

TOWN OF GLASTONBURY

INVITATION TO BID

<u>BID #</u>	<u>ITEM</u>	<u>DATE & TIME REQUIRED</u>
GL-2015-21	Griswold Street at House / Harris Streets Intersection Improvements	April 30, 2015 at 11:00 A.M.

The Town of Glastonbury will receive Sealed Bids, in duplicate, for improvements to the intersection of Griswold Street at Harris Street and House Street, including new traffic signal equipment and other related improvements, State Project No. 53-187 (Bid #GL-2015-21). Bids will be received only at the Office of the Purchasing Agent, Town Hall (second level), 2155 Main Street, Glastonbury, CT 06033, Attention: Mary F. Visone, Purchasing Agent, until April 30, 2015 at 11:00 A.M. (local time), at which time they will be publicly opened and read aloud. No late bids will be accepted.

The Town reserves the right to waive informalities or reject any or all bids when said action is deemed to be in the best interests of the Town.

Bid Forms, Plans, and Specifications may be obtained at no cost from the Town's website at www.glastonbury-ct.gov or they may be purchased at The Print House LLC, 22 Krieger Lane, Unit 6, Glastonbury, CT 06033, tel. (860) 652-0803.

The successful Bidder is required to comply with all provisions of the Civil Rights Act of 1964, the Equal Opportunity Act of 1972, Executive Orders #3, No. 17, 11246, 11375 and 11478. Contractors shall comply with State Statutes concerning Employment and Labor Practices, if applicable, and Section 31-53 of the Connecticut Statutes, as amended (Prevailing Wages). Federal Davis Bacon Labor Standards must be complied with under this contract.

All bidders are hereby made aware that eleven (11) percent of the awarded contract value shall be performed by Disadvantaged Business Enterprises (DBE).

The Town of Glastonbury is an Affirmative Action/Equal Opportunity Employer. Minority / Women / Disadvantaged Business Enterprises are encouraged to bid.

Mary F. Visone
Purchasing Agent

TABLE OF CONTENTS

SECTION

[INFORMATION FOR BIDDERS](#)

IB

[GENERAL CONSTRUCTION SPECIFICATIONS](#)

GCS

[SPECIAL CONDITIONS](#)

SC

[BID PROPOSAL](#)

BP

[SPECIAL PROVISIONS \(ROADWAY ITEMS\)](#)

SP

[SPECIAL PROVISIONS \(TRAFFIC SIGNAL ITEMS\)](#)

[ATTACHMENT A: NON-COLLUSION AFFIDAVIT, OTHER REQUIRED FORMS](#)

[ATTACHMENT B: REQUIRED CONTRACT PROVISIONS, STATE AND FEDERAL WAGE RATES](#)

[ATTACHMENT C: DBE CONTRACT PROVISIONS](#)

ATTACHMENT D: CONSTRUCTION PLANS

**GRISWOLD HOUSE HARRIS INTERSECTION
INFORMATION FOR BIDDERS**

BID #GL-2015-21

1. Sealed bids **(one original and one copy)** on the attached Bid Forms will be received at the Office of the Purchasing Agent, Town Hall, 2155 Main Street, Glastonbury, Connecticut 06033 (second level). At the designated time of opening, they will be publicly opened, read, recorded and placed on file.
2. Whenever it is deemed to be in the best interest of the Town, the Town Manager, Purchasing Agent or designated representative shall waive informalities in any and all bids. The right is reserved to reject any bid when such action is deemed to be in the best interest of the Town of Glastonbury.
3. The award will be on the basis of bid total cost unless otherwise specified. The bid total cost shall be arrived at by the mathematical calculation of the unit price multiplied times the number of units specified for each line item, and the total sum of all line items in the bid. In the event that the Town finds computational errors in a respondent's bid proposal, the bid total cost shall be recalculated by the Town based on the unit prices contained in the bid proposal.
4. Bids will be carefully evaluated as to conformance with stated specifications.
5. The envelope enclosing your bid should be clearly marked by bid number, time of bid opening, and date.
6. If a bid involves any exception from stated specifications, they must be clearly noted as exceptions, underlined, and attached to the bid.
7. The Bid Documents contain the provisions required for the requested item. Information obtained from an officer, agent, or employee of the Town or any other person shall not affect the risks or obligations assumed by the Bidder or relieve him/her from fulfilling any of the conditions of the bid.
8. Each Bidder is held responsible for the examination and/or to have acquainted themselves with any conditions at the job site which would affect their work before submitting a bid. Failure to meet this criteria shall not relieve the Bidder of the responsibility of completing the bid without extra cost to the Town of Glastonbury.
9. Any bid may be withdrawn prior to the above-scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No Bidder may withdraw a bid within sixty (60) days after the actual date of the opening thereof. Should there be reasons why a bid cannot be awarded within the specified period, the time may be extended by mutual agreement between the Town and the Bidder.
10. Each bid must be accompanied by a bid bond payable to the Town for ten percent (10%) of the total amount of the bid. The bid bond of the successful Bidder will be retained until the payment bond and performance bond have been executed and approved, after which it will be returned. A certified check may be used in lieu of a bid bond. The Town of Glastonbury will not be liable for the accrual of any interest on any certified check submitted. Cashier's checks will not be accepted.
11. A 100% Performance and Payment bond are required of the successful bidder. This bond shall cover all aspects of the specification and shall be delivered to the Purchasing Agent prior to the issuance of a purchase order. The Performance and Payment Bond will be returned upon the delivery and acceptance of the bid items.
12. The Bidder agrees and warrants that in the submission of this sealed Bid, they will not discriminate or permit discrimination against any person or group of persons on the grounds of

race, color, religion, national origin, sex, or physical disability including, but not limited to blindness, unless it is shown by such Bidder that such disability prevents performance of that which must be done to successfully fulfill the terms of this sealed Bid or in any manner which is prohibited by the laws of the United States or the State of Connecticut: and further agrees to provide the Human Relations Commission with such information requested by the Commission concerning the employment practices and procedures of the Bidder. An Affirmative Action Statement will be required by the successful Bidder.

