall be submitted for each diameter and length of welded stud.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.13
ROADSIDE DEVELOPMENT**

Delete article M.13.01 – Topsoil and replace it with the following:

“Article M.13.01 – Topsoil: The term topsoil used herein shall mean a soil meeting the soil textural classes established by the USDA Classification System based upon the proportion of sand, silt, and clay size particles after passing a No. 10 (2 millimeter) sieve and subjected to a particle size analysis. The topsoil shall contain 5% to 20% organic matter as determined by loss on ignition of oven-dried samples dried at 221° F (105° C). The pH range of the topsoil shall be 5.5 to 7.0.

The following textural classes shall be acceptable:

Loamy sand, including coarse, loamy fine, and loamy very fine sand, with not more than 80% sand

Sandy loam, including coarse, fine and very fine sandy loam

Loam

Clay loam, with not more than 30% clay

Silt loam, with not more than 60% silt

Sandy clay loam, with not more than 30% clay

All textural classes of topsoil with greater than 80% sand content will be rejected.

The topsoil furnished by the Contractor shall be a natural, workable soil that is screened and free of subsoil, refuse, stumps, roots, brush, weeds, rocks and stones over 1 1/4 inches (30 millimeters) in diameter, and any other foreign matter that would be detrimental to the proper development of plant growth.

The Contractor shall notify the Engineer of the location of the topsoil at least 15 calendar days prior to delivery. The topsoil and its source shall be inspected and approved by the Engineer before the material is delivered to the project. Any material delivered to the project, which does not meet specifications or which has become mixed with undue amounts of subsoil during any operation at the source or during placing and spreading, will be rejected and shall be replaced by the Contractor with acceptable material.

When topsoil is not furnished by the Contractor, it shall be material that is stripped in accordance with Section 2.02 or is furnished by the State, and will be tested as determined by the Engineer.

1. Planting Soil: Soil Material to be used for plant backfill shall be one of the following textural classes:

Loamy sand, with not more than 80% sand

Sandy loam

Loam

Clay loam, with not more than 30% clay

Silt loam, with not more than 60% silt

Sandy clay loam, with not more than 30% clay

Planting soil shall be premixed, consisting of approximately 50 % topsoil, 25 % compost or peat, and 25% native soil. Planting soil shall be loose, friable, and free from refuse, stumps, roots, brush, weeds, rocks and stones 2 inches (50 millimeters) in diameter. In addition, the material shall be free from any material that will prevent proper development and plant growth.

- (a) For ericaceous plants and broad-leaved evergreens requiring an acid soil, planting soil shall have a true pH of 4.5 to 5.5. If it has not, it shall be amended by the Contractor at his own expense to the proper pH range by mixing with sulphur.
- (b) Planting soil for general planting of nonacid-loving plants shall have a true pH value of 5.6 to 6.5. If it has not, it shall be amended by the Contractor at his own expense to the proper pH range by mixing with dolomitic limestone.

The amount of either sulphur or limestone required to adjust the planting soil to the proper pH range (above) shall be determined by the Engineer based on agronomic tests. The limestone shall conform to the requirements of Article M.13.02. The sulphur shall be commercial or flour sulphur, unadulterated, and shall be delivered in containers with the name of the manufacturer, material, analysis, and net weight (mass) appearing on each container.

The Engineer reserves the right to draw such samples and to perform such tests as he deems necessary to ensure that these specifications are met.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.16
TRAFFIC CONTROL SIGNALS**

Article M.16.04 – Poles:

Subarticle 1. Steel Poles:

(i) Wire Entrance Fitting:

In the second sentence, delete “required to accept the cables”.

Article M.16.06 – Traffic Signals:

In the 1st paragraph of subsection 9 replace “MIL” with “MILSPEC”.

Under the paragraph entitled Third Coat, replace the first two sentence with the following:

“ Dark Green Enamel: Shall be Dark Green exterior baked enamel and shall comply with FS A-A 2962. The color shall be No. 14056, FS No. 595.”

and in the third sentence replace “MIL” with “MILSPEC.”

Article M.16.08 – Pedestrian Push Button

Subarticle – Painting

Delete the entire “Third Coat” paragraph and replace with the following:

Third Coat: Dark Green Enamel, shall be DARK GREEN exterior-baking enamel and shall comply with Federal Specifications A-A 2962. The color shall be No. 14056, Federal Standard No. 595.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.17
ELASTOMERIC MATERIALS**

M.17.01 – Elastomeric Bearing Pads:

In the 2nd paragraph of subsection 4(b), replace “MS MIL” with “MILSPEC.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.18
SIGNING**

M.18.10 – Demountable Copy:

In the chart under subsection 3H, replace “MS MIL” with “MILSPEC.”

NO TEXT THIS PAGE

SECTION 9

PERMITS

NO TEXT THIS PAGE



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

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

1. Project Identification

ConnDOT Project No(s).	(PE)	(Construction)	City/Town(s)
		9056-0055	Greenwich
Project Name	Replacement of Bridge No. 056055, John Street over East Branch Byram River		

2. Funding Source

Check the funding source(s) for the subject project from the eligible list below:

<input checked="" type="checkbox"/> State Local Bridge Program: DOT Br. No(s). 056055	<input type="checkbox"/> STP – Urban Program
<input type="checkbox"/> Federal Local Bridge Program: DOT Br. No(s).	<input type="checkbox"/> STP – Rural Minor / Major Collector Program
<input type="checkbox"/> Small Town Economic Assistance Program	<input type="checkbox"/> Local Roads Accident Reduction Program
<input type="checkbox"/> Transportation Enhancement Program	<input type="checkbox"/> Federal Earmark Project
	<input type="checkbox"/> CT Special Act Grant
	<input type="checkbox"/> Safe Routes to School Program

3. Quality Assurance/Quality Control

The intent of this document is to assist the applicant as well as the reviewer with the regulatory requirements, process, scope and the completeness of the documentation for the flood management certification of a project. **Failure to complete this document in its entirety and/or to provide the information indicated therein will result in rejection of the flood management submission and a possible delay in the project.**

Enter contact information and signature of the person responsible for preparing this document and the completeness of the submission below:

Name		Company Name	
Stuart Harris, PE		Fuss & O'Neill, Inc.	
Mailing Address	City/Town	State	Zip Code
146 Hartford Road	Manchester	CT	06040
Telephone No.	Fax No.	Email address	
860-646-2469 x5232	860-643-6313	sharris@fando.com	
Date Prepared		Signature	
1-17-2013			
<input checked="" type="checkbox"/> Check this box if this document has been prepared by the ConnDOT Approved Hydraulic Engineer who shall be responsible for the submission content. The Approved Hydraulic Engineer shall need only date and sign this section, provided the other contact information is the same as in Section 7, Hydraulic Engineer Approval.			

¹ Federal or state funding passed to municipalities by ConnDOT

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

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

4. Other Permits/Authorizations/Certifications

This section should be completed in conjunction with Section 8, *Flooding Source Identification & Floodplain Determination*, Section 9, *Floodplain Involvement*, and Section 10, *Environmental Considerations*.

Check for other permits/authorizations/certifications required for the subject project:

ConnDOT Flood Management General Certification – The general certification applies to certain minor activities in a regulatory floodplain and is separate from the Flood Management Certification Program for Municipal Projects. The application form and descriptions of approved activities for the general certification are available on the Hydraulics and Drainage (H & D) website (<http://www.ct.gov/dot/cwp/view.asp?a=2303&q=300868>)

The descriptions of approved activities of the general certification have been reviewed. The subject project does not qualify for the Flood Management General Certification.

DEP Inland Water Resources Div. (IWRD): NO IWRD PERMITS REQUIRED
http://www.ct.gov/dep/cwp/view.asp?a=2709&q=324222&depNav_GID=1643

Permit Type	Date Approved	Permit Type	Date Approved
<input type="checkbox"/> Inland Wetlands & Watercourses		<input type="checkbox"/> Dam Construction	
<input type="checkbox"/> Stream Channel Encroachment Line*		<input type="checkbox"/> 401 Water Quality Certification	
<input type="checkbox"/> Water Diversion		<input type="checkbox"/> General Permit - <i>Indicate type below</i>	

*A listing of SCEL regulated areas is provided at the H & D website @ <http://www.ct.gov/dot/cwp/view.asp?a=2303&q=300868> Type:

Any project that requires an **Inland Wetlands & Watercourses, Stream Channel Encroachment Line or Water Diversion** permit from the DEP is not eligible for this program. The project must be submitted to the DEP in accordance with the MOU.

DEP (Other Permits): **Date Approved**

Aquifer Protection Area (http://www.ct.gov/dep/cwp/view.asp?a=2709&q=324222&depNav_GID=1643)

Stormwater and Dewatering Wastewaters from Construction Activities (a.k.a. Stormwater Discharge) http://www.ct.gov/dep/cwp/view.asp?a=2709&q=324212&depNav_GID=1643#StormwaterConstructionGP

DEP Office of Long Island Sound Programs (OLISP): NO OLISP PERMITS REQUIRED
http://www.ct.gov/dep/cwp/view.asp?a=2709&q=324222&depNav_GID=1643

Permit Type	Date Approved	Permit Type	Date Approved
<input type="checkbox"/> Structures, Dredging and Fill & Tidal Wetlands		<input type="checkbox"/> Certificate of Permission	
<input type="checkbox"/> OLISP General Permit - <i>Indicate type</i>	Type:		

U.S. Army Corps of Engineers (Corps): NO CORPS PERMIT REQUIRED
<http://www.nae.usace.army.mil/reg/index.htm>

Permit Type	Date Approved
<input checked="" type="checkbox"/> Programmatic General Permit (PGP) <input checked="" type="checkbox"/> Category 1 <input type="checkbox"/> Category 2	pending
<input type="checkbox"/> Individual	

Municipal Permits:

Permit Type	Date Approved	Permit Type	Date Approved
Greenwich Inland Wetlands	11/19/2012		

5. Exemptions

<p>Any project that requires an exemption (CGS Section 25-68d.) from the Flood Management Regulations is <u>not</u> eligible for this program. Complete this section to determine if an exemption is required.</p>		
Project complies	Exemption required	The application for Flood Management Certification shall provide information certifying that:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. The proposal will not obstruct flood flows or result in an adverse increase in flood elevations, significantly affect the storage or flood control value of the floodplains, cause an adverse increase in flood velocities, or an adverse flooding impact upon upstream, downstream or abutting properties, or pose a hazard to human life, health or property in the event of a base flood or base flood for a critical activity.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. The proposal complies with the provisions of the National Flood Insurance Program (44 CFR 59 et seq.), and any floodplain zoning requirements adopted by a municipality in the area of the proposal and the requirements for stream channel encroachment lines adopted pursuant to the provisions of section 22a-342.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. If the base flood or base flood for a critical activity is elevated above the increment authorized by the National Flood Insurance Program or the flood storage loss would cause adverse increases in such base flood flows, easements and property in floodplains shall be acquired, through public or private purchase or conveyance.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. The proposal promotes long-term nonintensive floodplain uses and has utilities located to discourage floodplain development.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. Flood-proofing techniques, dikes, dams, channel alterations, seawalls, breakwaters or other structures have been considered and will be used to the extent feasible to protect new and existing structures and utility lines, only where there are no practical alternatives and stormwater management practices will be implemented in accordance with regulations adopted pursuant to section 25-68h.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. Flood forecasting and warning capabilities are consistent with the system maintained by the National Weather Service and a flood preparedness plan has been prepared.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. The project design is consistent with the floodplain management and stormwater management standards set forth in Sections 25-68h-2 and 25-68h-3 of the Regulations of Connecticut State Agencies.
<p><input type="checkbox"/> The project requires an exemption from the Flood Management Regulations and is not eligible for this program. The project shall be submitted to the DEP in accordance with the MOU.</p>		
<p>If an exemption is required, indicate the specific regulation(s) and/or standard(s) that can not be met, the reason(s) why and the potential impacts below:</p> <p>n/a</p>		
<p><input type="checkbox"/> A letter to the DEP must be prepared requesting an exemption from the Flood Management Regulations citing the specific regulations which can not be met, the reasons why and the potential impacts.</p> <p><input type="checkbox"/> When submitted to the DEP, exemption requests require a public notice and comment period that could result in a public hearing prior to approval.</p>		

6. Significant Impacts

Any project or activity considered a significant impact as defined under Section 25-68h-1 of the Flood Management Regulations for State Agencies is not eligible for this program. Complete this section to determine if the project includes a significant activity as defined in the regulations.

Yes	No	Does the project include any activity that would create/cause:
<input type="checkbox"/>	<input checked="" type="checkbox"/>	1. A five percent increase in peak flow rates at any downstream point
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. A twenty percent increase in flow velocities or a change that allows a stable condition to become unstable
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3. An unacceptable cumulative impact
<input type="checkbox"/>	<input checked="" type="checkbox"/>	4. Flooding on developed property not currently subject to flooding
<input type="checkbox"/>	<input checked="" type="checkbox"/>	5. A downstream dam to become unsafe

If the answer is yes to one or more of the above, the project includes a significant activity as defined in the regulations and is not eligible for this program. The project shall be submitted to the DEP in accordance with the MOU.

Due to the proposed improvements in upstream backwater (up to 1.9 foot improvement for the 100 year design discharge), proposed upstream channel velocities correspondingly increase in the general range of 1-3 fps. The maximum computed increase occurs at Section 1393 where the channel velocity increases from 3.7 fps to 6.8 fps (+3.1 fps or +83%). Although this is a notable relative increase, the proposed channel velocity of 6.8 fps is not especially high. The existing upstream riverbed is well protected with cobbles and could be considered to be mostly "self-armored". In addition, stone walls run along both streambanks which protect them from erosion and undercutting. The existing upstream channel is well protected and stable, as such, the CE does not recommend installing riprap channel protection because the proposed computed channel velocities are not particularly high and the placement of such would adversely impact aquatic resources.

7. Hydraulic Engineer Approval

In order to be eligible for this program, the engineer responsible for preparing the hydraulic analysis and design and the flood management certification for the project must be pre-approved by the Department in accordance with Section 404.01 of the Department's Consultant Administration And Project Development Manual and Section 1.2.4 of the Drainage Manual. Enter the information for the approved Hydraulic Engineer below:

Name	CT PE Number	Company Name	
Stephen T. Andrzejewski	0023891		
Mailing Address	City/Town	State	Zip Code
129 Military Hwy.	Gales Ferry	CT	06335
Telephone No.	Fax No.	Email address	
860-464-7819		STAndrzejewski@sbcglobal.net	
Approval Request Date		Date Approved	
12/20/2011		12/21/2011	

8. Flooding Source Identification & Floodplain Determination

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

Note: FMC is not required for proposed activities in:

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

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

Flooding Source	Site 1	Site 2	Site 3
Site Description (ex. Br. No., Sta., etc.)	Bridge No. 056055		
Name of Stream or Waterbody	East Branch Byram River		
Drainage Area @ Site	1.69 sm		
<input checked="" type="checkbox"/> Copies of the drainage area delineation(s) must be attached and included in the preliminary hydrologic and hydraulic design reports.			
FEMA Flood Insurance Study (FIS) Data. Downloads available at FEMA Map Service Center: http://msc.fema.gov/webapp/wcs/stores/servlet/StoreCatalogDisplay?storeId=10001&catalogId=10001&langId=-1&userType=G			
Flood Insurance Rate & Floodway Maps	Site 1	Site 2	Site 3
Map Panel No(s)	09001C0481F		
Effective Date(s)	6/18/2010		
Flood Hazard Zone(s) [Indicate "None", if no zone]	Unnumbered "A"		
Regulatory Floodway (Yes/No)	No		
<input checked="" type="checkbox"/> Copies of FEMA Flood Insurance Rate Maps (FIRM) and Floodway & Flood Hazard Boundary Maps (if separate maps were published) with bridge locations and/or project limits annotated must be attached to this form and included in the preliminary hydraulic design and the floodplain/floodway analysis reports.			