13. Bidder agrees to comply with all of the latest Federal and State Safety Standards and Regulations and certifies that all work required in this bid will conform to and comply with said standards and regulations. Bidder further agrees to indemnify and hold harmless the Town for all damages assessed against the Town as a result of Bidder's failure to comply with said standards and/or regulations.
14. All correspondence regarding any purchase made by the Town of Glastonbury shall reference the Town's purchase order number. Each shipping container shall clearly indicate both Town purchase order number and item number.
15. Bidder is required to review the Town of Glastonbury Code of Ethics adopted July 8, 2003 and effective August 1, 2003. Bidder shall acknowledge that they have reviewed the document in the area provided on the bid/proposal response page (BP). The selected Bidder will also be required to complete and sign an Acknowledgement Form prior to award. The Code of Ethics and the Consultant Acknowledgement Form can be accessed at the Town of Glastonbury website at www.glastonbury-ct.gov. Upon entering the website scroll down to click on **Bids & Proposals Icon** which will bring you to the links for the **Code of Ethics** and the **Consultant Acknowledgement Form**. If the Bidder does not have access to the internet, a copy of these documents can be obtained through the Purchasing Department at the address listed within this bid/proposal.
16. **Non-Resident Contractors:** (if applicable)
Upon award the Town is required to report names of nonresident (out of state) Contractors to the State of Connecticut, Department of Revenue Services (DRS) to ensure that Employment Taxes and other applicable taxes are being paid by Contractors. **A single surety bond for 5% of the entire contract price is required to be filed with DRS by any unverified nonresident prime or general contractor (if awarded) where the contract price for the project is \$250,000 or more.** The contractor will be required to promptly furnish to the Town a copy of the **Form AU-968 - Certificate of Compliance** issued by the State of Connecticut, DRS. See State of Connecticut **Notice SN 2012 (2)**.
17. Bidder shall include on a sheet(s) attached to its proposal a complete disclosure of all past and pending mediation, arbitration and litigation cases that the bidder or its principals (regardless of their place of employment) have been involved in for the most recent five years. Please include a statement of the issues in dispute and their resolution. Acceptability of Bidder based upon this disclosure shall lie solely with the Town.
18. Bidder or its principals, regardless of their place of employment, shall not have been convicted of, nor entered any plea of guilty, or nolo contendere, or otherwise have been found civilly liable or criminally responsible for any criminal offense or civil action. Bidder shall not be in violation of any State or local ethics standards or other offenses arising out of the submission of bids or proposals, or performance of work on public works projects or contracts.
19. It is the responsibility of the bidder to check the Town's website before submitting bid for addendums posted prior to bid opening.

20. **State Prevailing Wage Rates:**

Respondents shall comply with State Statutes concerning Employment and Labor Practices, if applicable, and Section 31-53 of the Connecticut General Statutes, as amended (Prevailing Wages). Wage Rate Determination for this project from the State of Connecticut is included in the Bid Documents. Certified payrolls for site labor shall be submitted weekly to the Town's Representative or his designee on the correct State of Connecticut form (see RFP). The Town reserves the right to, without prior notice, audit payroll checks given to workers on site in order to ascertain that wages and fringe benefits are being paid as required by the State of Connecticut. Please make special note of the State requirement to adjust wage and fringe benefit rates on each July 1st following the original published rates.

NOTE that respondent is to include in its proposal all costs required by such annual increases in the PREVAILING RATES. NO escalation clauses are to be included in the respondent's proposal and NO escalation clauses will be in the Contract Agreement. Respondent is to anticipate any future increases and include these costs in the proposal response.

Contractor's invoices will not be paid if certified payrolls are incomplete, incorrect or not received in a timely manner.

All Apprentices must be registered with the State of Connecticut and their number shall not exceed the number allowed by law. Otherwise, all workers must be paid at least the Journeyman rate listed including benefits.

OSHA SAFETY AND HEALTH CERTIFICATION

Effective July 1, 2009: Any Mechanic, Laborer, or Worker, who performs work in a classification listed on the prevailing wage rate schedule on any public works project covered under C.G.S. Section 31-53, both on site and on or in the public building, must have completed a federal OSHA Safety and Health course within the last 5 years.

21. **Federal Prevailing Wage Rates: (Davis-Bacon and Related Acts (DBRA))**

Federal Davis Bacon Labor Standards must be complied with under this contract. The execution of the contract by the bidder binds it to all applicable Federal Davis Bacon Labor Laws and Regulations. Federal Prevailing Wage Rates are included in this bid package.

The Davis-Bacon and Related Acts (DBRA) are administered by the US Department of Labor Wage and Hour Division. These Acts apply to contractors and subcontractors performing on federally funded or assisted contracts in excess of \$2,000 for the construction, alteration, or repair (including painting and decorating) of public buildings or public works. The Davis-Bacon Act requires that all contractors and subcontractors performing on federal contracts (and contractors or subcontractors performing on federally assisted contracts under the related Acts) in excess of \$2,000 pay their laborers and mechanics not less than the prevailing wage rates and fringe benefits listed in the contract's Davis-Bacon wage determination for corresponding classes of laborers and mechanics employed on similar projects in the area. Davis-Bacon labor standards clauses must be included in covered contracts. Additional compliance information may be found at:

<http://www.dol.gov/compliance/guide/dbra.htm#Basic>

<http://www.dol.gov/whd/regs/compliance/whdfs66.pdf>

22. **Each bid shall also include a description of three (3) projects completed by the bidder with references to demonstrate successful experience with similar projects.**

23. Each bid shall include a signed copy of the Non-Collusion Affidavit form which is included with Attachment A.
24. In order to expedite award of this contract, all bidders shall submit the following additional items as part of their bid response. Blank forms related to the items listed below are included as part of Attachment A.
 - A. Contractor's Proposed Progress Chart – Highway Construction Bar Chart.
 - B. Certificate of Compliance with Connecticut General Statute Section 31-57b.
 - C. Disadvantaged Business Enterprise (DBE) Participation Approval Request form
 - D. Anticipated Source of Material form (CON-83).
 - E. Certificate of Insurance (ACCORD FORM)
 - F. Affirmative Action Program Certification
25. The bidder is hereby notified that eleven (11) percent of the awarded contract value shall be performed by Disadvantaged Business Enterprises (DBE) that have been certified by the Connecticut Department of Transportation.

IMPORTANT: Failure to comply with general rules may result in disqualification of the Bidder.

NOTE: Any technical questions regarding this bid shall be made in writing (email acceptable) and directed to Stephen Braun, Assistant Town Engineer, 2155 Main Street, PO Box 6523, Glastonbury, CT 06033; stephen.braun@glastonbury-ct.gov. Telephone (860) 652-7743 between the hours of 8:00 a.m. – 4:30 p.m. For administrative questions concerning this bid/proposal, please contact Mary F. Visone, Purchasing Agent, at (860) 652-7588 or email the Purchasing Department at purchasing@glastonbury-ct.gov. All questions, answers, and/or addenda, as applicable, will be posted on the Town's website at www.glastonbury-ct.gov (Upon entering the website scroll down to click on Bids & Proposals Icon, then scroll down page to see the active bid table. You must click the Bid Title to view all bid details and document links). The request must be received at least five (5) business days prior to the advertised response deadline. **It is the respondent's responsibility to check the website for addenda prior to submission of any bid/proposal.**

01.00 WORKMANSHIP, MATERIALS AND EMPLOYEES

01.01 Wherever in this contract the word "Engineer" is used, it shall be understood as referring to the Town Engineer/Manager of Physical Services of the Town of Glastonbury acting personally or through any assistants duly authorized.

01.02 The entire work described herein shall be completed in accordance with the plans and specifications to the full intent and meaning of the same. Unless otherwise specified, all materials incorporated in the permanent work shall be new, and both workmanship and material shall be of good quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

01.03 The wording "furnish", "install", "construct", "furnish and install", or any similar terms, unless specifically noted to the contrary, shall include all labor, materials, water, tools, equipment, light, power, transportation, and any other services required for the completion of the work.

01.04 The Contractor shall at all times enforce strict discipline and good order among his employees, and shall seek to avoid employing on the work any unfit person or anyone not skilled in the work assigned to him.