9. Floodplain Involvement

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

9. Floodplain Involvement (continued)

Regulatory floodplain/floodway analyses – Based on the type and extent of floodplain involvement, does the project require detailed hydraulic analyses in accordance with the DEP "Hydraulic Analysis Guidance Document" available at http://www.ct.gov/dep/cwp/view.asp?a=2709&q=324222&depNav_GID=1643						Yes/No
						Yes
If no, explain:						
Has the stream been studied in detail by the FEMA FIS? (Yes/No)						No
If yes, the back-up hydraulic analysis data used in the FIS must be obtained from FEMA using the FIS Data Request Form (http://www.fema.gov/library/viewRecord.do?id=2223), unless the town/city has a copy of the data that matches the effective study. Enter the FEMA data request and receipt information in the space provided:						
Date Requested	n/a	Data Available (Yes/No)?	n/a	Date Received	n/a	
<input type="checkbox"/> A copy of the archive hydraulic data obtained from FEMA or the town/city must be included in the preliminary floodplain/floodway analysis report.						
<input type="checkbox"/> All copies of correspondence with FEMA, in particular, if FEMA determines that the hydraulic data is unavailable, must be included in the preliminary floodplain/floodway analysis report.						
Critical Activity - Does the proposed project involve the treatment, storage and disposal of hazardous waste or the siting of hospitals, housing for the elderly, schools or residences, in the 0.2 per cent (500 year) floodplain?						Yes/No
						No
<input type="checkbox"/> If yes, the base flood for the critical activity shall have a recurrence interval equal to the 500 year flood event.						
Nonintensive Floodplain Uses - Will the proposed project promote development in floodplains or will utilities servicing the project be located so as to enable floodplain development?						Yes/No
						No
Explain (<i>required if yes or no</i>): The proposed project will replace an existing bridge that was reportedly constructed in 1921 and is structurally deficient requiring major rehabilitation. The proposed project will replace the existing structure and should not promote floodplain development. In addition, the project does not include additional utilities which would enable or promote floodplain development.						
National Flood Insurance Program (NFIP) – Does the proposed project meet the NFIP minimum standards established in 44 CFR, Chapter 1, Subchapter B, Part 60.3, floodplain management criteria for flood-prone areas?						Yes/No
						Yes
Municipal Regulations - Has the municipality in which the proposed project is to be located adopted floodplain regulations containing requirements that are more restrictive than the NFIP floodplain management criteria for flood-prone areas?						Yes/No
						No
If yes, describe the more restrictive requirements:						
Section 6-139.1 of the Greenwich Municipal Code, dated 6/18/2010, does not include any more restrictive floodplain requirements which relate to this specific project.						
Does the proposed project comply with the more restrictive standards of the municipality (Yes/No)?						n/a

9. Floodplain Involvement (continued)

<p>Regulatory Floodplain with No Floodway – The NFIP requires that until a regulatory floodway is designated, that no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point. (If no regulatory floodway has been adopted, project impacts may be evaluated by considering an equivalent conveyance loss on the opposite side of the river from the proposed project.)</p>			
Is the proposed project consistent with this requirement?		<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
			<input type="checkbox"/> Not applicable. The site has a regulatory floodway.
<p>Floodway Encroachments - Does the proposed project include encroachments, including fill, new construction, substantial improvements, or other development within a NFIP adopted regulatory floodway?</p>			Yes/No
			No
<p>If yes, will the proposed encroachment into the floodway result in any increase in flood levels during either the 100 year or 10 year discharges?</p>			
100-year:	<input type="checkbox"/> No Increase	<input type="checkbox"/> There is an increase in 100-yr flood level of (1/100ths of a foot):	n/a
		Is the increase contained within city/town property (Yes/No)?	
		Has approval of such increase been received in accordance with 44 CFR, Chapter 1, Subchapter B, Part 65.12 (Yes/No)?	
<p>RCSA Section 25-68h-2(c)(5) and Section 60.3(d)(3) of NFIP regulations prohibit any activity within a regulatory floodway which would result in any increase in the base flood water surface elevation. In order for any proposed project which does not meet these standards to be approved, a map revision is required from FEMA. Some increase in the floodway elevations within the roadway right-of-way may be acceptable without FEMA's prior approval, however, an exemption to the flood management regulations would be required and the project would need to be submitted to the DEP in accordance with the MOU.</p>			
10-year:	<input type="checkbox"/> No Increase	<input type="checkbox"/> There is an increase in 10-yr flood level of (1/100ths of a foot):	n/a
		Is the increase contained within city/town property (Yes/No)?	
<p>RCSA Section 25-68h-2(c)(5) prohibits any activity within a regulatory floodway which would result in an increase in the elevation of the 10-year water surface. An increase within the right of way or one with no adverse impact may be approved, however, an exemption to the flood management regulations would be required and the project would need to be submitted to the DEP in accordance with the MOU.</p>			
<p>Flooding - Will the proposed project pose any hazard to human life, health or property in the event of a base flood?</p>			Yes/No
			No
<p>Explain:</p> <p>The 25 year discharge just overtops the existing roadway. Proposed hydraulic conditions will be significantly improved with 0.9 feet of superstructure underclearance for the 100 year design discharge. For the 500 year flow, nearly two feet of freeboard will be provided to the upstream edge of pavement.</p>			

9. Floodplain Involvement (continued)

Flood Elevations - Will the proposed project cause an increase in flood elevation during the base flood discharge?	Yes/No
	No
If yes, the increase in flood elevation in 1/100ths of a foot is:	
Flood Velocities - Will the proposed project cause an increase in flow velocity during the base flood discharge?	Yes/No
	Yes
If yes, the increase in flow velocity in feet per second is:	
	≤3.1 fps for Q100
Will such increase in velocity or flood elevation cause channel erosion or pose any hazard to human life, health or property?	Yes/No
	No
<p>Explain:</p> <p>The maximum computed increase occurs at Section 1393 where the channel velocity increases from 3.7 fps to 6.8 fps (+3.1 fps or +83%). Although this is a notable relative increase, the proposed channel velocity of 6.8 fps is not especially high. The existing upstream riverbed is well protected with cobbles and could be considered to be mostly "self-armored". In addition, stone walls run along both streambanks which protect them from erosion and undercutting.</p>	
Flood Storage - Will the proposed project affect the flood storage capacity or flood control value of the floodplain?	Yes/No
	No
<p>Explain:</p> <p>The proposed structure results in a 1.9 foot reduction in backwater upstream of the bridge for the 100-year design flood. For this discharge, HEC-RAS computes a corresponding proposed reduction in total storage of only 0.45 ac-ft which is insignificant compared to the 1.69sm (1082 acres) drainage area upstream of John Street. This minimal loss of storage will not adversely impact flooding conditions within the watershed.</p>	
Degrading or Aggrading Stream Beds - Is the streambed currently degrading or aggrading?	
<input type="checkbox"/> Degrading	<input type="checkbox"/> Aggrading
<input checked="" type="checkbox"/> Neither	
Has the project design addressed degrading or aggrading streambed conditions (Yes/No)?	n/a
Ice Jams - Is the watercourse prone to ice jams or floods due to ice (Yes/No)?	
	No
Has the project design considered ice jams or floods due to ice (Yes/No)?	No
<p>Storage of Materials & Equipment - Storage of materials that could be injurious to human health or the environment in the event of flooding is prohibited below the elevation of the 500 year flood. Other material or equipment may be stored below the 500 year flood elevation provided that such material or equipment is not subject to major damage by floods, and provided that such material or equipment is firmly anchored, restrained or enclosed to prevent it from floating away or that such material or equipment can be removed prior to flooding.</p>	
Will the construction or use of the proposed project involve the storage of materials below the 500 year flood elevation that are buoyant, hazardous, flammable, explosive, soluble, expansive or radioactive, or the storage of any other materials which could be injurious to human, animal or plant life in the event of a flood?	Yes/No
	Yes
<p>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.</p> <p>The proposed project will not involve the permanent storage of any such materials below the 500 year flood elevation. However during construction, materials such as lumber, fuel, oil, etc. could potentially be utilized below the 500 year flood elevation. The contractor will be required to prepare an approved Flood Contingency Plan. The plan will provide assurance that such materials stored below the 500 year flood elevation can be removed or protected prior to the occurrence of a flood.</p>	

9. Floodplain Involvement (continued)

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

10. Environmental Considerations

Fish Passage & Habitat – The design of bridges, culverts and stream channel alterations along watercourses must be reviewed by and receive concurrence from the Department of Environmental Protection Fisheries Division. Enter the Fisheries review and concurrence information below.			
Fisheries Review Request Date	Fisheries Comments Date	Fisheries Concurrence Date	
4/13/2012	5/30/2012	7/24/2012	
<input checked="" type="checkbox"/> Copies of all correspondence with the DEP Fisheries must be attached to this form and/or included in the preliminary hydraulic design and the floodplain/floodway analysis reports			
Endangered, Threatened Or Special Concern Species – Is the project site located within an area identified as a habitat for endangered, threatened or special concern species as identified on the "State and Federal Listed Species and Natural Communities Map"? http://www.ct.gov/dep/cwp/view.asp?a=2698&q=322898&depNav_GID=1707		Yes/No	Date of Map
		Yes	12/2012
If yes, complete and submit a <i>Connecticut Natural Diversity Data Base (CT NDDB) Review Request Form (DEP-APP-007)</i> to the DEP Bureau Of Natural Resources, Wildlife Division. http://www.ct.gov/dep/cwp/view.asp?a=2709&q=324218&depNav_GID=1643#NDDB			Date Requested
			12/7/2011
Correspondence received (Yes/No)?	Yes	Date Reviewed	2/3/2012
Concerns:	False Mermaid-Weed and Tiger Spiketail Dragonfly		
Has a field survey been conducted to determine the presence of these species? If yes, provide biologist's name & address.		Yes/No	Survey Date
		Yes	6/3/2012
Name	Address		
Mike Thomas	206 Skyview Drive, Cromwell, CT 06416		
<input checked="" type="checkbox"/> Copies of any correspondence provided to or received from the NDDB, including copies of the completed CT NDDB Review Request Form, any field surveys, and any other information which may lead you to believe that endangered or threatened species may or may not be located in the area of the project, must be attached to this form.			
Aquifer – Is the site located within an aquifer protection area as defined in Section 22a-354a through 354bb of the General Statutes? If yes, coordination with the water company is required.			Yes/No
			No
Name of Water Company	n/a		
Public Water Supply – Is the project located within a public water supply watershed or a well-head protection area?		Yes/No	<input type="checkbox"/> Reservoir <input type="checkbox"/> Well-head
		n/a	
Name of Reservoir or Well-head		Name of Water Company	

10. Environmental Considerations (continued)

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

10. Environmental Considerations (continued)

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

Indicate the area of impact to inland or tidal wetlands from the project (0 = No Impact)

	<input checked="" type="checkbox"/> Inland
	<input type="checkbox"/> Tidal

Permanent (Acres)	Temporary (Acres)	Total Impact (Acres)
286 sf (0.0066 acres)	543 sf (0.0125 acres)	829 sf (0.0190 acres)

Does the project result in fill in the regulatory floodway (Yes/No)? No

Does the project include a bridge or culvert waterway crossing (Yes/No)? Yes

Is the drainage area to the bridge/culvert greater than or equal to one square mile (Yes/No)? Yes

<input checked="" type="checkbox"/> Bridge or Open-Bottom Structure	<input type="checkbox"/> Culvert or Artificial-Bottom Structure
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<input checked="" type="checkbox"/> Crossing spans at least 1.2 times the watercourse bank full width <input checked="" type="checkbox"/> Structure has an openness ratio equal to or greater than 0.25 meters <input checked="" type="checkbox"/> Structure allows for continuous flow and does not result in a change of the normal surface elevation of the upstream waters, waterway or wetland <input checked="" type="checkbox"/> Structure incorporates a riparian bank on at least one side for wildlife passage <i>Open bottom arches, bridge spans or embedded culverts are generally preferred over traditional culverts and are required for Category 1/non-reporting projects. However, site constraints may make use of an open bottom arch, bridge span or embedded culverts impractical, and in these cases documentation must be provided.</i>	<input type="checkbox"/> Structure has an openness ratio equal to or greater than 0.25 meters <input type="checkbox"/> Culvert gradient is less than or equal to the streambed gradient upstream and downstream of the culvert <input type="checkbox"/> Invert is set at least 1 foot below streambed elevation; (for double box crossings, at least one box is set 1 foot below, for culverts where one foot is not practicable, 25% of the pipe must be depressed) <input type="checkbox"/> Structure allows for continuous flow and does not result in a change of the normal surface elevation of the upstream waters, waterway or wetland <input type="checkbox"/> Structure does not impede the passage of fish
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Waterway Crossing Data – Enter the bridge/culvert crossing data below.

Location	Site 1		Site 2		Site 3	
Bridge/Culvert Type	Three-sided concrete culvert					
Span/Size	25.0 ft	7.62 m	ft	m	ft	m
Channel Bankfull Width	±20 ft	±6.1 m	ft	m	ft	m
Culvert embedment depth	n/a ft	n/a m	ft	m	ft	m
Cross Sectional Area (excludes embedded area)	101 ft ²	9.4 m ²	ft ²	m ²	ft ²	m ²
Bridge/Culvert Length (in direction of flow)	34 ft	10.4 m	ft	m	ft	m
Openness Ratio (m ² /m)	0.9 m			m		m

Check the type of permit required for the project:

Project is Category 1 eligible. Documentation will be processed through Office of Environmental Planning.

Project is Category 2 eligible and must be presented at Project Manager's Meeting. Corps application Form ENG 4345 and CT PGP addendum (both available at <http://www.nae.usace.army.mil/reg/index.htm>) must be prepared. If any of the above criteria cannot be met, a justification for the reasons must be included in the permit submission.

Project is not eligible for PGP. An individual permit must be submitted to the Corps.

11. Stormwater Management

Stormwater Runoff – The proposed project will (check all that apply):		
<input checked="" type="checkbox"/> Increase the area of impervious surfaces	<input type="checkbox"/> Alter existing drainage patterns	
<input checked="" type="checkbox"/> Increase runoff coefficients	<input type="checkbox"/> Alter time of concentrations	
<input type="checkbox"/> Change the timing of runoff in relation to adjacent watersheds		
Will the proposed project impact downstream areas by increasing peak flow rates, the timing of runoff, or the volume of runoff?		Yes/No No
If yes, describe the downstream impacts for the 2, 10 and 100 year frequency discharges: The overall width of the bridge is proposed to be increased from 21.8 feet to 34 feet to match into the roadway width of the easterly approach. This minor widening will slightly increase the area of pavement by 550sf and minimally alter runoff coefficients. However, overall, such increases are insignificant and the proposed project will not adversely impact existing runoff conditions.		
The pre and post development peak flow rates at the downstream design point are as follows:		
Return Frequency (Year)	Peak Discharges (CFS)	
	Pre-Development	Post-Development
2	no existing easterly system	Not computed
10	no existing easterly system	Q25- 1.8 cfs
100	no existing easterly system	Not computed
The above peak discharges were computed utilizing the a storm duration of:		Hour 11.1 mins.
This duration storm was selected because: The project design storm duration is equal to the estimated travel time in accordance with the rational method.		
Describe the location of the design point and why this location was chosen: The 15 inch drainage outfall at 3+24 right.		
Stormwater Detention Facilities – Does the proposed project include the construction of any stormwater detention facilities?		Yes/No No
<input type="checkbox"/> If yes, complete the <i>Stormwater Detention Facilities</i> worksheet and attach		
Storm Drainage Systems – Does the proposed project include the construction of subsurface storm drainage systems?		Yes/No Yes
<input checked="" type="checkbox"/> If yes, complete the <i>Storm Drainage Systems</i> worksheet and attach		

12. Hydrologic Report(s)

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

13A. Preliminary Hydraulic Analysis Report

The following hydraulic models shall be developed:

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

13A. Preliminary Hydraulic Analysis Report (continued)

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

13B. Preliminary Floodplain/Floodway Analysis Report

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

The following hydraulic models shall be developed:

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

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

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

Culverts and Bridges

Complete this section <i>only</i> if the proposed project includes the repair, modification, replacement or new construction of a culvert or bridge. Use a separate worksheet for each culvert/bridge on the project.			
Bridge No.	Roadway	Station/Location	Stream Name
056055	John Street	17+28 to 17+56	East Branch Byram River
All culverts and bridges are designed in accordance with methods and procedures defined in the DOT Drainage Manual as revised, DOT 816 as revised and the CT 2004 Stormwater Quality Manual as revised.			
Utilizing the DOT Drainage Manual classifications listed below, the culvert or bridge is classified as a:			
<input type="checkbox"/> <i>Minor Structure</i> - Minor structures have a drainage area of less than one square mile in which there is no established watercourse. They shall be designed to pass the 25 year frequency discharge.			
<input type="checkbox"/> <i>Small Structure</i> - Small structures have a drainage area of less than one square mile in which there is an established watercourse. They shall be designed to pass the 50 year frequency discharge.			
<input checked="" type="checkbox"/> <i>Intermediate Structure</i> - Intermediate structures have a drainage area greater than one square mile and less than 10 square miles. They shall be designed to pass the 100 year frequency discharge with reasonable underclearance.			
<input type="checkbox"/> <i>Large Structure</i> - Large structures have a drainage area greater than 10 square miles and less than 1000 square miles. They shall be designed to pass the 100 year frequency discharge with an underclearance not less than two feet.			
<input type="checkbox"/> <i>Monumental Structure</i> - Monumental structures <i>have</i> a drainage area greater than 1000 square miles. They shall be designed to meet the requirements of the Connecticut Department of Environmental Protection, U.S. Army Corps of Engineers, and the U.S. Coast Guard.			
<input type="checkbox"/> <i>Tidal Structure</i> - Tidal structures are subject to tidal action and shall be classified as minor, small, intermediate, etc. depending on their drainage area. These structures shall be designed in accordance with the previously listed <i>classifications</i> . However if the highway is subject to frequent tidal flooding, the design storm may be made consistent with the frequency of flooding by tidal action. The proposed culvert or bridge is classified as:			
<input type="checkbox"/> Minor <input type="checkbox"/> Small <input type="checkbox"/> Intermediate <input type="checkbox"/> Large <input type="checkbox"/> Monumental			
Note: Underclearance requirements are most applicable to bridge superstructures that are subject to buoyancy and damage from debris impact and are not applicable to culverts (enclosed conduits).			
Culverts and bridges will be designed for flood frequencies and underclearances stipulated in the DOT Drainage Manual as listed above, except that on local roads and driveways with low traffic volumes and where alternate routes are available, lower design criteria are acceptable when:			
<input type="checkbox"/> Flood discharges may be allowed to cross over roads that are at or close to the floodplain grade.			
<input checked="" type="checkbox"/> Water surface elevations are not increased by more than one foot, and will not cause damage to upstream properties.			
<input type="checkbox"/> Provisions are made to barricade the road when overtopped.			
<input type="checkbox"/> The road or driveway is posted as being subject to flooding.			
Has the structure been designed in accordance with the criteria established in the DOT Drainage Manual?			Yes/No
			No
If no, have the preceding conditions been incorporated with the lower design criteria (Yes/No)?			No
The culvert or bridge has been designed for:	Design Frequency (Year)	Underclearance (feet)	
	100 year	0.93 feet	
Describe the lower design standards and the reasons for not complying with the DOT Drainage Manual:			
The provided underclearance is substantially close (<1") to the one foot minimum recommended in the Drainage Manual and is not as critical a design criteria for this proposed three-sided concrete culvert as would be for a conventional bridge structure whose superstructure would be more susceptible to movement as a result of lateral flood/debris loads. Since the proposed design provides nearly two feet of freeboard for the 500 year discharge, it is the applicant's opinion that posting the roadway as being subject to flooding is unwarranted.			