02.00 SUPERINTENDENT

02.01 The Contractor shall keep on the work during its progress, in the absence of the Contractor, a competent Superintendent. The Superintendent shall be acceptable to the Engineer and shall fully represent the Contractor. All directions given to the Superintendent shall be binding as if given to the Contractor.

03.00 PRECONSTRUCTION MEETING

03.01 A Preconstruction Meeting will be held with the Engineer, Contractor, and any private utility company prior to commencing any work. The Engineer shall arrange the meeting based on a mutually convenient time.

04.00 PERMITS

04.01 Other than local permits, all permits, licenses, and fees required for the performance of the Contract work shall be secured and paid for by the Contractor.

05.00 PROPERTY ACCESS

05.01 The Contractor shall take all proper precautions to protect from injury or unnecessary interference, and provide proper means of access to abutting property where the existing access is cut off by the Contractor.

05.02 The Contractor shall take all proper precautions to protect persons from injury or unnecessary inconvenience and leave an unobstructed way along the public and private places for travelers, vehicles, and access to hydrants.

05.03 The Contractor shall make arrangements with the adjacent property owners for such trespass as he may reasonably anticipate in the performance of the work. All such arrangements shall be reported, in writing, to the Engineer.

06.00 PROTECTION OF THE PUBLIC AND OF WORK AND PROPERTY

06.01 The Contractor shall continuously maintain adequate protection of all work from damage, and shall take all reasonable precautions to protect the Town from injury or loss arising in connection with the Contract.

06.02 The Contractor shall adequately protect adjacent private and public property as provided by law and the Contract Documents.

06.03 The Contractor shall make good any damage, injury, or loss of his work and to the property of the Town resulting from lack of reasonable protective precautions.

07.00 EXISTING IMPROVEMENTS

07.01 The Contractor shall conduct his work so as to minimize damage to existing improvements. Except where specifically stated otherwise in the specifications, drawings, or as directed by the Engineer, it will be the responsibility of the Contractor to restore to their original condition, as near as practical, all improvements on public or private property. This shall include:

- a. Property within and adjacent to the side of installation such as shrubs, walks, driveways, fences, etc.
- b. Utility mains, ducts, poles, and services. The Contractor is hereby notified that utilities, if/where shown on the plans, are at approximate locations. These locations are subject to possible errors in the source of information and errors in transcription. The Contractor shall make certain of the exact location of all mains, ducts, poles, and services prior to excavation.

08.00 SEPARATE CONTRACTS

08.01 The Engineer reserves the right to let other contracts in connection with this work. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate his work with theirs. Wherever work being done by the Town of Glastonbury forces or by other contractors is contiguous to work covered by this Contract, the respective rights of the various interests involved shall be established by the Engineer to secure the completion of the various portions of the work.

09.00 INSPECTION OF WORK

09.01 The Town shall provide sufficient personnel for the inspection of the work.

09.02 The Engineer shall at all times have access to the work whenever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and for inspection.

09.03 If the specifications or the Engineer's instructions require any work to be specially tested or approved, the Contractor shall give the Engineer timely notice of its readiness for inspection and, if the inspection is by another authority other than the Engineer, of the date fixed for such inspection. Inspections by the Engineer shall be made promptly. If any work should be covered up without approval or consent of the Engineer, it must, if required by the Engineer, be uncovered for examination and properly restored at the Contractor's expense.

09.04 Reinspection of any work may be ordered by the Engineer. If such work is found to be in accordance with the Contract Documents, the Town shall pay the cost of reinspection and replacement. If such work is not in accordance with the Contract Documents, the Contractor shall pay such cost.

10.00 RIGHT TO INCREASE OR DECREASE WORK

10.01 The Town shall have the right to increase or decrease the amount of work herein specified as may be required.

11.00 RIGHT OF ENGINEER TO STOP WORK FOR WEATHER CONDITIONS

11.01 Should the work, in the opinion of the Engineer, be in danger by reason of inclemency of weather, or could not be finished in time to prevent such danger, the Contractor shall cease operations upon order of the Engineer, and shall not resume them until ordered to do so by the Engineer when the weather conditions are favorable. The Contractor shall, upon such orders, discontinue work, remove all materials or appliances for or in use upon the work, and place the streets in proper condition for use by the public during the time the work is suspended as herein provided, without cost to the Town.

12.00 CONTRACTOR TO BE RESPONSIBLE FOR IMPERFECT WORK OR MATERIALS

12.01 Any faithful work or imperfect material that may be discovered before the acceptance and the payment of the work shall be corrected upon the order of the Engineer. The acceptance and payment of the work does not in any manner relieve the Contractor of his obligation to construct work in the proper manner and the use of materials herein specified.

13.00 TOWN MAY NOTIFY CONTRACTOR IF WORK IS NOT CARRIED ON SATISFACTORILY

13.01 If, in the opinion of the Engineer, the Contractor is not proceeding with the work at a sufficient rate of progress so as to finish in the time specified, or has abandoned said work, or is not complying with the terms and stipulations or the Contract and specifications, the Engineer may serve notice on the Contractor to adopt such methods as will ensure the completion of the work in the time specified.

13.02 If, within five days after the Engineer has notified the Contractor that his work is not being carried on satisfactorily as before mentioned, the Engineer shall have the right to annul the Contract and manage the work under the direction of the Engineer, or re-let, for the very best interest of the Town as a new contract, the work under said new Contract shall be considered the responsibility of the defaulting Contractor.

13.03 Additional costs incurred over and above the original Contract shall be borne by the Performance Bond.

14.00 DEDUCTIONS FOR UNCORRECTED WORK

14.01 If the Engineer deems it inexpedient to correct work that has been damaged or that was not done in accordance with the Contract, an equitable deduction from the Contract price shall be made therefor.

14.02 The Contractor shall promptly remove from the premises all materials condemned by the Engineer as failing to meet Contract requirements, whether incorporated in the work or not, and the Contractor shall promptly replace and re-execute his own work in accordance with the Contract and without expense to the Town, and shall bear the expense of making good all work by other contractors destroyed or damaged by such removal or replacement.

14.03 If the Contractor does not remove such condemned work and materials as promptly as possible after written notice, the Engineer may remove them and store the materials at the expense of the Contractor.

15.00 CLEANING UP

15.01 The Contractor must remove all debris of every description as the work progresses and leave the surroundings in a neat and orderly condition to the satisfaction of the Engineer.

15.02 Upon completion, and before acceptance and final payment, the Contractor shall remove from the site all equipment, forms, surplus material, rubbish and miscellaneous debris and leave the site in a neat and presentable condition.

16.00 ROYALTIES AND PATENTS

16.01 The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Town of Glastonbury harmless from loss on account thereof, except that the Town of Glastonbury shall be responsible for all such loss when a particular manufacturer, product, or process is specified by the Town of Glastonbury.

01.00 NOTICE TO CONTRACTOR

01.01 Intent of Contract: The intent of the Contract is to prescribe a complete work or improvement that the Contractor undertakes to do, in full compliance with the specifications, plans, special provisions, proposal, and Contract. The Contractor shall perform all work in close conformity with the lines, grades, typical cross-sections, dimensions, and other data shown on the plans or as modified by written orders, including the furnishing of all materials, implements, machinery, equipment, tools, supplies, transportation, labor, and all other things necessary to the satisfactory prosecution and completion of the project.

01.02 The Contractor is hereby alerted to the fact that the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction, Form 816 (Form 816) and supplements thereto dated July 2014 are the governing specifications and are to be considered part of the Contract Documents. The Form 816 shall not be provided by the Town and any cost associated therewith shall be the responsibility of the Contractor. In case of any discrepancy between the Contract Drawings or Specifications and the Form 816, the matter shall immediately be submitted to the Engineer. The Engineer shall have sole authority in resolving any discrepancies.

01.03 Much time and effort has gone into this project in an effort to minimize impact on trees and adjacent properties. Extreme care shall be taken by the Contractor to honor commitments made by the Town. Prior to doing any work, the Contractor should meet with the Engineer to become familiar with the conditions encountered and commitments made.

01.04 Traffic Cones and Drums: Traffic Drums and 42-inch Traffic Cones shall have four six-inch 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.

01.05 NCHRP 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).

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.

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>

01.06 Superpave Design Level Information: Hot-Mix Asphalt (HMA) constructed according to the Superpave mix-design system is required to attain a Superpave Design Level and is required to use a Performance Graded (PG) binder. **All HMA Mix Designations included in the contract shall use Superpave Design Level 3 using PG 64S-22 Binder.**

01.07 Limitations on work hours are described in Special Conditions Section 17.02. The Contractor shall understand and strictly comply with these limitations.

01.08 Notice to Contractor - Traffic Signals:

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

Qualified/Unqualified Workers

U.S. Department of Labor
Occupational Safety & Health Administration (OSHA) www.osha.gov
Part Number 1910
Part Title Occupational Safety & Health Administration
Subpart S
Subpart Title Electrical
Standard Number 1910.333
Title Selection and use of work practices

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

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

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

Utility poles cannot be double loaded without proper guying.

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

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

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

The 30 Day Test on traffic control equipment, as specified in Section 10.00, Article 10.00.10 - TESTS, will not begin until the items listed below are delivered to the town of Glastonbury, Engineering Department:

Four (4) sets of cabinet wiring diagrams. Leave one set in the controller cabinet.
All spare load switches and flash relays.

01.09

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" of the Form 816.

02.00 COMMUNICATIONS

02.01 All notices, demands, requests, instructions, approvals, proposals, and claims must be in writing.

02.02 Any notice to, or demand upon, the Contractor shall be sufficiently given if delivered at the office of the Contractor stated on the signature page of the Agreement (or at such other office as the Contractor may, from time to time, designate) in a sealed, postage-prepaid envelope or delivered with charges prepaid to any telegraph company for transmission, in each case addressed to such office.

02.03 All papers required to be delivered to the Town shall, unless otherwise specified in writing to the Contractor, be delivered to the Town Engineer/Manager of Physical Services, 2155 Main Street, Glastonbury, CT 06033, and any notice to, or demand upon, the Town shall be delivered at the above address in a sealed, postage-prepaid envelope or delivered with charges prepaid to any telegraph company for transmission, in each case addressed to such office or to such other representatives of the Town, or to such other address as the Town may subsequently specify in writing to the Contractor for such purpose.

02.04 Any such notice shall be deemed to have been given as of the time of actual delivery or, in case of mailing, when the same should have been received in due course of post or, in the case of telegrams, at the time of actual receipt, as the case may be.

03.00 PARTIAL USE OF IMPROVEMENTS

03.01 The Town may, at its election, give notice to the Contractor and place in use those sections of the work that have been completed, inspected and can be accepted as complying with the Contractor Documents and if, in its opinion, each such section is reasonably safe and fit for the use and accommodation for which it was intended, provided:

- a. The use of such sections of the work shall not materially impede the completion of the remainder of the work by the Contractor.

- b. The Contractor shall not be responsible for any damages or maintenance costs due directly to the use of such sections.
- c. The use of such sections shall in no way relieve the Contractor of his liability due to having used defective materials or to poor workmanship.
- d. The period of guarantee shall not begin until the date of the final acceptance of all work required under this Contract.

04.00 INSURANCE

04.01 The Bidder shall, at its own expense and cost, obtain and keep in force during the entire duration of the Project or Work the following insurance coverage covering the Bidder and all of its agents, employees and sub-contractors and other providers of services and shall name the **Town of Glastonbury and its employees and agents as an Additional Insured** on a primary and non-contributory basis to the Bidders Commercial General Liability and Automobile Liability policies. **These requirements shall be clearly stated in the remarks section on the Bidders Certificate of Insurance.** Insurance shall be written with insurance carriers approved in the State of Connecticut and with a minimum Best's Rating of A-VIII. In addition, all carriers are subject to approval by the Town. Minimum Limits and requirements are stated below:

- a. Worker's Compensation Insurance:
 - Statutory Coverage
 - Employer's Liability
 - \$500,000 each accident/\$500,000 disease-policy limit/\$500,000 disease each employee
 - A Waiver of Subrogation shall be provided
- b. Commercial General Liability:
 - Including Premises and Operations, Products and Completed Operations, Personal and Advertising Injury, Contractual Liability and Independent Contractors
 - Limits of Liability for Bodily Injury and Property Damage
Each Occurrence: \$1,000,000
Aggregate: \$2,000,000
(The Aggregate Limit shall apply separately to each job.)
 - A Waiver of Subrogation shall be provided
- c. Automobile Insurance:
 - Including all owned, hired, borrowed, and non-owned vehicle
 - Limit of Liability for Bodily Injury and Property Damage
Per Accident: \$1,000,000
 - A Waiver of Subrogation shall be provided
- d. Umbrella of Excess Liability:
 - State in the Remarks Section that coverage is follow form.
 - Limit of Liability Each Occurrence \$1,000,000
Aggregate \$1,000,000

e. Owner's and Contractor's Protective Liability Insurance:

With respect to the Contractor's Project operations and also those of its subcontractors, the Contractor shall carry, for and on behalf of the State and the Town of Glastonbury, insurance which shall provide coverage of at least \$1,000,000 for each accident or occurrence resulting in damages from (1) bodily injury to or death of persons and/or (2) injury to or destruction of property. Subject to that limit per accident or occurrence, the policy shall provide an aggregate coverage of at least \$2,000,000 for all pertinent damages arising during the policy period

04.02 The Bidder shall direct its Insurer to provide a Certificate of Insurance to the Town before any work is performed. The Contractor shall be responsible to notify the Town **60 days** in advance with written notice of cancellation or non-renewal. The Certificate shall evidence all required coverage. The Bidder shall provide the Town copies of any such insurance policies upon request.

04.03 **INDEMNIFICATION:** To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Town and the State of Connecticut and its consultants, agents, and employees from and against all claims, damages, losses and expenses, direct, indirect or consequential (including but not limited to fees and charges of engineers, attorneys and other professionals and court and arbitration costs) to the extent arising out of or resulting from the performance of the Contractor's work, provided that such claim, damage, loss or expense is caused in whole or in part by any negligent act or omission by the Contractor, or breach of its obligations herein or by any person or organization directly or indirectly employed or engaged by the Contractor to perform or furnish either of the services, or anyone for whose acts the Contractor may be liable.