Culverts and Bridges (continued)

<p>Design Discharge – If the subject site is located in a FEMA floodway or a <i>numbered "A"</i> zone, the discharge for analyzing the acceptability of a project at that site must be the same discharge used by FEMA in establishing the floodway or <i>numbered "A"</i> zone designation for the site. If the subject site is located in an <i>unnumbered "A"</i> zone or is not located in a FEMA flood zone, such that no detailed study is available, hydrologic analysis must be performed to establish an appropriate design discharge for evaluating the acceptability of the project at that site. If a design discharge is recommended other than the discharge used by FEMA, the designer must still evaluate the project using the FEMA design discharge and provide a detailed justification as to why another discharge was selected.</p>			
100-Year FEMA Discharge (cfs)	n/a	100-Year Design Discharge (cfs)	430
<p>Natural Condition – Bridges and culverts should be designed so that the proposed water surface profile does not exceed the natural profile by more than one foot for the 100-year floodplain analysis. This applies to the replacement of existing bridges and culverts as well as the construction of new structures.</p>			
Will the proposed culvert or bridge meet this standard?	Yes/No	Maximum Increase Proposed vs Natural (feet) Is?	
	Yes	0.4 feet (section 1260)	
If no, provide justification below:			
<p>Headwater – Will the proposed culvert or bridge be designed so that flooding during the design discharge does not endanger the roadway or cause damage to upstream developed property?</p>			Yes/No
			Yes
<p><i>Freeboard</i> is defined as the vertical distance between the design water surface and the upstream control such as the low point of the roadway edge, sill of a building or other controlling element. Indicate the amount of freeboard (in feet) provided in the proposed culvert or bridge design:</p>			approx. 3.5'
Indicate the hydraulic design control(s) for the proposed culvert or bridge below:			
<input checked="" type="checkbox"/> The elevation of roadway edge at roadway low point <input type="checkbox"/> The sill elevation of building or other structure <input type="checkbox"/> A water surface elevation equal or less than the FEMA regulatory elevation <input checked="" type="checkbox"/> One foot over natural condition requirement <input type="checkbox"/> A water surface elevation non-damaging or not encroaching onto private property <input type="checkbox"/> A ratio of the headwater/culvert depth (HW/D) less than 1.5 <input type="checkbox"/> A water surface elevation below a divide where the flow would be diverted from the area tributary to the culvert <input type="checkbox"/> Maintain existing water surface elevation and flood storage due to downstream flooding concerns <input type="checkbox"/> Other:			
<p>Downstream Peak Flows – Will the proposed culvert or bridge increase downstream peak flows by decreasing existing headwater depths during flooding events?</p>			Yes/No
			No
If yes, describe the selected design criteria and the impacts to downstream properties:			

Culverts and Bridges (continued)

Alignment – If the proposed bridge or culvert is new construction, has the structure been aligned to minimize the relocation of the watercourse? <input checked="" type="checkbox"/> No new alignment	Yes/No
	n/a
Fish Passage – Does the culvert design allow for the passage of fish?	Yes/No
	Yes
Has the rigid floors at new or replaced bridges and culverts been depressed a minimum of one foot below the normal streambed with one foot native streambed material on top? <input checked="" type="checkbox"/> No rigid structural floor	Yes/No
	n/a
If no, has written approval been obtained from DEP Fisheries (Yes/No)?	n/a
Describe the specific design provisions for fish passage: The proposed three-sided concrete box culvert will provide a natural streambed which should maintain existing fish passage conditions. In addition, a two foot wide riparian shelf is proposed along the face of Abutment #2 (easterly abutment) as a wildlife crossing, the existing low rock weir downstream of the bridge will be preserved and large rounded boulders will be placed along the toe of the riprap protection. Final DEEP Fisheries approval is attached hereto.	
Parapet Walls – Does the design utilize solid parapet walls in the sag part of a vertical curve?	Yes/No
	No
If yes, has the use of such walls been deemed hydraulically acceptable by the DOT Hydraulics and Drainage?	Yes/No
	n/a
Multiple Openings – The use of a single large culvert or bridge opening is preferred over the use of multiple small openings. Has the design minimized the use of multiple small openings? If no, explain:	Yes/No
	Yes
Debris Blockage – Is the culvert or bridge prone to blockage by debris?	Yes/No
	No
If yes, has the project design incorporated measures to minimize the potential for debris blockage?	Yes/No
	n/a

Temporary Hydraulic Facilities

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

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

Describe the temporary facilities:

During construction, John Street will be closed to traffic. Temporary cofferdams are proposed to be utilized at both abutments to protect the watercourse from the work site. The maximum height of the cofferdams will provide protection for the 2 year temporary design discharge with one foot of freeboard. Refer to the Sedimentation and Erosion Control Plan for specifics.

Storm Drainage Systems

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

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

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

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

- c. *Future Development* - Has the design of the system considered future development of adjacent properties?
 Yes No (Future development potential is assumed to be minimal.)

- 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.

Proposed new catch basins will have four foot sumps.

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

Yes No

Explain:

The project plans include suggested erosion and sedimentation control measures. The construction contractor will be required to prepare an approved E&S plan in accordance with Town and State guidelines. This plan will be coordinated with the contractor's actual operations.

Alterations of Watercourses

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

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

The channel capacity is designed for the: *n/a* year flood. (The proposed project does not intend to increase the size of the existing channel, therefore, no specific channel construction or design is proposed.)

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

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

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

Yes No

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

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

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

The proposed three-sided concrete box culvert will provide a natural streambed which should maintain existing fish passage conditions. In addition, a two foot wide riparian shelf is proposed along the face of Abutment #2 (easterly abutment) as a wildlife crossing, the existing low rock weir downstream of the bridge will be preserved and large rounded boulders will be placed along the toe of the riprap protection. In general, proposed channel work has been minimized to reduce impacts to the existing natural channel conditions. Final DEEP Fisheries approval is attached hereto.

Stormwater Detention Facilities

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

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

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

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

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

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

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

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

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

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

Explain:

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

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

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

Yes No

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

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

Yes No

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

Yes No

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

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

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

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

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

Yes No

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

Yes No

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

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

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

Yes No

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

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

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

Yes No

If yes, the structure will be: Elevated Floodproofed

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

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

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

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

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

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

Yes No

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

Yes No

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

Yes No

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

Yes No

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

Yes No

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

Yes No No foundation drains

Supporting Documentation
Application to DOT for Flood Management Certification
John Street over East Branch Byram River, Greenwich
Bridge No. 056055
January 16, 2013

The following documents are included in support of this application to DOT for Flood Management Certification:

1. Project location map
2. Flood Insurance Rate Map, Fairfield County, 6/18/2010
3. Aquifer protection area map, State of Connecticut, 10/30/2012
4. Inland Wetlands Permit, Greenwich Inland Wetlands and Watercourses Agency, 11/19/2012
5. Connecticut DEEP Fisheries correspondence-
 - A. Transmittal letter, Fuss & O'Neill to DEEP Fisheries, 4/13/2012
 - B. Transmittal letter, Fuss & O'Neill to DEEP Fisheries, 5/7/2012
 - C. Review letter, DEEP Fisheries to Fuss & O'Neill, 5/30/2012
 - D. Transmittal letter, Fuss & O'Neill to DEEP Fisheries, 7/16/2012
 - E. CTDEP Inland Fisheries Division Coordination Transmittal Memorandum, final sign-off 7/24/2012
6. Connecticut DEEP NDDDB correspondence-
 - A. NDDDB map, 12/2012
 - B. Initial request for NDDDB review, 12/7/2011 by Robert Clausi, Greenwich Senior Wetland Analyst
 - C. Review letter, Nelson Debarros, DEEP Wildlife to Fuss & O'Neill, 2/3/2012
 - D. Tiger Spiketail Site Survey Report, 6/13/2012 by Michael Thomas
 - E. DEEP approval of Tiger Spiketail Site Survey Report - Jenny Dickson, DEEP 8/20/2012
 - F. DEEP concurrence regarding False Mermaid Weed- Nelson Debarros, DEEP Wildlife 11/8/2012 email to Frank Petise, Greenwich Engineering Division
7. Special Provisions-
 - A. 0703008A Heavy Riprap
 - B. 0703030A Placement of Channel Boulder
 - C. 0950005A Turf Establishment

Project Location Map- Glenville Quadrangle



Bridge No. 056055

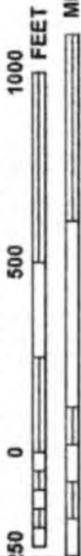
MN TN
14°

0 1000 FEET 0 500 1000 METERS

Map created with TOPO! © 2003 National Geographic (www.nationalgeographic.com/topo)



MAP SCALE 1" = 500'



NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0481F
FIRM
FLOOD INSURANCE RATE MAP
FAIRFIELD COUNTY,
CONNECTICUT
(ALL JURISDICTIONS)

PANEL 481 OF 626
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:
COMMUNITY NUMBER 090008
SUFFIX 0481 F

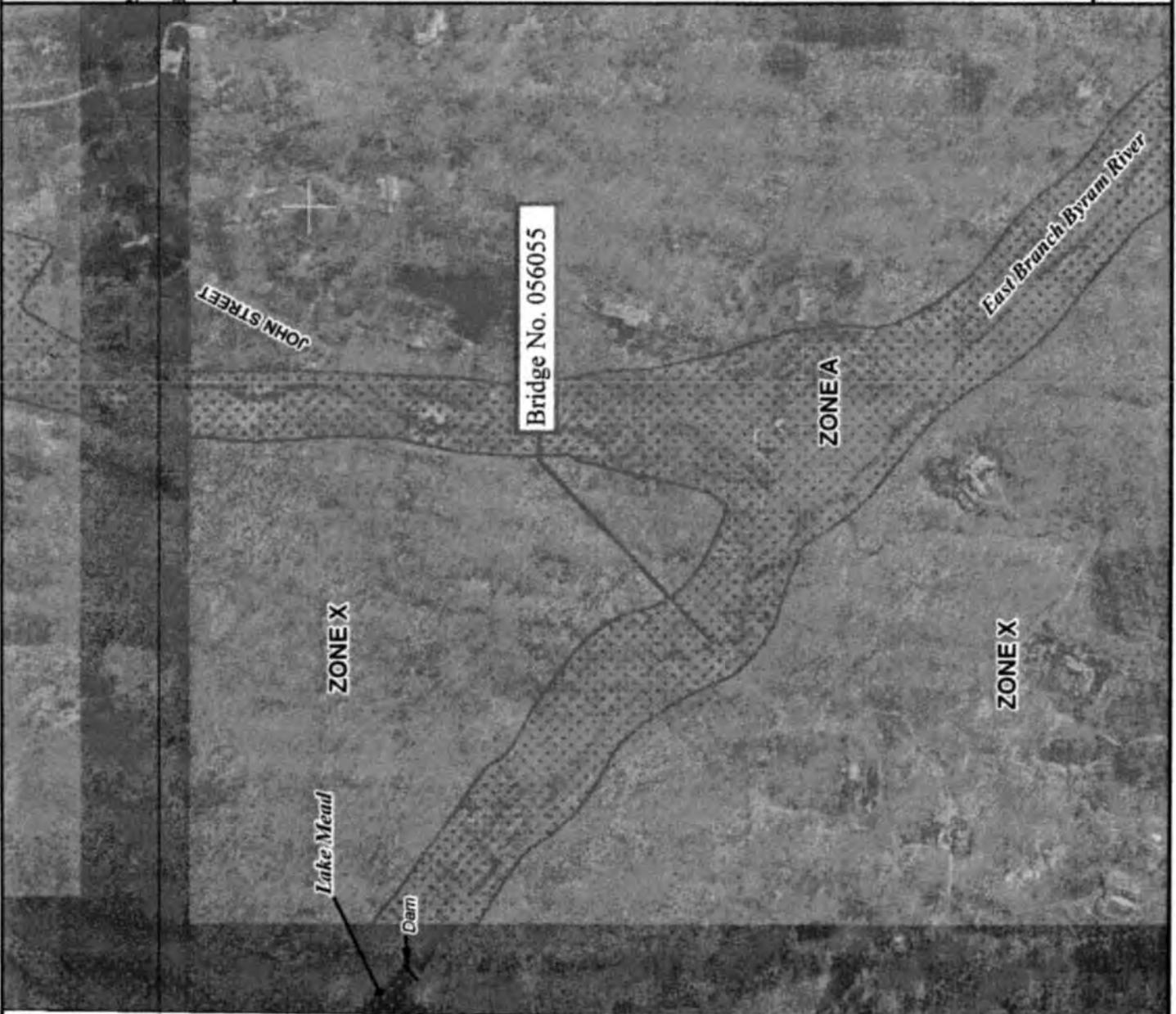
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER
09001C0481F
EFFECTIVE DATE
JUNE 18, 2010

Federal Emergency Management Agency

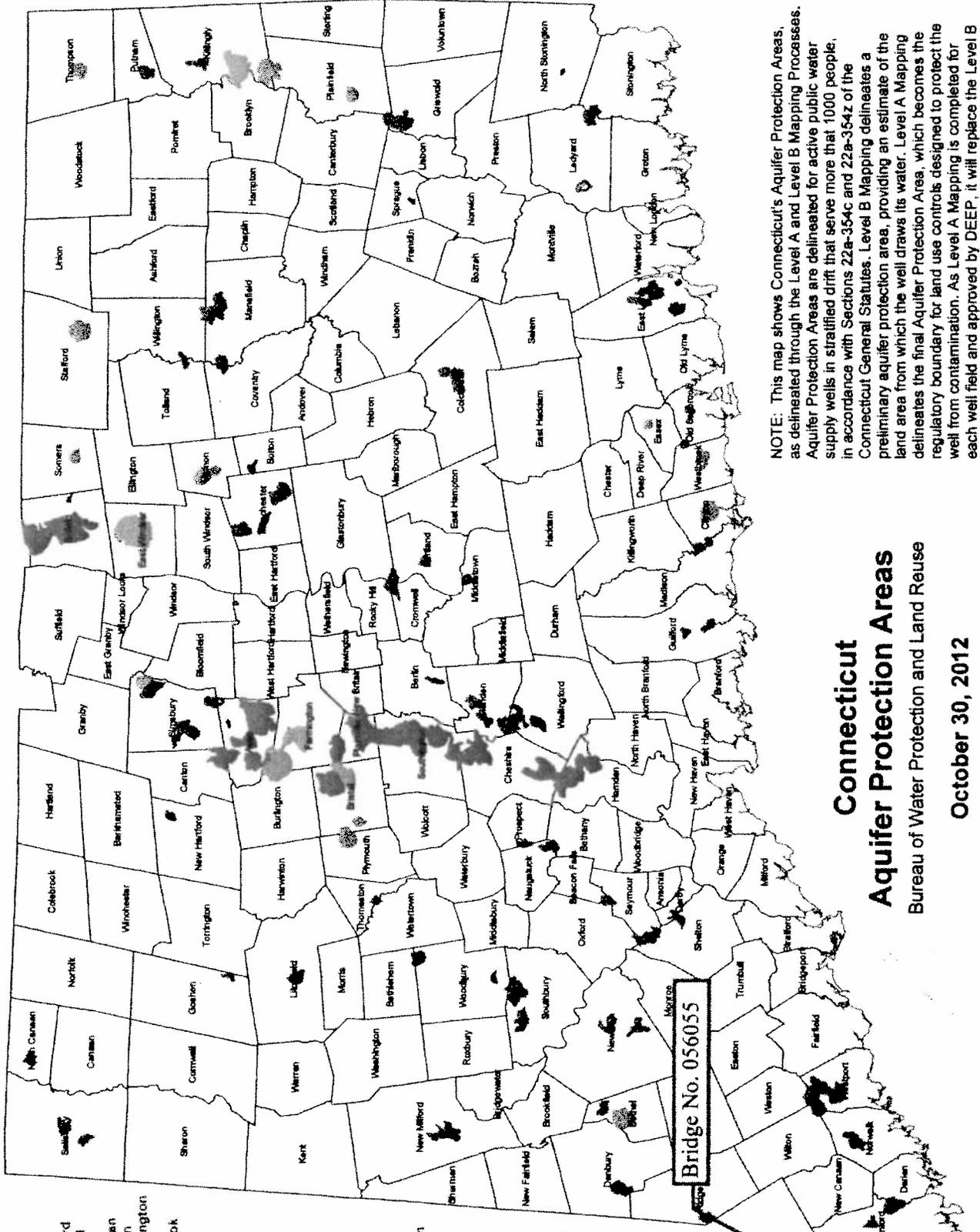
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



Towns with Aquifer Protection Areas

- Avon
- Beacon Falls
- Berlin
- Bethany
- Bethel
- Bethlehem
- Bolton
- Bristol
- Brooklyn
- Burlington
- Canterbury
- Canton
- Cheshire
- Colchester
- Coventry
- Cromwell
- Danbury
- Darien
- Derby
- East Lyme
- East Windsor
- Enfield
- Essex
- Farmington
- Glastonbury
- Goshen
- Griswold
- Guilford
- Hamden
- Thompson
- Killingly
- Ledyard
- Litchfield
- Madison
- Manchester
- Mansfield
- Meriden
- Middletown
- Naugatuck
- New Britain
- New Hartford
- New Milford
- Newtown
- North Canaan
- North Haven
- North Stoughton
- Norwalk
- Old Saybrook
- Oxford
- Plainfield
- Plainville
- Plymouth
- Portland
- Prospect
- Putnam
- Ridgefield
- Rocky Hill
- Salisbury
- Seymour
- Shelton
- Simsbury
- Southbury
- Southington
- Stratford
- Stamford
- Stonington
- Sturbridge
- Thomaston
- Tolland
- Vernon
- Wallingford
- Watertown
- Westbrook
- Weston
- Westport
- Willington
- Wilton
- Woodbury

* Towns in red have adopted the Final Aquifer Protection Areas



**Connecticut
Aquifer Protection Areas**
Bureau of Water Protection and Land Reuse

October 30, 2012

- Level A Aquifer Protection Area (Final Adopted)
- Level A Aquifer Protection Area (Final)
- Level B Aquifer Protection Area (Preliminary)



Connecticut Department of Energy & Environmental Protection

NOTE: This map shows Connecticut's Aquifer Protection Areas, as delineated through the Level A and Level B Mapping Processes. Aquifer Protection Areas are delineated for active public water supply wells in stratified drift that serve more than 1000 people, in accordance with Sections 22a-354c and 22a-354z of the Connecticut General Statutes. Level B Mapping delineates a preliminary aquifer protection area, providing an estimate of the land area from which the well draws its water. Level A Mapping delineates the final Aquifer Protection Area, which becomes the regulatory boundary for land use controls designed to protect the well from contamination. As Level A Mapping is completed for each well field and approved by DEEP, it will replace the Level B Mapping. Towns that have adopted the Aquifer Protection Areas at the local level and for which land use regulations are now in place are designated by the solid red above and in red in the list of Towns with Aquifer Protection Areas.

www.ct.gov/deep/aquiferprotection



TOWN OF GREENWICH

Town Hall • 101 Field Point Road • Greenwich, CT 06830

Michael N. Chambers
Director

Inland Wetlands
and
Watercourses Agency
(203) 622-7736
(Fax) (203) 622-7764

November 28, 2012

Town of Greenwich
Attn: James W. Michel, PE
Department of Public Works - Engineering Division
101 Field Point Road
Greenwich, CT 06830

Re: Application #2012-117 of Town of Greenwich to conduct regulated activities on John Street Bridge over East Branch of the Byram River

PERMIT #2012-83

Dear Mr. Michel:

The Inland Wetlands and Watercourses Agency found the proposed activities in the above mentioned application are regulated activities that will not have a significant impact on the inland wetlands and watercourses involved. Following this summary ruling, the Agency decided to issue the enclosed permit with conditions.