05.00 WORK BY OTHERS

05.01 Private utilities, contractors, developers or other parties may be expected to be working within the Contract area during this Contract. It shall be the responsibility of the Contractor to coordinate his work with the work being done by others in order that the construction shall proceed in an efficient and logical manner. The Contractor shall have no claim or claims whatever against the Town, the Engineer, or other parties due to delays or other reasons caused by the work by others or his failure to coordinate such work.

06.00 CONTRACTOR'S WORK AND STORAGE AREA

06.01 The Contractor shall contact the Town to determine if any specific locations will be designated, or gain its approval prior to using any area for storage of equipment, materials and trailers during the period of this Contract. The Contractor shall confine his work/storage area to the limits as designated or approved and shall be responsible for the security of the work/storage area. Upon completion of the Contract, the Contractor shall remove all equipment and materials, except as otherwise specified, and restore the site to its original condition as approved by the Engineer and at no cost to the Town.

07.00 DISPOSAL AREA

07.01 The Tryon Street Bulky Waste Facility will be available to the Contractor, at no charge, for disposal of materials that are accepted at that facility. Waste disposal guidelines for the Bulky Waste facility are published on the Town web site at the address shown below. Each bidder shall have reviewed and understand these guidelines prior to submitting a bid for the project.

<http://www.glastonbury-ct.gov/Modules/ShowDocument.aspx?documentid=699>

Acceptable materials generally include such materials as brush, stumps, demolition materials, and excess excavated earth materials. Unacceptable materials generally include such items as carpet, appliances, upholstered furniture; hazardous wastes such as pesticides, oil based paints and thinners; or other wastes as designated by the State Department of Environmental Protection. Demolition material cannot contain asbestos or other hazardous materials.

The Contractor shall obtain a disposal area for all other unsuitable or surplus materials at no cost to the Town.

08.00 DUST CONTROL

08.01 During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities so as to minimize the creation and dispersion of dust. If the Engineer decides that it is necessary to use water or calcium chloride for more effective dust control, the Contractor shall furnish and spread the material, as directed, without additional compensation.

09.00 MAINTENANCE / GUARANTEE PERIOD

09.01 The Contractor shall be held responsible to the Town for maintenance for a minimum of one-year following completion of all work under this Contract with respect to defects, settlements, etc.

10.00 PROTECTION OF EXISTING UTILITIES

10.01 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. Before starting any excavation, the Contractor shall submit to the Engineer plans or details showing the proposed method the Contractor will use to support and protect all existing utilities during construction. The furnishing of such plans and details shall not serve to relieve the Contractor of any responsibility for the proper conduct of the work.

10.02 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 supports shall be provided for the existing installation. Utility companies shall be contacted and advised of proposed work prior to the start of actual excavation.

10.03 There will be no extra payment for submitting plans or details for supporting and protecting all existing utilities during construction.

11.00 TIME FOR COMPLETION/NOTICE TO PROCEED

11.01 **It the Town's intent that substantial completion of the work included in this contract be achieved on or before November 30, 2015.** As such, the Town will schedule a pre-construction meeting immediately upon award of this contract and will issue a Notice to Proceed at this meeting. Contractors who submit a bid for this project shall be prepared to respond to this expedited schedule, and include all costs related to this schedule in their bid.

Within five (5) business days after the date of the Notice of Award, the Contractor must provide the appropriate bond and insurance certificates to the Town Purchasing Agent and must be issued a Notice to Proceed / Purchase Order for the Project prior to initiating any work.

11.02 The work under this Contract shall be completed as described in Section 1.08 Prosecution and Progress of the Special Provisions. A maximum of one hundred seventy (170) calendar days has been allocated for this contract, including up to 60 days for Phase 1 (Organization Phase) and 110 days for Phase 2 (Construction Phase). Such days shall be computed from the start date stated on the Notice to Proceed. If the entire 60 days is not required for Phase 1, any remaining additional time shall not be transferable to Phase 2 unless approved in writing by the Engineer.

11.03 When the Contract time is stated on a calendar-day basis, that time shall be the number of consecutive calendar days contained in the Contract period, excluding the time period from each December 1 through the following March 31 (the "winter shutdown period"). The time will be computed as herein provided on a consecutive-day basis, including all Saturdays, Sundays, holidays, and non-work days from April 1 through November 30 of each included year. Time will not be charged for days in the winter shutdown period. If the Engineer so approves, the Contractor may work on certain tasks of the Project during the winter shutdown period with no charge being made against the Contract time. **If work during winter shut down is approved by the Town, approval may be granted with the condition that work under the items Trafficperson (Municipal Police Officer) or Trafficperson (Uniformed Flagger) will not be measured for payment, at the discretion of the Town.**

12.00 LIQUIDATED DAMAGES

12.01 As actual damages for any delay in completion of the work that the Contractor is required to perform under this Contract are impossible to determine, the Contractor and the Sureties shall be liable for and shall pay to the Town the sum of \$1,000.00 as fixed, agreed and liquidated damages for each calendar day of delay from the above-stipulated completion, or completion as modified in writing by both parties, until such work is satisfactorily completed and accepted.

13.00 SCHEDULE OF DRAWINGS

13.01 The Contractor is hereby alerted that the plan set entitled "Proposed Intersection Improvements Griswold – Harris – House Streets, State Project 53-187", including thirty six (36) sheets prepared by the Town of Glastonbury Engineering Division and Benesch is to be considered part of these specifications.

14.00 CHANGES IN THE WORK

14.01 The Town reserves the right to perform portions of the work in connection with these plans and specifications. The reduction in the work to be performed by the Contractor shall be made without invalidating the Contract. Whenever work is done by the Town contiguous to other work covered by this Contract, the Contractor shall provide reasonable opportunity for the execution of the work and shall properly coordinate his work with that of the Town.

15.00 LAYOUT OF WORK

15.01 The Town shall provide stake-out of the work in accordance with the plans or as directed by the Engineer. The Contractor shall protect all stakes from damage or destruction and shall be responsible to assure that the grade stakes have not been altered prior to actual construction. The Town shall replace grade stakes that have been removed, at no cost to the Contractor, if their removal was caused by reasons beyond reasonable care and protection by the Contractor. If it is determined by the Engineer that the Contractor did not provide reasonable protection, the cost of restaking will be deducted from any amounts due the Contractor in the performance of the work.

16.00 REMOVAL AND STORAGE OF MATERIALS AND STRUCTURES FOUND ON THE WORK

16.01 All salvable materials, including traffic signal equipment, topsoil, gravel, fill materials, etc. and structures, including drainage pipes, catch basins and manhole frames and covers, guide railing, etc. that are not to remain in place or that are not designated for use in the work, shall be carefully removed by the Contractor and delivered to the Town Highway Garage located at 2380 New London Turnpike. All salvable materials removed and stored shall remain the property of the Town. The Engineer shall determine the materials or structures to be salvaged.

17.00 PROSECUTION AND PROGRESS

17.01 **ADVANCE NOTICE:** The Contractor shall give the Engineer a seven-day advance written notice of construction activities that will alter traffic patterns that result in lane shifts, detours, temporary closures of lane(s), permanent closure of lane(s), or lane reductions. This advance notification will allow the Town to publish news releases and/or provide public radio announcements to inform the public of revised traffic patterns or possible traffic delays. Failure of the Contractor to provide such timely notice shall be considered a breach of Contract and will subject the Contractor to stop work orders until such time as the seven-day notice has been satisfied.

17.02 **ALLOWABLE HOURS OF OPERATION (WORK PERIOD):**

Allowable hours of operation for milling and paving work are limited to Sunday through Thursday, 7:00 PM to 6:00 AM.

All other contract work that maintains bi-directional traffic on 11 foot wide travel lanes shall be performed Monday through Friday during the hours of 6:00 AM and 2:30 PM.

Any work that requires alternating one-way traffic on Griswold Street shall be performed Monday through Friday during the hours of 9:30 AM and 2:30 PM.

Work on weekends or during time periods other than those described above will not be permitted. No work will be allowed on designated Town Holidays unless permission is granted by the Town.

17.03 CONSTRUCTION PHASING: Roadway construction shall be completed in the following phases:

Phase 1 – All contract work required on the north side of Griswold Street and Harris Street, including traffic equipment foundations, conduits, catch basins, roadway widening, and sidewalks. Maintain one 11 foot travel lane in each direction on Griswold Street and Harris Street. Provide continuous passage for pedestrian using existing concrete sidewalks on the south side of Griswold Street. Provide pedestrian traffic warning signs 500 feet in advance of sidewalk closures on the north side of the Griswold Street.

Phase 2 – All work required on the south side of Griswold Street, including traffic equipment foundations, conduits, roadway widening, catch basins, and sidewalks. Maintain one 11 foot travel lane in each direction on Griswold Street. Provide continuous passage for pedestrians using new concrete sidewalks on the north side of Griswold Street, provide pedestrian traffic warning signs 500 feet in advance of sidewalk closures on the south side of the road.

Phase 3 – Complete utility installations crossing Griswold Street (including drainage, electrical conduits, etc.). Provide alternating one-way traffic subject to limited work hours as described in Section 17.02.

Phase 4 – House Street Full Depth Construction Station 5+50 to 7+50 (off-road areas only). Maintain one 11 foot travel lane in each direction on Griswold Street and House Street during this phase.

Phase 5 – House Street Full Depth Construction Station 4+40 to Station 5+50. Provide alternating one-way traffic on a paved or gravel travel surface not less than 11 feet wide during the allowable work hours. Closing House Street and detouring of traffic using Spring Street Extension will not be acceptable during this phase.

Phase 6 – Mill and overlay Griswold Street and Harris Street within project limits during allowable hours of operation as described in Section 17.02. Install new pavement markings.

Phase 7 – Shift traffic to relocated House Street using temporary signalization or new traffic signal equipment as necessary.

Phase 8 – Remove pavement from the abandoned section of House Street, install new driveways, permanent pavement markings, restore all areas with topsoil and turf establishment.

17.04 SEQUENCE OF CONSTRUCTION OPERATIONS: Work shall be sequenced as follows:

Milling shall be completed across the full width of the road during the given work period. Limits of work for each work period shall be selected to ensure that adequate time is provided to install temporary transitions and temporary pavement markings prior to end of the allowable work period.

Temporary paved transitions shall be installed at locations of transverse drop-downs and temporary driveway ramps shall be installed as described in the Maintenance and

Protection of Traffic Special Provision within the work area before the end of each allowable work period.

Temporary pavement markings shall be installed on the milled surface and on any intermediate courses of pavement before the end of each work period as described in the Special Provision for Maintenance and Protection of Traffic.

Paving work shall be sequenced with ongoing milling operation as required in order to limit the time period that vehicles will travel on a milled surface. Within seven (7) days of the completion of milling operations for any particular work area, placement of at least the first course of bituminous concrete pavement within the same work area shall be completed.

Bituminous concrete driveway aprons removed during any given work period shall be replaced within that same work period. Curb replacement and topsoiling work behind the curb may take place during a separate work period as required.

Permanent epoxy resin pavement markings shall be installed 30 days after the placement of the final surface course of pavement to avoid bleeding of asphalt through the epoxy paint. Temporary pavement markings shall be installed where necessary on the surface course of pavement as indicated in the Maintenance and Protection of Traffic Special Provision.

17.05 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.

The Contractor shall temporarily provide a 4H:1V traversable slope of suitable material in those areas where a longitudinal dropdown exists. The cost of furnishing, installing and removing this material shall be included in the contract lump sum for "Maintenance and Protection of Traffic."

The Contractor shall ensure that suitable temporary access is provided to all residential and commercial driveways at all times as described in the Special Provision for Maintenance and Protection of Traffic.

18.00 EXTRA WORK AND RETAINAGE

18.01 Extra and cost plus work shall be governed by Article 1.04.05 and Article 1.09.04 of the Form 816.

18.02 Sections 1.08.01, 1.09.06, 1.09.07, and 9.75 of the Supplemental Specifications dated July 2014 are hereby deleted. Retainage shall be governed by Article 1.09.06 of the Form 816, except that the retainage amount shall be equal to five (5) percent.

19.00 SUBMITTALS AND MATERIALS TESTING

19.01 The Contractor shall provide source and supply information, sieve analysis, and material samples for gravel subbase, process stone base, modified riprap, and other granular materials to the Town for review and approval. The Town shall retain a lab for testing of these materials as required and shall perform in place compaction testing at no expense to the Contractor.

**GRISWOLD HOUSE HARRIS INTERSECTION
SPECIAL CONDITIONS**

BID #GL-2015-21

- 19.02 Shop drawings / catalog cuts shall be provided by the Contractor for all pre-cast concrete structures, pipes and fittings, erosion control products, seed mixes, and other items to be supplied for review and approval by the Engineer as described in the specifications and the Form 816.
- 19.03 Mix designs for all bituminous and portland cement concrete materials shall be provided by the Contractor to the Engineer for review and approval.
- 19.04 Certified Materials Test Reports and Materials Certificates shall be provided for all products and materials to be provided under this contract as described in these specifications and the Form 816.

**GRISWOLD HOUSE HARRIS INTERSECTION
 BID PROPOSAL**

BID #GL-2015-21

TOWN OF GLASTONBURY			
BID / PROPOSAL		GL # or RPGL #	2015-21
DATE ADVERTISED	04/07/2015	DATE / TIME DUE	04/30/2015 at 11:00 A.M.
NAME OF PROJECT	Griswold Street at House / Harris Streets Intersection Improvements		

It is the responsibility of the Bidder to clearly mark the outside of the bid envelope with the Bid Number, Date and Time of Bid Opening, and it also **THE RESPONSIBILITY OF THE BIDDER TO CHECK THE TOWN'S WEBSITE BEFORE SUBMITTING BID FOR ADDENDA POSTED PRIOR TO BID OPENING.**

The Bidder acknowledges receipt of the following Addenda:

Addendum #1 _____ (Initial & Date)

Addendum #2 _____ (Initial & Date)

Addendum #3 _____ (Initial & Date)

OTHER ITEMS REQUIRED WITH SUBMISSION OF BID PROPOSAL:

The following bid checklist describes items required for inclusion with the above-referenced bid proposal package. It is provided for the convenience of the bidders and, therefore, should not be assumed to be a complete list.