Your attention is directed to the special and standard conditions because those in **BOLD** require action either prior to the start of clearing or construction activities or within a specific time period after the receipt of the permit.

The statement and permit are on file in the office of this Agency.

The effective date of the permit is the date of issue. The permit expires 24 months from the effective date, but when deemed necessary, the Agency may extend the period according to the provisions in Section 11.11 of the Regulations.

If you have any questions concerning this permit or the functions and values of wetlands in Greenwich, please let me know.

Sincerely,

Lawrence Perry, Chairman
John Conte, Vice Chairman
Stephan Skoufalos, Secretary

RECEIVED

NOV 30 2012

DPW - ENGINEERING DIVISION

An Equal Opportunity Employer, M/F/H



INLAND WETLANDS
AND
WATERCOURSES

PERMIT #2012-83

Application #2012-117

Issued to: Town of Greenwich
Attn: James W. Michel, PE
Department of Public Works - Engineering Division
101 Field Point Road
Greenwich, CT 06830

Date Issued: November 19, 2012

The Inland Wetlands & Watercourses Agency finds that the following proposed activities on the property of the Town of Greenwich are regulated activities not involving a significant impact or major effect on the inland wetlands or watercourses as defined in Section 2 of the Inland Wetlands & Watercourses Regulations of the Town of Greenwich:

1. Reconstruct a bridge and roadway approaches as shown on the plans entitled, "Replacement of John Street Bridge No. 056055 Over East Branch Byram River" - Prepared by Fuss & O'Neill, Inc. - Sheet 1, "Title Sheet" - Sheet 9, "Sedimentation & Erosion Control Plan" - Sheet 10, "Roadway Plan" - Sheet 11, "Roadway Profile" - Sheet 12, "Grading Plan" - Sheet 17, "Cross Sections Sta. 17+00 - 17+60" - Sheet 20, "Bridge General Plan 1" - Sheet 23, "Footing Plan" - Sheet 24, "Wingwall Details", dated August 13, 2012 - Certified by Stuart H. Harris (CT PE#14313).
2. Site grading, clearing and landscaping as reviewed and approved by Agency Staff prior to the commencement of clearing or construction activities.

After a full review of the considerations set forth in Section 10 of the Regulations and other pertinent factors, this permit is issued with the following special and standard conditions:

INLAND WETLANDS AND WATERCOURSES AGENCY

PERMIT #2012-83

SPECIAL CONDITIONS:

1. The Wetlands Agency Staff shall review and approve the final construction designs and locations for the bridge prior to the start of clearing or construction activities. Plans shall be submitted in both paper and digital formats.
2. Any material excavated at the site shall be disposed of at an upland or off-site location reviewed and approved by the Agency Staff prior to the start of clearing or construction activities.
3. The permittee shall keep a spill kit on site and shall limit refueling to an off-site location or a dedicated location within the construction envelope that has been reviewed and approved by Staff prior to the start of clearing or construction activities.
4. The permittee or assigned agent shall schedule a site meeting with IWWA Staff, the contractor, and other relevant parties to review the project plans, erosion control measures, and site conditions before work begins.
5. Work within the watercourse corridor shall be limited to periods of low flow. Low flow periods normally occur between August and October. Wetlands Agency Staff may determine if the in-stream activities related to the bridge replacement can occur at other times of the year following an on-site field investigation to evaluate flow conditions.
6. The permittee shall implement the sedimentation/erosion control plan prepared by Fuss & O'Neill, Inc. and as shown on the permit maps.
7. Provisions of the *Connecticut Guidelines for Soil Erosion and Sediment Control* (2002, as revised) shall be implemented where required by Agency staff.
8. No grading, clearing, landscaping or other ground surface disturbance shall occur within 35 feet of the regulated inland wetland and watercourse area except as reviewed and approved by the Inland Wetlands Agency staff.
9. During construction, piles of fill, erodible material and debris shall not be created within 35 feet of regulated inland wetland and watercourse areas.
10. The existing vegetation within the wetland/watercourse areas and all associated buffer areas shall be preserved in an undisturbed natural state.
11. The permittee shall submit an "as-built" survey drawing locating foundations and other authorized structures with distances to regulated areas upon completion of construction activities. Plans shall be submitted in both paper and digital formats.

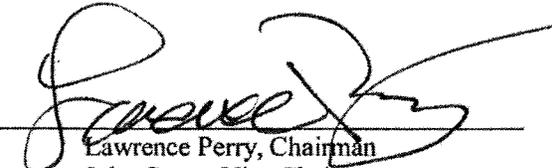
**ALL GREENWICH INLAND WETLANDS AND WATERCOURSES AGENCY PERMITS*
ARE SUBJECT TO THE FOLLOWING STANDARD CONDITIONS:**

1. The Wetlands Director shall receive written notice from the permittee before regulated activities commence and upon completion.
2. The attached compliance statement will be signed by the contractor engaged to perform the regulated activities and then returned to the Agency office before work commences.

3. Steps taken to control sedimentation, erosion and downstream siltation shall include but need not be limited to:
 - a. the stabilization of all disturbed earth surfaces with a suitable ground cover and/or spread hay mulch during and following construction activities.
 - b. **the installation of a temporary erosion control fence or other suitable erosion control measure as indicated on the permit map or as required by Agency Staff. This erosion control measure will be installed prior to the start of construction activities. Its location will be reviewed and approved in the field by Agency Staff.**
 - c. the limitation of all construction activities to a landscape envelope shall be reviewed and approved by the Agency Staff.
 - d. **the placement of additional erosion controls as reviewed and approved by Agency Staff prior to the commencement of clearing and construction activities.**
4. This permit shall not be assigned or transferred by the permittee to any other party without the written consent of the Greenwich Inland Wetlands and Watercourses Agency.
5. This permit may be revoked or suspended if the permittee exceeds the conditions or limitations of this permit or has secured this permit through deception or inaccurate information (I.W. & W.A. Regulations - Section 14.3).
6. This permit does not obviate the permittee's obligation to obey all other applicable federal, state and local laws or to obtain any applicable federal, state and local permits.
7. The permittee shall immediately inform the Wetlands Director of problems involving sedimentation, erosion, downstream siltation or any other unexpected adverse impacts which develop in the course of, or are caused by, the work herein authorized.
8. Any material, man-made or natural, which is in any way disturbed and/or utilized during work herein authorized shall not be deposited in any wetland or watercourse, either on or off site, unless so specifically authorized in this permit.
9. Any inland wetland and watercourse area disturbed by construction or future living activities shall be restored to a natural state as required by the Wetlands Director.

* Special Note:

This permit expires in 24 months unless an extension is requested and granted according to Section 11.11 of the Inland Wetlands and Watercourses Regulations of the Town of Greenwich. The expiration date of this permit is **November 19, 2014.**



Lawrence Perry, Chairman
John Conte, Vice Chairman
Stephan Skoufalos, Secretary



INLAND WETLANDS AND WATERCOURSES AGENCY

APPLICATION # 2012-117

PERMIT # 2012-83

As the contractor engaged by, Town of Greenwich to

perform the activities described in the Greenwich Inland Wetlands and Watercourses Permit # 2012-83

at John Street Bridge over the East Branch of the Byram River I have read the permit
(PROPERTY ADDRESS)

and will comply with all conditions therein.

Work will commence on or about _____ and be completed within _____ months.

Contractor Name

Address

City

State

Zip Code

Telephone Number

Fax Number

Email Address

Signature

MAIL TO: Greenwich Inland Wetlands and Watercourses Agency
Town Hall
101 Field Point Road
Greenwich, CT 06830
Telephone: (203) 622-7736
Fax: (203) 622-7764



FUSS & O'NEILL

April 13, 2012

Mr. Don Mysling
Fisheries Biologist
CTDEEP Inland Fisheries Division
230 Plymouth Road, RFD #4
Harwinton, CT 06791

Re: Replacement of Bridge No. 056055
John Street over East Branch Byram River
Greenwich, Connecticut

Dear Mr. Mysling:

Enclosed please find a copy of the Final Design roadway and general bridge plans for the replacement of the above referenced bridge. Various measures have been incorporated into the design to minimize impacts to the natural environment adjacent to and under the proposed bridge.

The abutments of the proposed structure have been located outside of the existing abutments to minimize impact to the watercourse. It is anticipated that the existing abutments will be removed either in the wet condition with turbidity control curtains placed downstream or by using short term temporary cofferdams such as sandbags.

Steel sheeting will be installed immediately in front of the proposed abutments to allow the existing watercourse to be maintained during construction of the proposed bridge. The sheeting will be left in place to provide additional long term protection against scour.

The proposed roadway drainage system will discharge to the watercourse through the southeast wingwall of the proposed bridge, and riprap has been provided for outlet protection in this area. Riprap has also been provided adjacent to existing drainage outlets at the northwest and southwest wingwalls for outlet protection.

I would appreciate any input you may have regarding recommendations or concerns at this site as part of our permit application coordination. If you have any questions, please contact me at (860) 646-2469 ext. 5232.

146 Hartford Road
Manchester, CT
06040
1860.646.2469
800.286.2469
1860.533.5143
www.fando.com

Sincerely,

Stuart H. Harris, P.E.
Associate

Enclosure

c: Frank Petise – Town of Greenwich

Connecticut
Massachusetts
Rhode Island
South Carolina

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Corres.



FUSS & O'NEILL

May 7, 2012

Mr. Don Mysling
Fisheries Biologist
CTDEEP Inland Fisheries Division
230 Plymouth Road, RFD #4
Harwinton, CT 06791

Re: Replacement of Bridge No. 056055
John Street over East Branch Byram River
Greenwich, Connecticut

Dear Mr. Mysling:

Attached is the following documentation supplementing our April 13, 2012 letter for this project:

- CTDEP Inland Fisheries Division Coordination Transmittal Memorandum
- Location Map
- Project Description
- Project area photographs

Please return the Transmittal Memorandum with any comments, recommendations or required additional information as part of our permit application coordination. If you have any questions, please contact me at (860) 646-2469 ext. 5232.

Sincerely,

Stuart H. Harris, P.E.
Associate

Enclosures

c: Frank Petise – Town of Greenwich

146 Hartford Road
Manchester, CT
06040
t 860.646.2469
800.286.2469
f 860.533.5143

www.fando.com

Connecticut
Massachusetts
Rhode Island
South Carolina

CTDEP INLAND FISHERIES DIVISION COORDINATION TRANSMITTAL MEMORANDUM

DOT Project #: 9056-0055 **Town:** Greenwich **Bridge #:** 056055
Waterway: East Branch Byram River **Drainage Basin Name & No.:** East Branch Byram River, 7410-00-1
Project Description / Scope of work: Replacement of John Street Bridge over East Branch Byram River

Initial Coordination

The following information is provided as required: Plan /submittal date : 04/13/2012

Legible location map with project site clearly marked
 Description of scope of work and if developed, pertinent 1/2 scale plans as deemed relevant.
 Area photographs

To be completed by CTDEP Inland Fisheries Division and returned to DOT Environmental Planning Division

Affect of proposal on our program interests is negligible. No further review is warranted.
 Additional information is required, a list of requested information is attached.
 Comments and recommendations are attached.

_____ Initials
 _____ Date

Structure Type Agreement

The following information is provided as required: Plan date: _____

Copies of previous correspondence from Fisheries Division
 If previous recommendations cannot be incorporated, provide narrative explaining why.
 1/2 scale plans of pertinent plan sheets including plan view, elevation view, profile and details as deemed relevant.

To be completed by CTDEP Inland Fisheries Division and returned to DOT Environmental Planning Division

DEP Fisheries agrees to the structure type presented in the plans.
 Comments and recommendations are attached.

ADP Initials
05/30/12 Date

Final Fisheries Sign-Off

Check here if project is not FM MOU eligible and will be finalized through DEP IWRD

The following information is provided as required: Plan date: _____

Copies of all previous correspondence from Fisheries Division
 If previous recommendations cannot be incorporated, provide narrative explaining why.
 1/2 scale plans of pertinent plan sheets including plan view, elevation view, profile and details as deemed relevant.

To be completed by CTDEP Inland Fisheries Division and returned to DOT Environmental Planning Division

DEP Fisheries comments have been adequately incorporated into project plans
 The attached Special Conditions must be incorporated into the contract language

 DEP Fisheries Biologist _____
 Date



**Connecticut Department of
Energy and Environmental Protection**
Bureau of Natural Resources
Inland Fisheries Division
79 Elm Street
Hartford, CT 06106

Stuart H. Harris, P.E.
Fuss & O'Neill
146 Hartford Road
Manchester, CT 06040

May 30, 2012

***RE: Replacement of Bridge No. 056055
John Street over the East Branch Byram River, Greenwich
CT DEEP Drainage Basin#: 7410***

As requested per your correspondences of April 13 and May 7, 2012, I have completed my review of the proposed replacement of the John Street Bridge over the East Branch Byram River, Greenwich.

The plans that accompanied the correspondence depict a 25-foot clear span bridge as being selected as a replacement for the existing 14'-7" clear span. The existing bridge abutments and wingwalls will be removed and the new supporting structures will be located farther landward to accommodate the longer span.

As you are aware from our previous involvement with bridge replacement projects, the Inland Fisheries Division routinely recommends the installation of span bridges or arch culverts for stream or river crossings as these structures best preserve physical aquatic habitat and do not create barriers to fish migration. As such, the proposed span-for-span bridge replacement at John Street is favorably supported..

However, I recommend the following measures for habitat conservation and/or enhancement:

1. The river channel profile beneath and adjacent to the bridge should not be altered (to include preserving the remnants of the low-head rock dam/located immediately downstream of the bridge).
2. Large (rounded) boulders should be installed at the toe of any rip rap slopes; and
3. Riparian vegetation disturbed during construction should be re-established in a timely manner upon the project's completion. The species of vegetation selected for reestablishment should be native to the immediate watershed and be non-invasive.

As best management practices:

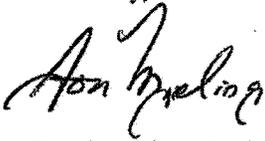
1. Unconfined instream activities should be allowed only during the time period of June 1 through September 30; and
2. All appropriate erosion and sediment controls should be established prior to and be maintained through all phases of construction

Page 1 of 2.

I have completed sign-off of the CTDEEP Inland Fisheries Division Coordination Transmittal Memorandum for this project and have forwarded it to the Connecticut Department of Transportation -- Office of Environmental Planning with this correspondence included as an attachment.

In closing, I appreciate the opportunity to have reviewed and to provide comment for the proposed replacement of the John Street Bridge. Trustfully, the recommendations derived from this brief correspondence will prove of value to yourself and/or the Town of Greenwich. Should either you or anyone associated with the design or regulatory review of the proposed bridge replacement have concerns or questions of my correspondence, they should feel free to contact me.