- _____ 1. Included Bid Bond as per Section 10 of the Information for Bidders.
- _____ 2. Included Disclosure of Past and Pending Mediation, Arbitration, and Litigation cases against the Bidder or its Principals as per Section 17 of the Information for Bidders.
- _____ 3. Included Qualifications Statement as per Section 22 of the Information for Bidders.
- _____ 4. Included Non-Collusion Affidavit as per Section 23 of the Information for Bidders
- _____ 5. Included other required ConnDOT Forms as per Section 24 of the Information for Bidders.
- _____ 6. Checked Town web site for Addenda and acknowledged Addenda on page BP-1.
- _____ 7. Acknowledged Code of Ethics on page BP-8.
- _____ 8. Clearly marked envelope with Bid Number, Date, Time of opening, Bidder's Company Name and address.

**GRISWOLD HOUSE HARRIS INTERSECTION
 BID PROPOSAL**

BID #GL-2015-21

BIDDER NAME: _____

<u>LINE NO.</u>	<u>ITEM NO.</u>	<u>ITEM DESCRIPTION</u>	<u>UNIT</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>EXT</u>
-----------------	-----------------	-------------------------	-------------	------------	-------------------	------------

1	0201001	A	Clearing and Grubbing	LS	1		
2	0202000	A	Earth Excavation	CY	1,500		
3	0202100	A	Rock Excavation and Disposal	CY	12		
4	0202451	A	Test Pit Excavation	CY	35		
5	0202529		Cut Bituminous Concrete Pavement	LF	1,790		
6	0202513	A	Removal of Concrete Sidewalk	SY	700		
7	0207000		Borrow	CY	320		
8	0209001		Formation of Subgrade	SY	2,370		
9	0210017	A	Stormwater Infiltration System (Site No. 1)	LS	1		
10	0210018	A	Stormwater Infiltration System (Site No. 2)	LS	1		
11	0210100	A	Anti-Tracking Pad	LS	1		
12	0210820		Water Pollution Control	EST	1	\$5,000.00	\$5,000.00
13	0212300	A	Processed Stone Base	CY	820		
14	0219001		Sedimentation Control System	LF	400		
15	0219011	A	Sedimentation Control Sack	EA	10		
16	0404101	A	Bituminous Concrete Patching - Partial Depth	SY	276		
17	0406170		HMA S1.0	TN	700		
18	0406171		HMA S0.50	TN	870		
19	0406173		HMA S0.25	TN	160		

**GRISWOLD HOUSE HARRIS INTERSECTION
 BID PROPOSAL**

BID #GL-2015-21

BIDDER NAME: _____

<u>LINE NO.</u>	<u>ITEM NO.</u>		<u>ITEM DESCRIPTION</u>	<u>UNIT</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>EXT</u>
20	0406236		Material for Tackcoat	Gal	1,026		
21	0406285	A	Fine Milling of HMA (0-4")	SY	2,760		
22	0507003	A	Remove Existing Catch Basin	EA	5		
23	0507006		Reset Catch Basin	EA	1		
24	0507084	A	Special Type "C" Catch Basin	EA	1		
25	0507120	A	Type "C" Catch Basin with 3' Sump	EA	6		
26	0507601	A	Manhole	EA	1		
27	0507781	A	Reset Manhole	EA	8		
28	0601369	A	Reset Segmental Retaining Wall	LS	1		
29	0651251	A	15" R.C. Pipe (Class V)	LF	148		
30	0815001		Bit Conc Lip Curb	LF	1,920		
31	0905014	A	Reset Wood Rail Fence	LF	30		
32	0905106	A	6' Stockade Fence	LF	110		
33	0906206	A	Ornamental Picket Fence (4' High)	LF	105		
34	0913817	A	Remove Chainlink Fence	LF	10		
35	0921001	A	Concrete Sidewalk	SF	6,400		
36	0921002	A	Concrete Sidewalk - 8" Thick	SF	210		
37	0921005	A	Concrete Sidewalk Ramp	EA	8		
38	0922001	A	Bituminous Concrete Sidewalk	SY	10		

**GRISWOLD HOUSE HARRIS INTERSECTION
 BID PROPOSAL**

BID #GL-2015-21

BIDDER NAME: _____

LINE NO.	ITEM NO.		ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	EXT
39	0922501	A	Bituminous Concrete Driveway	SY	440		
40	0944000	A	Furnishing and Placing Topsoil	SY	2,300		
41	0950005	A	Turf Establishment	SY	2,300		
42	0952001	A	Selective Clearing and Thinning	LS	1		
43	0970006	A	Trafficperson (Municipal Officer)	EST	1	\$114,000.00	\$114,000.00
44	0970007	A	Trafficperson (Uniformed Flagger)	HR	800		
45	0971001	A	Maintenance and Protection of Traffic	LS	1		
46	0975002		Mobilization	LS	1		
47	0976002		Barricade Warning Lights - High Intensity	Day	3,000		
48	0977001		Traffic Cone	EA	120		
49	0978002		Traffic Drum	EA	40		
50	0979003	A	Construction Barricade Type III	EA	10		
51	1206023	A	Removal and Relocation of Existing Signs	LS	1		
52	1208928	A	Sign Face Sheet Aluminum Type III Reflective Sheeting	SF	42		
53	1209114		Hot-Applied Painted Pavement Markings 4" Yellow	LF	2,100		
54	1209124		Hot-Applied Painted Pavement Markings 4" White	LF	400		
55	1209131		Hot Applied Painted Legend, Arrows, and Markings	SF	1,150		
56	1210101	A	4" White Epoxy Resin Pavement Markings	LF	400		
57	1210102	A	4" Yellow Epoxy Resin Pavement Marking	LF	2,100		

**GRISWOLD HOUSE HARRIS INTERSECTION
 BID PROPOSAL**

BID #GL-2015-21

BIDDER NAME: _____

<u>LINE NO.</u>	<u>ITEM NO.</u>		<u>ITEM DESCRIPTION</u>	<u>UNIT</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>EXT</u>
58	1210105	A	Epoxy Resin Pavement Marking Sym. & Legends	SF	1,150		
59	1211001		Removal of Pavement Markings	SF	500		
60	1220013	A	Construction Signs Bright Fluorescent Sheeting	SF	180		
61	1302060	A	Adjust Gate Box (Gas)	EA	3		
62	1302061	A	Adjust Gate Box (Water)	EA	8		
63	1002015		Rock In Foundation Excavation	V.F.	20		
64	1002201		Traffic Control Foundation - Mast Arm	EA.	4		
65	1002203		Traffic Control Foundation Pedestal - Type I	EA.	5		
66	1002208		Traffic Control Foundation Controller - Type IV	EA.	1		
67	1008015		2" Rigid Metal Conduit - Surface	L.F.	90		
68	1008115		2" Rigid Metal Conduit In Trench	L.F.	605		
69	1008215		2" Rigid Metal Conduit Under Roadway	L.F.	370		
70	1008908	A	Clean Existing Conduit	L.F.	500		
71	1010001		Concrete Handhole	EA.	3		
72	1010021		Concrete Handhole - Type II	EA.	3		
73	1010060	A	Clean Existing Concrete Handhole	EA.	3		
74	1017032	A	Service (Metered)	EA.	1		
75	1102002	A	8' Aluminum Pedestal	EA.	4		
76	1102008	A	4'-4" Aluminum Pedestal	EA.	1		