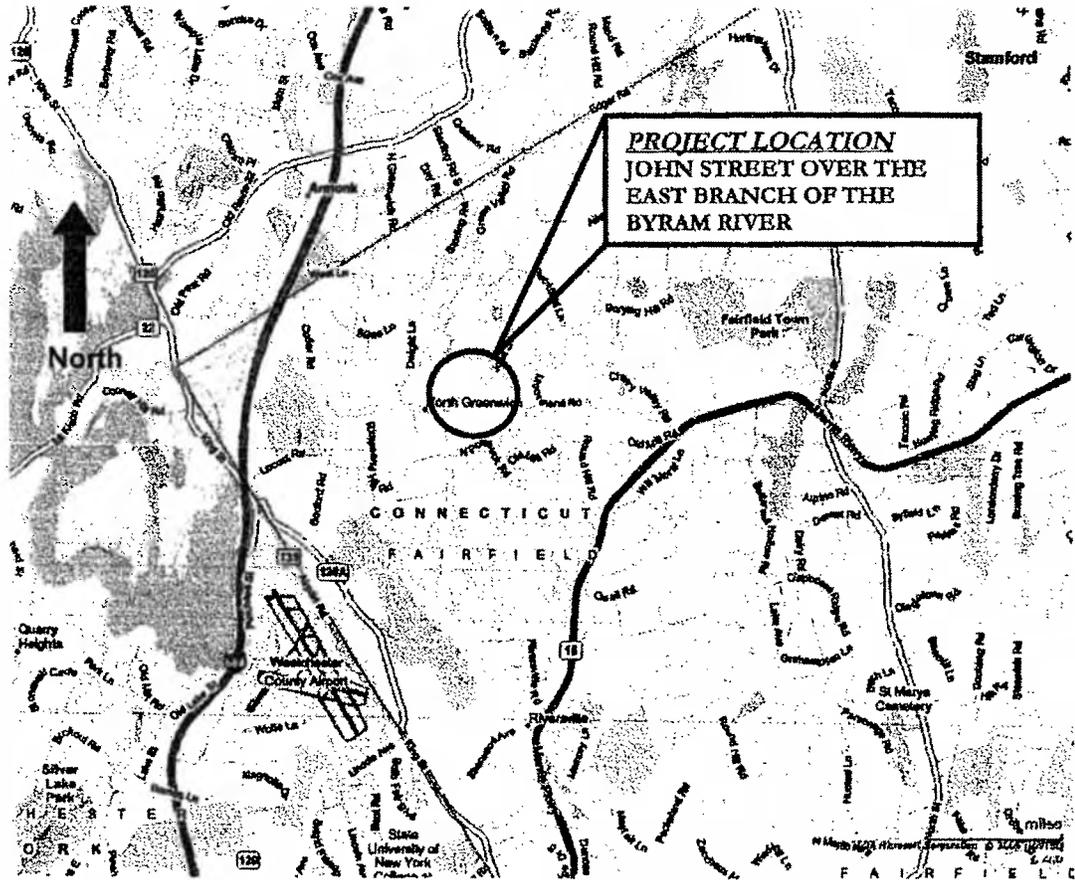
Sincerely,



Don Mysling, Senior Fisheries Biologist
Inland Fisheries Division - Habitat Conservation and Enhancement Program
Western Headquarters, 230 Plymouth Road, Harwinton, CT 06791
(P) 860.567.8998 (E-mail) donald.mysling@ct.gov

CC: ConnDOT Office of Environmental Planning, Newington
Inland Fisheries Division Hartford Office Files
Files: {MiscBridgeReplacement: FussOneillJohnStGreenwich}

Page 2 of 2.



LOCATION MAP - FIG. No. 1

Inspection of the John Street Bridge over the East Brach of the Byram River
Greenwich, CT.
November 30, 2006



Photo #5 – West Approach From Bridge



Photo #6 – North Elevation From Up Stream

Inspection of the John Street Bridge over the East Branch of the Byram River
Greenwich, CT.
November 30, 2006

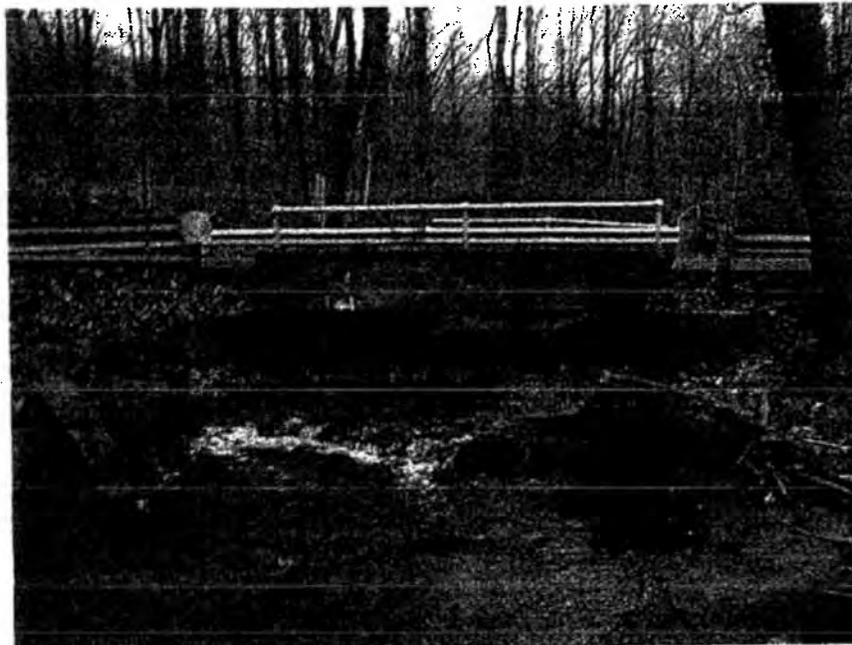


Photo #7 – South Elevation From Down Stream



Photo #8 – Upstream Channel From Bridge



FUSS & O'NEILL

July 16, 2012

Mr. Don Mysling
Fisheries Biologist
CTDEEP Inland Fisheries Division
230 Plymouth Road, RFD #4
Harwinton, CT 06791

Re: Replacement of Bridge No. 056055
John Street over East Branch Byram River
Greenwich, Connecticut

Dear Mr. Mysling:

In response to your May 30, 2012 letter, we have revised the plans for the referenced project to incorporate your recommendations. A copy of your letter, the revised plans and the CTDEEP Inland Fisheries Division Coordination Transmittal Memorandum are attached.

Please return the Transmittal Memorandum with the Final Fisheries Sign-Off so we can complete and submit the MOU to CTDOT. If you have any questions, please contact me at (860) 646-2469 ext. 5232.

Sincerely,

Stuart H. Harris, P.E.
Associate

Enclosures

c: Frank Petise – Town of Greenwich

146 Hartford Road
Manchester, CT
06040
f 860.646.2469
800.286.2469
f 860.533.5143

www.fando.com

Connecticut
Massachusetts
Rhode Island
South Carolina

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Corres.

CTDEP INLAND FISHERIES DIVISION COORDINATION TRANSMITTAL MEMORANDUM

DOT Project #: 9056-0055 Town: Greenwich Bridge #: 056055
Waterway: East Branch Byram River Drainage Basin Name & No.: East Branch Byram River, 7410-00-1
Project Description / Scope of work: Replacement of John Street Bridge over East Branch Byram River

Initial Coordination

The following information is provided as required:
Plan /submittal date : 04/13/2012
[X] Legible location map with project site clearly marked
[X] Description of scope of work and if developed, pertinent 1/2 scale plans as deemed relevant.
[X] Area photographs

To be completed by CTDEP Inland Fisheries Division and returned to DOT Environmental Planning Division
Affect of proposal on our program interests is negligible. No further review is warranted.
Additional information is required, a list of requested information is attached.
Comments and recommendations are attached.
Initials
Date

Structure Type Agreement

The following information is provided as required:
Plan date:
Copies of previous correspondence from Fisheries Division
If previous recommendations cannot be incorporated, provide narrative explaining why.
1/2 scale plans of pertinent plan sheets including plan view, elevation view, profile and details as deemed relevant.

To be completed by CTDEP Inland Fisheries Division and returned to DOT Environmental Planning Division
[X] DEP Fisheries agrees to the structure type presented in the plans.
[X] Comments and recommendations are attached.
Initials
Date

Final Fisheries Sign-Off

Check here if project is not FWA/VOU eligible and will be finalized through DEP IWRB

The following information is provided as required:
Plan date: 7/13/2012
[X] Copies of all previous correspondence from Fisheries Division
[X] If previous recommendations cannot be incorporated, provide narrative explaining why.
[X] 1/2 scale plans of pertinent plan sheets including plan view, elevation view, profile and details as deemed relevant.

To be completed by CTDEP Inland Fisheries Division and returned to DOT Environmental Planning Division
[X] DEP Fisheries comments have been adequately incorporated into project plans
The attached Special Conditions must be incorporated into the contract language
Date: 07/24/2012
DEP Fisheries Biologist

Natural Diversity Data Base Areas GREENWICH, CT

December 2012

-  State and Federal Listed Species & Significant Natural Communities
-  Town Boundary

NOTE: This map shows general locations of State and Federal Listed Species and Significant Natural Communities. Information on listed species is collected and compiled by the Natural Diversity Data Base (NDDDB) from a number of data sources. Exact locations of species have been buffered to produce the general locations. Exact locations of species and communities occur somewhere in the shaded areas, not necessarily in the center. A new mapping format is being employed that more accurately models important riparian and aquatic areas and eliminates the need for the upstream/downstream searches required in previous versions.

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

www.ct.gov/deep/hddbrequest

This file has PDF Layers. Look for the Layers tab on the left. Expand the layers and use the "eye" icons to change visibility.

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



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





Request for Natural Diversity Data Base (NDDB) State Listed Species Review

All requesters must completely fill out Parts I - VII of this form and submit Attachments A and B, or the request will be rejected as incomplete.

There are no fees associated with NDDB Reviews.

DEP USE ONLY

Request No. _____

Hardcopy _____ Electronic files _____

Part I: Preliminary Screening

Before submitting this request, you must review the Natural Diversity Data Base "State and Federal Listed Species and Significant Natural Communities Maps" found on the [DEP website](#). Follow the instructions on the map or in this form's instruction document. These maps are updated twice a year, usually in June and December.

Does your site, including all affected areas, meet the screening criteria according to the instructions:

Yes No

Enter the date of the map reviewed for pre-screening: December 2011

Part II: Requester Information

If the requester is a corporation, limited liability company, limited partnership, limited liability partnership, or a statutory trust, it must be registered with the Secretary of State. If applicable, the company name shall be stated **exactly as it is registered with the Secretary of State.*

If the requester is an individual, provide the legal name (include suffix) in the following format: First Name; Middle Initial; Last Name; Suffix (Jr, Sr., II, III, etc.).

1. Requester Company Name*: **Greenwich Inland Wetlands & Watercourses Agency**

Name: **Bob Clausi**

Address: **Greenwich Town Hall, 101 Field Point Road**

City/Town: **Greenwich**

State: **CT**

Zip Code: **06830**

Business Phone: **203-622-7736**

ext.

Fax: **203-622-7764**

Requester can best be described as:

Business Entity Federal Agency Municipal govt. State agency Individual

Tribe Other (specify):

Acting as (Affiliation), pick one:

Property owner Consultant Engineer Facility owner Applicant

Biologist Pesticide Applicator Other representative (specify): **Regulating authority**

2. List Primary Contact to receive Natural Diversity Data Base correspondence and inquiries, if different from requester.

Company:

Contact Person:

Title:

Mailing Address:

City/Town:

State:

Zip Code:

Business Phone:

ext.

Fax:

Email: **rclausi@greenwichct.org**

Part II: Requester Information (continued)

Affiliation of primary contact, check one: Property owner Consultant Engineer
 Facility owner Applicant Biologist Pesticide Applicator
 Other representative (specify): **Senior Wetlands Analyst - Town of Greenwich**

3. Project Type:
Choose Project Type: Bridge work , If other describe: Widen/realign roadway approach to bridge

Part III: Site Information

This request can only be completed for one site. A separate request must be filed for each additional site.

1. Site Location
Site Name or Project Name: **Replacement of John Street Bridge (No.056055) over East Branch Byram River**
Town(s): **Greenwich**
Street Address or Location Description:
John Street between Round Hill Road and Riversville Road
Size in acres, or site dimensions: **~550' along road x 60' (max.) wide**
Latitude and longitude of the center of the site in decimal degrees (e.g., 41.23456 -71.68574):
Latitude: **41.09912** Longitude: **-73.66302**
Method of coordinate determination (check one):
 GPS Photo interpolation using CTECO map viewer Other (specify):

2a. Describe the current land use and land cover of the site.
Forest and riparian.

b. Check all that apply and enter the size in acres or % of area in the space after each checked category.

<input type="checkbox"/> Industrial/Commercial _____	<input type="checkbox"/> Residential _____	<input checked="" type="checkbox"/> Forest <u>10%</u>
<input checked="" type="checkbox"/> Wetland <u>10%</u>	<input type="checkbox"/> Field/grassland _____	<input type="checkbox"/> Agricultural _____
<input type="checkbox"/> Water _____	<input type="checkbox"/> Utility Right-of-way _____	
<input checked="" type="checkbox"/> Transportation Right-of-way <u>80%</u>	<input type="checkbox"/> Other (specify): _____	

Part IV: Project Information

1. Is the subject activity limited to the maintenance, repair, or improvement of an existing structure within the existing footprint? Yes No If yes, explain.

Part IV: Project Information (continued)

2. Give a detailed description of the activity which is the subject of this request and describe the methods and equipment that will be used.

Demolish bridge, construct new and wider bridge, widen roadway at bridge approach, minor realignment of other portions of roadway, installation of E&S controls at limits of construction envelope (see plan).

3. Provide a contact for questions about the project details if different from Part II primary contact.

Name: **Frank Petisse, Senior Civil Engineer, Town of Greenwich Department of Public Works**

Phone: 203-622-7860

Email: fpetisse@greenwichct.org

Part V: Request Type and Associated Application Type

Check *one* box from either Group 1 or Group 2, indicating the appropriate category for this request.

Group 1. If you check one of these boxes, fill out Parts I – VII of this form and submit the required attachments A and B.

- Preliminary screening was negative but an NDDB review is still requested
- Request regards a municipally regulated or unregulated activity (no state permit/certificate needed)
- Request regards a preliminary site assessment or project feasibility study
- Request relates to land acquisition or protection
- Request is associated with a *renewal* of an existing permit, with no modifications

Group 2. If you check one of these boxes, fill out Parts I – VII of this form and submit required attachments A, B, and C.

- Request is associated with a *new* state or federal permit application
- Request is associated with modification of an existing permit
- Request is associated with a permit enforcement action
- Request regards site management or planning, requiring detailed species recommendations
- Request regards a state funded project, state agency activity, or CEPA request

If you are filing this request as part of a state or federal permit application enter the application information below.

Permitting Agency and Application Name: _____

State DEP Application Number, if known: _____

State DEP Enforcement Action Number, if known: _____

State DEP Permit Analyst/Engineer, if known: _____

Is this request related to a previously submitted NDDB request? Yes No

Enter the previous NDDB Request Number(s), if known: _____

Part VI: Supporting Documents

Please check each attachment submitted as verification that *all* applicable attachments have been supplied with this request form. Label each attachment as indicated in this part (e.g., Attachment A, etc.) and be sure to include the requester's name, site name and the date. **Please note that Attachments A and B are required for all requesters.** Attachment C (DEP-APP-007C) is supplied at the end of this form.

<input checked="" type="checkbox"/> Attachment A:	Overview Map: an 8 1/2" X 11" print/copy of the relevant portion of a USGS Topographic Quadrangle Map clearly indicating the exact location of the site.
<input checked="" type="checkbox"/> Attachment B:	Detailed Site Map: fine scaled map showing site boundary details on aerial imagery with relevant landmarks labeled. (Site boundaries in GIS [ESRI ArcView shapefile, in NAD83, State Plane, feet] format can be substituted for detailed maps, see instruction document)
<input type="checkbox"/> Attachment C:	Supplemental Information, Group 2 requirement (attached, DEP-APP-007C) <input type="checkbox"/> Section i: Supplemental Site Information and supporting documents <input type="checkbox"/> Section ii: Supplemental Project Information and supporting documents

Part VII: Requester Certification

The requester *and* the individual(s) responsible for actually preparing the request must sign this part. A request will be considered incomplete unless all required signatures are provided.

<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>	
Signature of Requester	12-7-11 Date
Robert E. Clausi Name of Requester (print or type)	Senior Wetlands Analyst Title (if applicable)
Signature of Preparer (if different than above)	Date
Name of Preparer (print or type)	Title (if applicable)

Note: Please submit the completed Request Form and all Supporting Documents to:

CENTRAL PERMIT PROCESSING UNIT
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
 79 ELM STREET
 HARTFORD, CT 06106-5127

Or email request to: dep.nddbrequest@ct.gov

Attachment C: Supplemental Information, Group 2 requirement

Section i: Supplemental Site Information

1. Existing Conditions

Describe all natural and man-made features including wetlands, watercourses, fish and wildlife habitat, floodplains and any existing structures potentially affected by the subject activity. Such features should be depicted and labeled on the site plan that must be submitted. Photographs of current site conditions may be helpful to reviewers.

- Site Photographs (optional) attached
- Site Plan/sketch of existing conditions attached

2. Biological Surveys

Has a biologist visited the site and conducted a biological survey to determine the presence of any endangered, threatened or special concern species Yes No

If yes, complete the following questions and submit any reports of biological surveys, documentation of the biologist's qualifications, and any NDDDB survey forms.

Biologist(s) name:

Habitat and/or species targeted by survey:

Dates when surveys were conducted:

- Reports of biological surveys attached
- Documentation of biologist's qualifications attached
- NDDDB Survey forms for any listed species observations attached

Section ii: Supplemental Project Information

1. Provide a schedule for all phases of the project including the year, the month and/or season that the proposed activity will be initiated and the duration of the activity.

2. Describe and quantify the proposed changes to existing conditions and describe any on-site or off-site impacts. In addition, provide an annotated site plan detailing the areas of impact and proposed changes to existing conditions.

- Annotated Site Plan attached



Connecticut Department of
**ENERGY &
ENVIRONMENTAL
PROTECTION**

Wildlife Division
Natural History Survey – Natural Diversity Data Base
79 Elm Street, 6th Floor
Hartford, CT 06106-5127

February 3, 2012

Bob Clausi
Greenwich Inland Wetlands & Watercourse Agency
Greenwich Town Hall
101 Field Point Road
Greenwich, CT 06830
relausi@greenwichct.org

Subject: NDDDB Request #201107780
Replacement of John Street Bridge (No.056055)
over East Branch Byram River; Greenwich, CT

Dear Bob Clausi,

I have reviewed Natural Diversity Data Base maps and files regarding the area delineated on the map you provided. According to our records, multiple State-listed species (RCSA Sec. 26-306) have been documented within or near your proposed project area.

STATE-LISTED PLANT SPECIES

False mermaid-weed (*Floerkea proserpinacoides*), a State Endangered plant species, has been documented immediately to the north of the John Street Bridge in Greenwich, CT (see attached map) and it may occur in additional locations surrounding the proposed project area. To prevent impacts to this State Endangered species, I recommend limiting the area of disturbance during construction and utilizing best management practices to reduce erosion and siltation. If any disturbance is anticipated within the highlighted area on the attached map, please contact Nelson DeBarros (nelson.debarros@ct.gov; 860-424-3585).

STATE-LISTED WILDLIFE SPECIES

Tiger spiketail (*Cordulegaster erronea*) Protection Status: Threatened

Habitat and Ecology: The tiger spiketail dragonfly is associated with small streams in densely forested ravines. Activities that alter the physical or chemical nature of the aquatic habitat, cause siltation or any source of pollution will be detrimental.

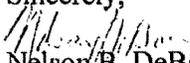
Recommendation: The DEEP Wildlife Division recommends field surveys of the site be conducted by a qualified entomologist knowledgeable in the study of tiger spiketail dragonflies, prior to the initiation of such work. A report summarizing the results of such surveys should include (1) the survey date(s); (2) descriptions of the habitat; (3) notes on the presence/absence of State-listed invertebrate species; (4) detailed maps of the area surveyed including the location

79 Elm Street, Hartford, CT 06106-5127
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and extent of State-listed invertebrate species; and (5) a statement/résumé indicating the entomologist's qualifications. The report should be sent to Jenny Dickson, DEEP Wildlife Division (jenny.dickson@ct.gov) for further review.

Natural Diversity Data Base information includes all information regarding critical biologic resources available to us at the time of the request. This information is a compilation of data collected over the years by the CT Department of Energy & Environmental Protection, Bureau of Natural Resources 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 proposed work has not been initiated within 12 months of this review, contact the NDDB for an updated review.

Please contact me if you have any questions (nelson.debarros@ct.gov; 860-424-3585). Thank you for consulting the Natural Diversity Data Base and continuing to work with us to protect State-listed species.

Sincerely,

Nelson B. DeBarros
Botanist/Ecologist



NDDB Request 2011007780
*Replacement of John Street
Bridge (No.056055) over East
Branch Byram River;*
Greenwich, CT

False mermaid-weed
(*Floerkea
proserpinacoides*)
State Endangered



0 137.5275 550 825 1,100 Feet

Map created 02/01/2012

SITE VISIT:
JOHN STREET BRIDGE, EAST BRANCH BYRAM RIVER
GREENWICH, CONNECTICUT



Prepared for:

James W. Michel, P. E.
Chief Engineer, DPW Engineering Division
Town of Greenwich

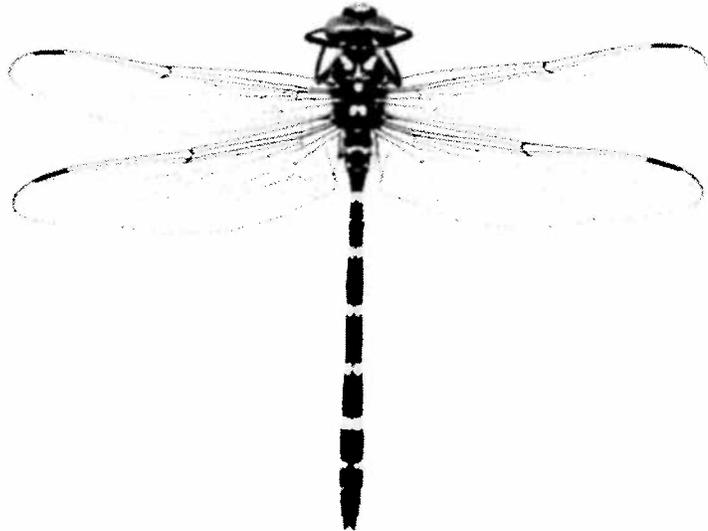
by:

Michael Thomas
206 Skyview Drive,
Cromwell, CT

June 13, 2012

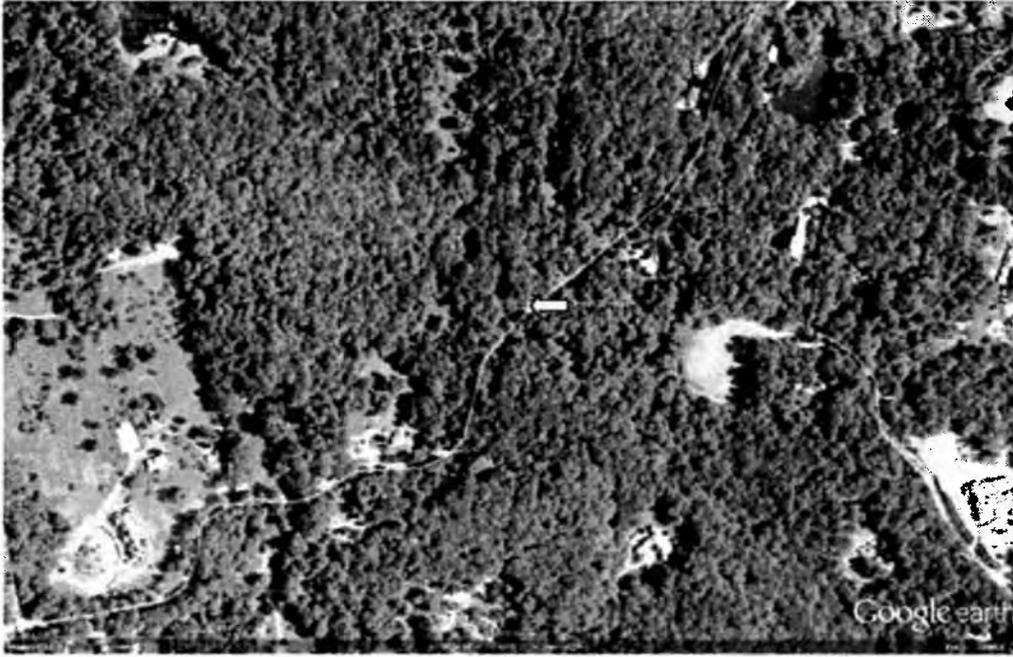
Introduction: The town of Greenwich has applied to the Department of Energy and Environmental Protection (DEEP) for permits to replace the John Street Bridge (No. 056055) over the East Branch Byram River. The property, owned by the Greenwich Audubon Center, was identified in a letter from Nelson DeBarros of the DEEP as being proximate to a Natural Diversity Database record for the Tiger Spiketail (*Cordulegaster erronea*). This dragonfly is listed as a Threatened Species by the State of Connecticut (RCSA Sec. 26-306). At the request of Frank Petise, Greenwich's Senior Civil Engineer, I visited the site on 3 June to determine the suitability of the project site for the Tiger Spiketail.

Tiger Spiketail (*Cordulegaster erronea*): The Tiger Spiketail is a large dragonfly of the family Cordulegastridae. This eastern species reaches its northeastern limit in Connecticut and is currently known from six sites. The yellow rings encircling each abdominal segment separates it from the other three species of Spiketails occurring in the State. Adults breed in shallow surface springs, seeps, cold rivulets, and narrow creeks with continuous water flow and fine sand sediments under a dense canopy of trees. Adults emerge in early June and fly through the end of July. The adults are most often observed in the vicinity of springs and seeps with skunk cabbage during the daylight hours. Permanent seeps and springs with suitable sediments (e.g. fine sand/silt) running into or occurring alongside forested streams may support populations of Tiger Spiketails. A single record for the Tiger Spiketail was documented from the town of Greenwich at the Audubon Center property on 20 June 1991 by Ken Soltesz (a regional expert on odonates). Details of the occurrence record (exact location, life stage) are not known.



Site Survey: James Michel, Greenwich Chief Engineer, and Michael Thomas visited the site on 3 June, 2012 at 10 a.m. Mr. Michel provided an overview of the project, which involves widening and raising the existing bridge profile to accommodate a 100 year flood event. The project is scheduled to begin in April of 2013. Sandbags will be used to temporarily divert the stream flow to allow construction of new bridge abutments. A cofferdam (silt collector) will be installed during the project to minimize the impact of silt sediments flowing downstream. The removal of a few trees along the road is planned. After completion of the project, the site will be restored to natural vegetation.

The East Branch Byram River was surveyed both upstream and downstream from the bridge for approximately 200 yards for immature (larvae) and adult dragonflies over a two-hour period. Conditions were favorable for adult activity (70°F & sunny).



Methods:

Larval Odonate Sampling: A colander and aquatic kick net were used to sample immature dragonflies at the John Street bridge site and in skunk cabbage seeps located adjacent to the river downstream. Fine silt sediments and submerged debris were collected in the colander and swirled, leaving larger debris and immature odonates. For areas with cobble/rock substrates, a kick net was used. The net was placed downstream and rocks upstream were kicked or agitated to expose and capture immatures. Immatures were identified in the field using a 20X hand lens, or were examined in the lab under a 60X microscope. Larval sampling is a more efficient method than surveying for the elusive and secretive adults and confirms if the species is breeding at the site.

Adult Sampling: An aerial insect net was used to capture adult dragonflies encountered at the site.

Results:

The river at the bridge site is inappropriate for the Tiger Spiketail. The substrate is composed primarily of rocks in fast flowing water with small pockets of fine silt sediments. Seeps and surface springs required by the Tiger Spiketail were absent at the planned construction site. No dragonfly larvae were found in the sediments at the bridge.



This was not the case a short distance downstream (50 yds.) where several common species of odonate larvae were found in fine silt sediments (see Table 1). Larvae of the Ashy Clubtail (*Gomphus lividus*), an abundant river species found throughout the State, were collected at several sites. The only Spiketail encountered was a Twin-spotted Spiketail (*Cordulegaster maculata*); the most common Spiketail species occurring on rivers in CT. One larva was collected in sandy sediments and an adult (male) was observed patrolling along the river downstream from the bridge.



Table 1. Dragonfly species found downstream from the bridge

Species	Number
<i>Calopteryx maculata</i>	1 larva in skunk cabbage seep
<i>Lanthus vernalis</i>	2 larvae
<i>Gomphus lividus</i>	8 larvae
<i>Cordulegaster maculata</i>	1 larva and one adult male patrolling along stream
<i>Plathemis lyida</i>	adults
<i>Ischnura verticalis</i>	adults
<i>Erythemis simplicicollis</i>	adults
<i>Libellula vibrans</i>	five adults observed along stream; on territory

Noteworthy was a skunk cabbage seep and small shallow creek (GPS N 41.0985 W 73.6827) flowing into the river approx. 100 yards downstream from the bridge. The substrate was rocky and did not appear to have the fine sand sediments required by the Tiger Spiketail. Although no Tiger Spiketail larvae were found in the seep/creek sediments, it is possible they could occur at low density if the water flow is permanent during the summer months. Stagnant pools in the skunk cabbage seeps were frequented by Great Blue Skimmers (*Libellula vibrans*); a southern species that is extending its range northward.



Freshwater mussels were not observed in the river. Small crayfish were common in the colander samples.

Summary: No state-listed dragonflies or other invertebrate species (freshwater mussels) were found during the survey conducted on 3 June, 2012. The best management practices should be utilized at the bridge construction site to minimize the impact of siltation and erosion. If these practices are implemented, it's unlikely the proposed bridge modifications will alter any of the seepage areas observed downstream that potentially could be suitable habitat for the Tiger Spiketail.

References:

Glotzhober, R.C. 2006. Life-history studies of *Cordulegaster erronea* hagen (Odonata: Cordulegastridae) in the laboratory and field. *Bulletin of American Odonatology* 10(1):1-18.

Hager et al. 2012. The Distribution of *Cordulegaster* (Odonata: Cordulegastridae) Nymphs in Seeps and Springs of Nelson Swamp (Madison Co., NY). *Northeastern Naturalist* 19(sp6):67-76.

Prepared by:

Michael Thomas
206 Skyview Drive
Cromwell, CT 06416

Qualifications:

- Member, Endangered Species Advisory Committee for Insects and Arachnids, Connecticut Department of Energy and Environmental Protection, 2000 - present.
- Curatorial Affiliate in Entomology, Yale Peabody Museum of Natural History, New Haven, CT, 2004 - present.
- Housatonic River Odonate Survey, Massachusetts Division of Fish and Wildlife, Natural Heritage and Endangered Species Program, 2008.

Publications:

- Wagner, D. L., and M. C. Thomas. 1999. The Odonate Fauna of Connecticut. *Bulletin of American Odonatology* 5(4):59-85
- Co-author of website (UConn) providing information on the natural history, conservation status, and biogeography of Connecticut's Dragonflies and Damselflies (<http://ghostmoth.eeb.uconn.edu/dragons/>)

From: Stuart Harris (SHarris@fando.com)
To: standrzejewski@sbcglobal.net; RBertoli@fando.com; kmikolinski@fando.com;
Date: Mon, August 27, 2012 9:44:40 AM
Cc:
Subject: FW: NDDDB 201107780: John Street Bridge, Greenwich, CT

Below is the response to the dragonfly report from Jenny Dickson of DEEP

Stuart Harris, PE
Director of Structural Engineering
Fuss & O'Neill, Inc | 146 Hartford Road | Manchester, CT 06040
860.646.2469 x5232 | sharris@fando.com | cell: 860.966.1970 | www.fando.com

-----Original Message-----

From: Dickson, Jenny [mailto:Jenny.Dickson@ct.gov]
Sent: Monday, August 20, 2012 3:02 PM
To: 'Frank Petise'; DeBarros, Nelson
Cc: James Michel; Stuart Harris; Juber, Stanley C.; Robert Clausi
Subject: RE: NDDDB 201107780: John Street Bridge, Greenwich, CT

Good afternoon, Frank.

I have reviewed the John Street Bridge, East Branch Byram River site visit report prepared by Michael Thomas and date June 13, 2012. I concur with Mr. Thomas's conclusion that the project is unlikely to have direct, negative impacts on the state-listed tiger spiketail dragonfly. Additionally, as indicated by Mr. Thomas, the use of best management practices during the bridge reconstruction to prevent downstream sedimentation should prevent any indirect impacts to areas of suitable habitat for this and other invertebrate species.

Thanks you for providing a copy of Mr. Thomas's report to us for review. If you have any additional questions or require additional information, please feel free to contact me.

Jenny

Jenny Dickson
Supervising Wildlife Biologist
CT DEP Wildlife Division, Wildlife Diversity Program PO Box 1550, Burlington, CT 06013
phone: 860-675-8130 (fax: 860-675-8134 (email: jenny.dickson@ct.gov

"DeBarros,
Nelson"
<Nelson.DeBarros@
ct.gov> To
"Frank Petise"
<Frank.Petise@greenwichct.org>

11/08/2012 03:51 PM cc

Subject
RE: NDDDB 201107780: John Street
Bridge, Greenwich, CT

Frank,

Thank you for your message.

No further coordination with the NDDDB is required regarding the population of false mermaid weed documented near the John Street Bridge in Greenwich.

Regards,

Nelson

Nelson DeBarros
Botanist/Plant Ecologist
Wildlife Division
Bureau of Natural Resources
Connecticut Department of Energy and Environmental Protection
79 Elm Street, Hartford, CT 06106-5127
P: 860.424.3585 | F: 860.424.4070 | E: nelson.debarros@ct.gov
cid:image002.png@01CCF636.65BB43A0

www.ct.gov/deep

Conserving, improving and protecting our natural resources and environment; Ensuring a clean, affordable, reliable, and sustainable energy supply.

www.ct.gov/dep/wildlife

-----Original Message-----

From: Frank Petise [<mailto:Frank.Petise@greenwichct.org>]

Sent: Wednesday, November 07, 2012 10:07 AM

To: DeBarros, Nelson

Subject: RE: NDDDB 201107780: John Street Bridge, Greenwich, CT

Good Morning Nelson,

I am writing in regards to the above referenced project. Now that we had the dragonfly report completed and Jenny said she agreed with the findings, some questions have arise about the false mermaid weed near the bridge.

It was my understanding reading the letter and from phone conversations with you that we would do our best to minimize any impacts to the plants throughout construction and that we would coordinate with you when we were working in the area identified on your letter. Is this correct, if so what sort of notification do you need from me? If not, what else do we need to do to satisfy the conditions from DEEP?

Thank you,
Frank

Frank W. Petise, P.E.
Senior Civil Engineer
DPW Engineering Division
101 Field Point Road
Greenwich, CT 06830
(203) 622-7860 phone
(203) 622-7747 fax

ITEM #0703008A - HEAVY RIPRAP

Description: Refer to Section 7.03 of the Standard Specifications.

Materials:

1-Stone: The stone for this work shall be the type called for on the plans and shall conform to the following gradation:

Particle Diameter	Particle Size (inches)
d ₁₀₀	42 max.
d ₈₅	27.5 – 32.5
d ₅₀	20 - 24
d ₁₅	13 – 18.5

Materials for this item shall consist of sound, tough, durable and angular rock, free from decomposed stones or other defects impairing its durability. The size of a stone as specified shall be its least dimension. Broken concrete or rounded stones shall not be acceptable.

2-Bedding: Refer to Section 7.03 of the Standard Specifications.

Construction Methods: Refer to Section 7.03 of the Standard Specifications.

Method of Measurement: Refer to Section 7.03 of the Standard Specifications.

Basis of Payment: Refer to Section 7.03 of the Standard Specifications.

Pay Item
Heavy Riprap

Pay Unit
c.y.

ITEM #0703030A - PLACEMENT OF CHANNEL BOULDER

Description: The work shall consist of furnishing and placing individual boulders within the limits of riprap as shown on the plans or as directed by the Engineer or DEEP Fisheries. The intent of the channel boulders is to create an unsymmetrical (uneven) streambank along the edge of the watercourse to enhance fish habitat. The riprap shall be measured and paid for under its particular pay item.

Quality Assurance: The Contractor shall notify the Engineer a minimum of 14 days prior to the placement of channel boulders so that their installation can be coordinated with DEEP Fisheries. The Engineer will then be responsible for direct communication with DEEP Fisheries. DEEP Fisheries shall be given the opportunity to be present during the placement of the channel boulders to provide direction as to the specific location of the boulders.

Materials:

1-Stone: The individual boulders shall have a diameter of approximately 3 to 4 feet. Boulders shall consist of sound, durable rock, resistant to the action of air and water. Either natural stone or rough, unhewn quarry stone may be used. The boulders shall generally be rounded with no sharp corners or edges as a result of cutting or crushing operations. Boulders with visible cracks or spalling will not be permitted. Boulders consisting of sandstone, shale, or other rock material prone to disintegration will not be permitted. The boulders shall be similar in mineral composition and color to the adjacent riprap.

2-Bedding: No bedding material shall be specifically installed for the channel boulders.

Construction Method:

- (a) The Contractor may use boulders salvaged from the project site, subject to acceptance by the Engineer or DEEP Fisheries. Boulders imported from an off-site source will be subject to inspection by the Engineer at the source, and shall not be brought to the job site prior to acceptance.
- (b) Boulders shall be installed at the general locations shown on the Plans, or as directed by the Engineer or DEEP Fisheries. Unless otherwise authorized, the Contractor shall not install the boulders unless the Engineer is present to observe the installation.
- (c) The placement of boulders shall be undertaken inside the limits of short term temporary flow diversion structures in conjunction with the placement of riprap. Additional short term temporary flow diversion structures, solely for the purpose of installing the boulders, will not be eligible for payment. Short term temporary flow diversion structures shall be paid under the contract unit price for "Structure Excavation – Earth (Complete)" and "Structure Excavation – Rock (Complete)".

- (d) The boulders shall not be dropped into place. They shall be installed in a manner that does not displace the adjacent riprap or riprap bedding nor cause damage/distortion of the underlying geotextile.
- (e) The boulders shall be integrated into the adjacent riprap so that the finished streambanks are adequately protected from riverine erosion and the riprap provides lateral support for the boulders. The Contractor shall adjust the placement of both items, as directed by the Engineer or DEEP Fisheries, to achieve both adequate protection of the streambanks and lateral support of the boulders.
- (f) Boulders shall be installed as generally shown on the Plans or as directed by the Engineer or DEEP Fisheries. The exposed surface of the in-place boulders shall extend approximately 6-15 inches above the finished grade of the adjacent riprap. Any notable gaps between two channel boulders shall be chinked with appropriate sized riprap to provide both adequate streambank erosion protection as well as lateral support for the boulders.
- (g) If in the opinion of either the Engineer or DEEP Fisheries, a particular boulder is too large or small for the hydraulic and habitat conditions at any location in the work area, the Contractor shall furnish and place an alternative boulder as directed.

Method of Measurement: This work will be measured for payment by the number of channel boulders installed as shown on the plans or as directed by the Engineer or DEEP Fisheries.

Basis of Payment: This item will be paid for at the contract unit price each for "Placement of Channel Boulder," complete in place, including all materials, equipment, tools, labor, fill, and excavations incidental thereto. Excavation and riprap will be measured and each paid for under its particular pay item. Water handling and dewatering will be paid for under "Structure Excavation – Earth (Complete)" and "Structure Excavation – Rock (Complete)".

Pay Item	Pay Unit
Placement of Channel Boulder	EA.

ITEM #0950005A - TURF ESTABLISHMENT

Work under this item shall conform to the requirements of Section 9.50 of the Standard Specifications Form 816, supplemented and amended as follows.

9.50.02 Materials: The materials for this work shall conform to the requirements of Section M.13 of the Standard Specifications Form 816 supplemented and amended as follows.

M.13.04 - Seed Mixtures: The grass seed mixtures shall conform to the following:

(a) Delete:

- Colonial Bentgrass (*Agrostis tenuis*)
- Birdsfoot Trefoil (*Lotus corniculatus*)
- Perennial Ryegrass (*Lolium perenne*)

Add the following:

Species	Proportion by Weight (Mass)	Minimum Purity (percent)	Minimum Germination (percent)
Velvet Bentgrass (<i>Agrostis canina</i>)	5 (2.3)	98	85
Partridge Pea (<i>Chamaecrista fasciculata</i>)	10 (4.5)	80	70
Canada Wildrye (<i>Elymus canadensis</i>)	20 (9.1)	90	60

9.50.03 Construction Methods: Construction Methods shall be those established as agronomically acceptable and feasible as determined by the Engineer.

1. Preparation of Seedbed: Add the following:

Where topsoil is not required the seedbed shall be free from refuse, stumps, roots, brush, weeds, rocks, and stones over 1 1/4 inches (30 millimeters) in diameter. If "Out-of-Season" seeding is required than the seedbed will need to be prepared again prior to final turf establishment.

2. Seeding Season: Delete the following:

(b) "Out-of-Season" Seeding shall...reseeding until the turf stand conforms to 9.50.0-5.

Add the following:

(b) "Out-of-Season" seeding shall be done in accordance with section M.13.04 (b) "temporary" seeding and seeded at the rate of 50lbs/acre (56 kg/hectare). Turf establishment can only be performed during the seeding season or as approved by a member of the Office of Environmental Planning.

9.50.04 Method of Measurement: This work will be measured for payment by the number of square yards (square meters) of surface area of accepted established turf as specified or by the number of square yards (square meters) surface area of seeding actually covered and as specified.

9.50.05 Basis of Payment: This work will be paid for at the contract unit price per square yard (square meters) for "Turf Establishment", which price shall include all materials, maintenance, equipment, tools, labor, and work incidental thereto. Partial payment of up to 60% may be made for completed, but not accepted.

Pay Item
Turf Establishment

Pay Unit
sq.y (sq.m)

NO TEXT THIS PAGE

SECTION 10

**STATE OF CONNECTICUT
PREVAILING WAGE RATES**

NO TEXT THIS PAGE

Project: Replacement Of Bridge Number 056-055 John Street Over East Branch Byram River

**Minimum Rates and Classifications
for Heavy/Highway Construction**

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

ID#: H 17375

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

Project Number: 06-15

Project Town Greenwich

FAP Number:

State Number:

Project: Replacement Of Bridge Number 056-055 John Street Over East Branch Byram River

CLASSIFICATION

Hourly Rate

Benefits

01) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters. **See Laborers Group 5 and 7**

1) Boilermaker	33.79	34% + 8.96
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	32.50	24.55
2) Carpenters, Piledrivermen	29.65	21.00

As of: Thursday, January 31, 2013

Project: Replacement Of Bridge Number 056-055 John Street Over East Branch Byram River

2a) Diver Tenders	29.65	21.00
3) Divers	38.11	21.00
4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	42.75	16.90
4a) Painters: Brush and Roller	30.22	16.90
4b) Painters: Spray Only	33.22	16.90
4c) Painters: Steel Only	30.47	15.40
4d) Painters: Blast and Spray	33.22	16.90

As of: Thursday, January 31, 2013

Project: Replacement Of Bridge Number 056-055 John Street Over East Branch Byram River

4e) Painters: Tanks, Tower and Swing	32.22	16.90
5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	48.75	37.73
6) Ironworkers: (Ornamental, Reinforcing, Structural, and Precast Concrete Erection)	33.50	27.98 + a
7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9)	38.67	25.56
----LABORERS---- - Last updated 4/11/12		
8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	25.80	16.45
9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen, air tool operator	26.05	16.45

As of: Thursday, January 31, 2013

Project: Replacement Of Bridge Number 056-055 John Street Over East Branch Byram River

10) Group 3: Pipelayers	26.30	16.45
11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block pavers and curb setters	26.30	16.45
12) Group 5: Toxic waste removal (non-mechanical systems)	27.80	16.45
13) Group 6: Blasters	27.55	16.45
Group 7: Asbestos Removal, non-mechanical systems (does not include leaded joint pipe)	26.80	16.45
Group 8: Traffic control signalmen	16.00	16.45

----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.---- Last updated 4/11/12----

As of: Thursday, January 31, 2013

Project: Replacement Of Bridge Number 056-055 John Street Over East Branch Byram River

13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	31.28	16.45 + a
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13b) Brakemen, Trackmen	30.37	16.45 + a
-------------------------	-------	-----------

----CLEANING, CONCRETE AND CAULKING TUNNEL----Last updated 4/11/12----

14) Concrete Workers, Form Movers, and Strippers	30.37	16.45 + a
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15) Form Erectors	30.68	16.45 + a
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----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----Last updated 4/11/12----

16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	30.37	16.45 + a
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As of: Thursday, January 31, 2013

Project: Replacement Of Bridge Number 056-055 John Street Over East Branch Byram River

17) Laborers Topside, Cage Tenders, Bellman	30.26	16.45 + a
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18) Miners	31.28	16.45 + a
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----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED
AIR: ----Last updated 4/11/12----

18a) Blaster	37.41	16.45 + a
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19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	37.22	16.45 + a
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20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	35.35	16.45 + a
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21) Mucking Machine Operator	37.97	16.45 + a
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As of: Thursday, January 31, 2013

Project: Replacement Of Bridge Number 056-055 John Street Over East Branch Byram River

----TRUCK DRIVERS----(*see note below)

Two axle trucks	27.88	17.22 + a
Three axle trucks; two axle ready mix	27.98	17.22 + a
Three axle ready mix	28.03	17.22 + a
Four axle trucks, heavy duty trailer (up to 40 tons)	28.08	17.22 + a
Four axle ready-mix	28.13	17.22 + a
Heavy duty trailer (40 tons and over)	28.33	17.22 + a

As of: Thursday, January 31, 2013

Project: Replacement Of Bridge Number 056-055 John Street Over East Branch Byram River

Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	28.13	17.22 + a
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----POWER EQUIPMENT OPERATORS----

Group 1: Crane handling or erecting structural steel or stone, hoisting engineer (2 drums or over), front end loader (7 cubic yards or over), Work Boat 26 ft. & Over. (Trade License Required)	35.50	20.50 + a
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Group 2: Cranes (100 ton rate capacity and over); Backhoe/Excavator over 2 cubic yards; Piledriver (\$3.00 premium when operator controls hammer). (Trade License Required)	35.18	20.50 + a
---	-------	-----------

Group 3: Excavator/Backhoe under 2 cubic yards; Cranes (under 100 ton rated capacity), Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar); Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required)	34.44	20.50 + a
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Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper)	34.05	20.50 + a
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Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell)	33.46	20.50 + a
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Project: Replacement Of Bridge Number 056-055 John Street Over East Branch Byram River

Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	33.46	20.50 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	33.15	20.50 + a
Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and Under Mandrel).	32.81	20.50 + a
Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	32.41	20.50 + a
Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder).	31.98	20.50 + a
Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	29.94	20.50 + a
Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	29.94	20.50 + a

Project: Replacement Of Bridge Number 056-055 John Street Over East Branch Byram River

Group 12: Wellpoint Operator.	29.88	20.50 + a
Group 13: Compressor Battery Operator.	29.30	20.50 + a
Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	28.16	20.50 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	27.75	20.50 + a
Group 16: Maintenance Engineer/Oiler	27.10	20.50 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	31.41	20.50 + a
Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	28.99	20.50 + a

As of: Thursday, January 31, 2013

Project: Replacement Of Bridge Number 056-055 John Street Over East Branch Byram River

**NOTE: SEE BELOW

----LINE CONSTRUCTION----(Railroad Construction and Maintenance)----Last updated 9/3/2010----

20) Lineman, Cable Splicer, Dynamite Man	44.36	3% + 13.70
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21) Heavy Equipment Operator	39.92	3% + 13.70
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22) Equipment Operator, Tractor Trailer Driver, Material Men	37.71	3% + 13.70
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23) Driver Groundmen	33.27	3% + 13.70
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----LINE CONSTRUCTION----Last updated 4/17/09----

As of: Thursday, January 31, 2013

Project: Replacement Of Bridge Number 056-055 John Street Over East Branch Byram River

24) Driver Groundmen	30.92	6.5% + 9.70
25) Groundmen	22.67	6.5% + 6.20
26) Heavy Equipment Operators	37.10	6.5% + 10.70
27) Linemen, Cable Splicers, Dynamite Men	41.22	6.5% + 12.20
28) Material Men, Tractor Trailer Drivers, Equipment Operators	35.04	6.5% + 10.45

As of: Thursday, January 31, 2013

Project: Replacement Of Bridge Number 056-055 John Street Over East Branch Byram River

Welders: Rate for craft to which welding is incidental.

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

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

Crane with 150 ft. boom (including jib) - \$1.50 extra
Crane with 200 ft. boom (including jib) - \$2.50 extra
Crane with 250 ft. boom (including jib) - \$5.00 extra
Crane with 300 ft. boom (including jib) - \$7.00 extra
Crane with 400 ft. boom (including jib) - \$10.00 extra

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

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

~Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work ~

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

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

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

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol.

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

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

As of: Thursday, January 31, 2013

Project: Replacement Of Bridge Number 056-055 John Street Over East Branch Byram River

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

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

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

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

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

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

As of: Thursday, January 31, 2013

November 29, 2006

Notice

To All Mason Contractors and Interested Parties Regarding Construction Pursuant to Section 31-53 of the Connecticut General Statutes (Prevailing Wage)

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute.

Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute.

The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

Forklift Operator:

- **Laborers (Group 4) Mason Tenders** - operates forklift solely to assist a mason to a maximum height of nine feet only.

- **Power Equipment Operator (Group 9)** - operates forklift to assist any trade and to assist a mason to a height over nine feet.

The U.S. Labor Department conducted a survey of rates in Connecticut but it has not been published and the rate in effect remains as outlined in the above Occupational Bulletin.

Since this is a classification matter and not one of jurisdiction, effective January 1, 2007 the Connecticut Labor Department will enforce the rate on each schedule in accordance with our statutory authority.

Your cooperation in filing appropriate and accurate certified payrolls is appreciated.

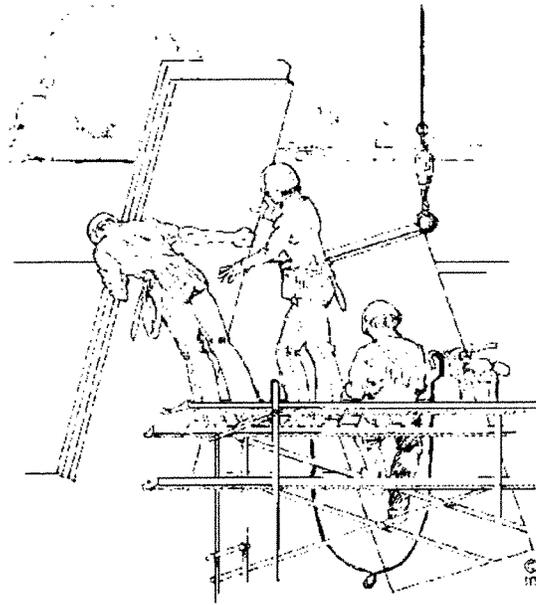
~NOTICE~

TO ALL CONTRACTING AGENCIES

Please be advised that Connecticut General Statutes Section 31-53, requires the contracting agency to certify to the Department of Labor, the total dollar amount of work to be done in connection with such public works project, regardless of whether such project consists of one or more contracts.

Please find the attached "Contracting Agency Certification Form" to be completed and returned to the Department of Labor, Wage and Workplace Standards Division, Public Contract Compliance Unit.

 Inquiries can be directed to (860)263-6543.



Connecticut Department of Labor
Wage and Workplace Standards Division
FOOTNOTES

Please Note: If the “Benefits” listed on the schedule for the following occupations includes a letter(s) (+ a or + a+b for instance), refer to the information below.

Benefits to be paid at the appropriate prevailing wage rate for the listed occupation.

If the “Benefits” section for the occupation lists only a dollar amount, disregard the information below.

Bricklayers, Cement Masons, Cement Finishers, Concrete Finishers, Stone Masons
(Building Construction) and
(Residential- Hartford, Middlesex, New Haven, New London and Tolland Counties)

- a. Paid Holiday: Employees shall receive 4 hours for Christmas Eve holiday provided the employee works the regularly scheduled day before and after the holiday. Employers may schedule work on Christmas Eve and employees shall receive pay for actual hours worked in addition to holiday pay.

Elevator Constructors: Mechanics

- a. Paid Holidays: New Year’s Day, Memorial Day, Independence Day, Labor Day, Veterans’ Day, Thanksgiving Day, Christmas Day, plus the Friday after Thanksgiving.
- b. Vacation: Employer contributes 8% of basic hourly rate for 5 years or more of service or 6% of basic hourly rate for 6 months to 5 years of service as vacation pay credit.

Glaziers

- a. Paid Holidays: Labor Day and Christmas Day.

Power Equipment Operators
(Heavy and Highway Construction & Building Construction)

- a. Paid Holidays: New Year’s Day, Good Friday, Memorial day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday. Holidays falling on Saturday may be observed on Saturday, or if the employer so elects, on the preceding Friday.

Ironworkers

- a. Paid Holiday: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

Laborers (Tunnel Construction)

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. No employee shall be eligible for holiday pay when he fails, without cause, to work the regular work day preceding the holiday or the regular work day following the holiday.

Roofers

- a. Paid Holidays: July 4th, Labor Day, and Christmas Day provided the employee is employed 15 days prior to the holiday.

Sprinkler Fitters

- a. Paid Holidays: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

Truck Drivers

(Heavy and Highway Construction & Building Construction)

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas day, and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

STATUTE 31-55a

- SPECIAL NOTICE -

**To All State and Political Subdivisions, Their Agents, and Contractors
Connecticut General Statute 31-55a - Annual adjustments to wage rates by
contractors doing state work.**

Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee, effective each July first.

- The prevailing wage rates applicable to any contract or subcontract awarded on or after October 1, 2002 are subject to annual adjustments each July 1st for the duration of any project which was originally advertised for bids on or after October 1, 2002.
- Each contractor affected by the above requirement shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.
- It is the **contractor's** responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's Web Site. The annual adjustments will be posted on the Department of Labor Web page: www.ctdol.state.ct.us. For those without internet access, please contact the division listed below.
- The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project. All subsequent annual adjustments will be posted on our Web Site for contractor access.

Any questions should be directed to the Contract Compliance Unit, Wage and Workplace Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd., Wethersfield, CT 06109 at (860)263-6790.

Informational Bulletin

THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE

(applicable to public building contracts entered into *on or after July 1, 2007*, where the total cost of all work to be performed is at least \$100,000)

- (1) This requirement was created by Public Act No. 06-175, which is codified in Section 31-53b of the Connecticut General Statutes (pertaining to the prevailing wage statutes);
- (2) The course is required for public building construction contracts (projects funded in whole or in part by the state or any political subdivision of the state) entered into on or after July 1, 2007;
- (3) It is required of private employees (not state or municipal employees) and apprentices who perform manual labor for a general contractor or subcontractor on a public building project where the total cost of all work to be performed is at least \$100,000;
- (4) The ten-hour construction course pertains to the ten-hour Outreach Course conducted in accordance with federal OSHA Training Institute standards, and, for telecommunications workers, a ten-hour training course conducted in accordance with federal OSHA standard, 29 CFR 1910.268;
- (5) The internet website for the federal OSHA Training Institute is http://www.osha.gov/fso/ote/training/edcenters/fact_sheet.html;
- (6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;
- (7) Within 30 days of receiving a contract award, a general contractor must furnish proof to the Labor Commissioner that all employees and apprentices performing manual labor on the project will have completed such a course;
- (8) Proof of completion may be demonstrated through either: (a) the presentation of a *bona fide* student course completion card issued by the federal OSHA Training Institute; *or* (2) the presentation of documentation provided to an employee by a trainer certified by the Institute pending the actual issuance of the completion card;
- (9) Any card with an issuance date more than 5 years prior to the commencement date of the construction project shall not constitute proof of compliance;

- (10) Each employer shall affix a copy of the construction safety course completion card to the certified payroll submitted to the contracting agency in accordance with Conn. Gen. Stat. § 31-53(f) on which such employee's name first appears;
- (11) Any employee found to be in non-compliance shall be subject to removal from the worksite if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;
- (12) Any such employee who is determined to be in noncompliance may continue to work on a public building construction project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;
- (13) The Labor Commissioner may make complaint to the prosecuting authorities regarding any employer or agent of the employer, or officer or agent of the corporation who files a false certified payroll with respect to the status of an employee who is performing manual labor on a public building construction project;
- (14) The statute provides the minimum standards required for the completion of a safety course by manual laborers on public construction contracts; any contractor can exceed these minimum requirements; and
- (15) Regulations clarifying the statute are currently in the regulatory process, and shall be posted on the CTDOL website as soon as they are adopted in final form.
- (16) Any questions regarding this statute may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of <http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm>; or by telephone at (860)263-6790.

THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE, AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTIMATELY ARISE CONCERNING THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.

Sec. 31-53b. Construction safety and health course. New miner training program. Proof of completion required for mechanics, laborers and workers on public works projects. Enforcement. Regulations. Exceptions. (a) Each contract for a public works project entered into on or after July 1, 2009, by the state or any of its agents, or by any political subdivision of the state or any of its agents, described in subsection (g) of section 31-53, shall contain a provision requiring that each contractor furnish proof with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

(b) Any person required to complete a course or program under subsection (a) of this section who has not completed the course or program shall be subject to removal from the worksite if the person does not provide documentation of having completed such course or program by the fifteenth day after the date the person is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section.

(c) Not later than January 1, 2009, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or in accordance with Federal Mine Safety and Health Administration Standards or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project.

(d) This section shall not apply to employees of public service companies, as defined in section 16-1, or drivers of commercial motor vehicles driving the vehicle on the public works project and delivering or picking up cargo from public works projects provided they perform no labor relating to the project other than the loading and unloading of their cargo.

(P.A. 06-175, S. 1; P.A. 08-83, S. 1.)

History: P.A. 08-83 amended Subsec. (a) by making provisions applicable to public works project contracts entered into on or after July 1, 2009, replacing provision re total cost of work with reference to Sec. 31-53(g), requiring proof in certified payroll form that new mechanic, laborer or worker has completed a 10-hour or more construction safety course and adding provision re new miner training program, amended Subsec. (b) by substituting "person" for "employee" and adding "or program", amended Subsec. (c) by adding "or in accordance with Federal Mine Safety and Health Administration Standards" and setting new deadline of January 1, 2009, deleted former Subsec. (d) re "public building", added new Subsec. (d) re exemptions for public service company employees and delivery drivers who perform no labor other than delivery and made conforming and technical changes, effective January 1, 2009.

Information Bulletin *Occupational Classifications*

The Connecticut Department of Labor has the responsibility to properly determine "job classification" on prevailing wage projects covered under C.G.S. Section 31-53.

Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification.

Below are additional clarifications of specific job duties performed for certain classifications:

- **ASBESTOS WORKERS**

Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.

- **ASBESTOS INSULATOR**

Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.

- **BOILERMAKERS**

Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.

- **BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS**

Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.

- **CARPENTERS, MILLWRIGHTS. PILEDRIVERMEN. LATHERS. RESILIENT FLOOR LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS**

Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.

- **CLEANING LABORER**

The clean up of any construction debris and the general cleaning, including sweeping, wash down, mopping, wiping of the construction facility, washing, polishing, dusting, etc., prior to the issuance of a certificate of occupancy falls under the *Labor classification*.

- **DELIVERY PERSONNEL**

If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages are not required. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.

An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer/tradesman and not a delivery personnel.

- **ELECTRICIANS**

Install, erect, maintenance, alteration or repair of any wire, cable, conduit, etc., which generates, transforms, transmits or uses electrical energy for light, heat, power or other purposes, including the Installation or maintenance of telecommunication, LAN wiring or computer equipment, and low voltage wiring.

***License required per Connecticut General Statutes: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9.**

- **ELEVATOR CONSTRUCTORS**

Install, erect, maintenance and repair of all types of elevators, escalators, dumb waiters and moving walks. ***License required by Connecticut General Statutes: R-1,2,5,6.**

- **FORK LIFT OPERATOR**

Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.

Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.

- **GLAZIERS**

Glazing wood and metal sash, doors, partitions, and 2 story aluminum storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which requires either a blended rate or equal composite workforce.

- **IRONWORKERS**

Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which requires either a blended rate or equal composite workforce. Insulated metal and insulated composite panels are still installed by the Ironworker.

- **INSULATOR**

Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings. Past practice using the applicable licensed trades, Plumber, Sheet Metal, Sprinkler Fitter, and Electrician, is not inconsistent with the Insulator classification and would be permitted.

- **LABORERS**

Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.

- **PAINTERS**

Maintenance, preparation, cleaning, blasting (water and sand, etc.), painting or application of any protective coatings of every description on all bridges and appurtenances of highways, roadways, and railroads. Painting, decorating, hardwood finishing, paper hanging, sign writing, scenic art work and drywall hhg for any and all types of building and residential work.

- **LEAD PAINT REMOVAL**

Painter's Rate

1. Removal of lead paint from bridges.
2. Removal of lead paint as preparation of any surface to be repainted.
3. Where removal is on a Demolition project prior to reconstruction.

Laborer's Rate

1. Removal of lead paint from any surface NOT to be repainted.
2. Where removal is on a *TOTAL* Demolition project only.

- **PLUMBERS AND PIPEFITTERS**

Installation, repair, replacement, alteration or maintenance of all plumbing, heating, cooling and piping. ****License required per Connecticut General Statutes: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2 S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4.***

- **POWER EQUIPMENT OPERATORS**

Operates several types of power construction equipment such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers or motor graders, etc. Repairs and maintains equipment. ****License required, crane operators only, per Connecticut General Statutes.***

- **ROOFERS**

Covers roofs with composition shingles or sheets, wood shingles, slate or asphalt and gravel to waterproof roofs, including preparation of surface. (tear-off and/or removal of any type of roofing and/or clean-up of any and all areas where a roof is to be relaid)

- **SHEETMETAL WORKERS**

Fabricate, assemble, install and repair sheetmetal products and equipment in such areas as ventilation, air-conditioning, warm air heating, restaurant equipment, architectural sheet metal work, sheetmetal roofing, and aluminum gutters.

Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, fascia, louvers, partitions, wall panel siding, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc. The sheet metal classification also applies to the vast variety of coated metal material panels and composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Insulated metal and insulated composite panels are still installed by the Iron Worker. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal and composite lockers and shelving, kitchen equipment, and walk-in coolers.

- **SPRINKLER FITTERS**

Installation, alteration, maintenance and repair of fire protection sprinkler systems.

***License required per Connecticut General Statutes: F-1,2,3,4.**

- **TILE MARBLE AND TERRAZZO FINISHERS**

Assists and tends the tile setter, marble mason and terrazzo worker in the performance of their duties.

- **TRUCK DRIVERS**

Definitions:

1) "Site of the work" (29 Code of Federal Regulations (CFR) 5.2(l)(b) is the physical place or places where the building or work called for in the contract will remain and any other site where a significant portion of the building or work is constructed, provided that such site is established specifically for the performance of the contract or project;

(a) Except as provided in paragraph (l) (3) of this section, job headquarters, tool yards, batch plants, borrow pits, etc. are part of the "site of the work"; provided they are dedicated exclusively, or nearly so, to the performance of the contract or project, and provided they are adjacent to "the site of work" as defined in paragraph (e)(1) of this section;

(b) Not included in the "site of the work" are permanent home offices, branch plant establishments, fabrication plants, tool yards etc, of a contractor or subcontractor whose location and continuance in operation are determined wholly without regard to a particular State or political subdivision contract or uncertain and indefinite periods of time involved of a few seconds or minutes duration and where the failure to count such time is due to consideration justified by industrial realities (29 CFR 785.47)

2) "Engaged to wait" is waiting time that belongs to and is controlled by the employer which is an integral part of the job and is therefore compensable as hours worked. (29 CFR 785.15)

3) "Waiting to be engaged" is waiting time that an employee can use effectively for their own purpose and is not compensable as hours worked. (29 CFR 785.16)

4) "De Minimus" is a rule that recognizes that unsubstantial or insignificant periods of time which cannot as a practical administrative matter be precisely recorded for payroll purposes, may be disregarded. This rule applies only where there are uncertain and indefinite periods of time involved of a short duration and where the failure to count such time is due to consideration justified by worksite realities. For example, with respect to truck drivers on prevailing wage sites, this is typically less than 15 minutes at a time.

Coverage of Truck Drivers on State or Political subdivision Prevailing Wage Projects

Truck drivers are covered for payroll purposes under the following conditions:

- Truck Drivers for time spent working on the site of the work.
- Truck Drivers for time spent loading and/or unloading materials and supplies on the site of the work, if such time is not de minimus

- Truck drivers transporting materials or supplies between a facility that is deemed part of the site of the work and the actual construction site.
- Truck drivers transporting portions of the building or work between a site established specifically for the performance of the contract or project where a significant portion of such building or work is constructed and the physical places where the building or work outlined in the contract will remain.

For example: Truck drivers delivering asphalt are covered under prevailing wage while "engaged to wait" on the site and when directly involved in the paving operation, provided the total time is not "de minimus"

Truck Drivers are not covered in the following instances:

- Material delivery truck drivers while off "the site of the work"
- Truck Drivers traveling between a prevailing wage job and a commercial supply facility while they are off the "site of the work"
- Truck drivers whose time spent on the "site of the work" is de minimus, such as under 15 minutes at a time, merely to drop off materials or supplies, including asphalt.

These guidelines are similar to U.S. Labor Department policies. The application of these guidelines may be subject to review based on factual considerations on a case by case basis.

For example:

- Material men and deliverymen are not covered under prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.
- Hauling material off site is not covered provided they are not dumping it at a location outlined above.
- Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

*Any questions regarding the proper classification should be directed to:
Public Contract Compliance Unit
Wage and Workplace Standards Division
Connecticut Department of Labor
200 Folly Brook Blvd, Wethersfield, CT 06109
(860) 263-6543*

***FRINGE BENEFITS EXPLANATION (P):**

Bona fide benefits paid to approved plans, funds or programs, except those required by Federal or State Law (unemployment tax, worker's compensation, income taxes, etc.).

Please specify the type of benefits provided:

- 1) Medical or hospital care _____
- 2) Pension or retirement _____
- 3) Life Insurance _____
- 4) Disability _____
- 5) Vacation, holiday _____
- 6) Other (please specify) _____

CERTIFIED STATEMENT OF COMPLIANCE

For the week ending date of _____,

I, _____ of _____, (hereafter known as Employer) in my capacity as _____ (title) do hereby certify and state:

Section A:

1. All persons employed on said project have been paid the full weekly wages earned by them during the week in accordance with Connecticut General Statutes, section 31-53, as amended. Further, I hereby certify and state the following:
 - a) The records submitted are true and accurate;
 - b) The rate of wages paid to each mechanic, laborer or workman and the amount of payment or contributions paid or payable on behalf of each such employee to any employee welfare fund, as defined in Connecticut General Statutes, section 31-53 (h), are not less than the prevailing rate of wages and the amount of payment or contributions paid or payable on behalf of each such employee to any employee welfare fund, as determined by the Labor Commissioner pursuant to subsection Connecticut General Statutes, section 31-53 (d), and said wages and benefits are not less than those which may also be required by contract;
 - c) The Employer has complied with all of the provisions in Connecticut General Statutes, section 31-53 (and Section 31-54 if applicable for state highway construction);
 - d) Each such employee of the Employer is covered by a worker's compensation insurance policy for the duration of his employment which proof of coverage has been provided to the contracting agency;
 - e) The Employer does not receive kickbacks, which means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided directly or indirectly, to any prime contractor, prime contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a prime contractor in connection with a subcontractor relating to a prime contractor; and
 - f) The Employer is aware that filing a certified payroll which he knows to be false is a class D felony for which the employer may be fined up to five thousand dollars, imprisoned for up to five years or both.
2. OSHA~The employer shall affix a copy of the construction safety course, program or training completion document to the certified payroll required to be submitted to the contracting agency for this project on which such employee's name first appears.

 (Signature) (Title) Submitted on (Date)

Section B: Applies to CONNDOT Projects ONLY
That pursuant to CONNDOT contract requirements for reporting purposes only, all employees listed under Section B who performed work on this project are not covered under the prevailing wage requirements defined in Connecticut General Statutes Section 31-53.

 (Signature) (Title) Submitted on (Date)

Note: CTDL will assume all hours worked were performed under Section A unless clearly delineated as Section B WWS-CP1 as such. Should an employee perform work under both Section A and Section B, the hours worked and wages paid must be segregated for reporting purposes.

*****THIS IS A PUBLIC DOCUMENT***
DO NOT INCLUDE SOCIAL SECURITY NUMBERS**

CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION
CONTRACT COMPLIANCE UNIT

CONTRACTING AGENCY CERTIFICATION FORM

I, _____, acting in my official capacity as _____,
authorized representative title

for _____, located at _____,
contracting agency address

do hereby certify that the total dollar amount of work to be done in connection with
_____, located at _____,
project name and number address

shall be \$_____, which includes all work, regardless of whether such project
consists of one or more contracts.

CONTRACTOR INFORMATION

Name: _____

Address: _____

Authorized Representative: _____

Approximate Starting Date: _____

Approximate Completion Date: _____

Signature

Date

Return To: Connecticut Department of Labor
Wage & Workplace Standards Division
Contract Compliance Unit
200 Folly Brook Blvd.
Wethersfield, CT 06109

Date Issued: _____

CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION

CONTRACTORS WAGE CERTIFICATION FORM

I, _____ of _____
Officer, Owner, Authorized Rep. Company Name

do hereby certify that the _____
Company Name

Street

City

and all of its subcontractors will pay all workers on the

Project Name and Number

Street and City

the wages as listed in the schedule of prevailing rates required for such project (a copy of which is attached hereto).

Signed

Subscribed and sworn to before me this _____ day of _____, 20 .

Notary Public

Return to:
Connecticut Department of Labor
Wage & Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

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