**GRISWOLD HOUSE HARRIS INTERSECTION
 BID PROPOSAL**

BID #GL-2015-21

BIDDER NAME: _____

<u>LINE NO.</u>	<u>ITEM NO.</u>		<u>ITEM DESCRIPTION</u>	<u>UNIT</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>EXT</u>
77	1104023	A	20' Steel Mast Arm Assembly	EA.	1		
78	1104028	A	30' Steel Mast Arm Assembly	EA.	2		
79	1104031	A	35' Steel Mast Arm Assembly	EA.	1		
80	1105101	A	1 Way, 1 Section Mast Arm Traffic Signal	EA.	6		
81	1105103	A	1 Way, 3 Section Mast Arm Traffic Signal	EA.	8		
82	1106001	A	1 Way Pedestrian Signal Pole Mounted	EA.	5		
83	1106003	A	1 Way Pedestrian Signal Pedestal Mounted	EA.	3		
84	1107011	A	Accessible Pedestrian Signal And Detector (Type A)	EA.	8		
85	1108163	A	Modify Existing Controller	EA	1		
86	1108187	A	System Integration	L.S.	1		
87	1108578	A	Full Actuated Controller - 8 Phase (Modified)	EA.	1		
88	1108660	A	Ethernet Switch - Field (4 Port, Hardened)	EA.	2		
89	1108661	A	Ethernet Switch - TCC (24 Port)	EA.	1		
90	1108725	A	Phase Selector (Modified)	EA.	2		
91	1108826	A	Fiber Optic Patch Cord	EA.	9		
92	1108843	A	12 Position Fiber Optic Patch Panel	EA.	2		
93	1111201	A	Temporary Detection - Site No. 1	L.S.	1		
94	1111407	A	Video Vehicle Detection System	EA.	1		
95	1112242	A	Fiber Optic Splice Enclosure (Signal)	EA.	2		

**GRISWOLD HOUSE HARRIS INTERSECTION
 BID PROPOSAL**

BID #GL-2015-21

BIDDER NAME: _____

LINE NO.	ITEM NO.		ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	EXT
96	1112243		Fiber Optic Cable Storage "Snow Shoe"	EA.	2		
97	1112413	A	Detector (Type A) (Modified)	EA.	5		
98	1112471	A	Pre-Emption System Chassis (Modified)	EA.	2		
99	1113014		3 Conductor No. 8 AWG Type SE Style THW	LF	100		
100	1113028	A	48 Strand Fiber Optic Interconnect Cable	LF	2340		
101	1113030	A	12 Strand Fiber Optic Drop Cable	LF	430		
102	1113102		5 Conductor No. 14 Cable	LF	720		
103	1113103		7 Conductor No. 14 Cable	LF	665		
104	1113104		9 Conductor No. 14 Cable	LF	470		
105	1113552	A	Detector Cable - Optical (Modified)	LF	425		
106	1114105		Messenger Wire	L.F.	925		
107	1118012	A	Removal and/or Relocation of Traffic Signal Equipment	L.S.	1		
108	1118051	A	Temporary Signalization - Site No. 1	L.S.	1		
109	1113812	A	Uninterruptible Power Supply (Non-Participating)	EA.	1		

TOTAL BASE BID AMOUNT: \$ _____
 (Numeric)

WRITTEN TOTAL BASE BID AMOUNT: _____

CODE OF ETHICS:

I/We have reviewed a copy of the Town of Glastonbury's Code of Ethics and agree to submit a Consultant Acknowledgement Form if I/We are selected. Yes_____ No_____*

***Bidder is advised that effective August 1, 2003, the Town of Glastonbury cannot consider any bid or proposal where the Bidder has not agreed to the above statement.**

Respectfully submitted:

Type or Print Name of Individual

Doing Business as (Trade Name)

Signature of Individual

Street Address

Title

City, State, Zip Code

Date

Telephone Number/Fax Number

E-Mail Address

SS# or TIN#

(Seal – If bid is by a Corporation)

Attest

**SPECIAL PROVISIONS
(ROADWAY ITEMS)**

INDEX OF ROADWAY SPECIAL PROVISIONS

SECTION 1.05 – CONTROL OF THE WORK.....	3
SECTION 1.06 – CONTROL OF MATERIALS.....	4
SECTION 1.07 - LEGAL RELATIONS AND RESPONSIBILITIES.....	6
SECTION 1.08 - PROSECUTION AND PROGRESS.....	7
SECTION 10.00 - GENERAL CLAUSES FOR HIGHWAY ILLUM.AND TRAFFIC SIGNAL PROJECTS.....	8
SECTION M.04 - BITUMINOUS CONCRETE.....	9
ITEM # 0201001A CLEARING AND GRUBBING.....	34
ITEM # 0202000A EARTH EXCAVATION.....	36
ITEM # 0202513A REMOVAL OF CONCRETE SIDEWALK.....	36
ITEM # 0202100A ROCK EXCAVATION AND DISPOSAL.....	37
ITEM # 0202451A TEST PIT EXCAVATION.....	41
ITEM # 0205001A EARTH TRENCH EXCAVATION.....	42
ITEM # 0210017A STORMWATER INFILTRATION SYSTEM (SITE NO. 1).....	50
ITEM # 0210018A STORMWATER INFILTRATION SYSTEM (SITE NO. 2).....	50
ITEM # 0210100A ANTI-TRACKING PAD.....	52
ITEM # 0212300A PROCESSED STONE BASE.....	53
ITEM # 0219011A SEDIMENTATION CONTROL SACK.....	54
ITEM # 0404101A BITUMINOUS CONCRETE PATCHING – PARTIAL DEPTH.....	55
ITEM # 0406170 HMA S1.0.....	56
ITEM # 0406171 HMA S0.5.....	56
ITEM # 0406173 HMA S0.25.....	56
ITEM # 0406285A FINE MILLING OF HOT MIX ASPHALT (HMA) (0 TO 4 INCHES).....	76
ITEM # 0507003A REMOVE EXISTING CATCH BASIN.....	79
ITEM # 0507084A SPECIAL TYPE “C” CATCH BASIN.....	79
ITEM # 0507120A TYPE “C” CATCH BASIN WITH 3’ SUMP.....	79
ITEM # 0507601A MANHOLE.....	80
ITEM # 0507781A RESET MANHOLE.....	84
ITEM # 601369A RESET SEGMENTAL RETAINING WALL.....	85
ITEM # 0651251A 15” R.C. PIPE (CLASS V).....	86
ITEM # 0905014A RESET WOOD RAIL FENCE.....	87
ITEM # 0905106A 6’ STOCKADE FENCE.....	88
ITEM # 0906206A ORNAMENTAL PICKET FENCE (4’ HIGH).....	89
ITEM # 0913817A REMOVE CHAINLINK FENCE.....	90
ITEM # 0921001A CONCRETE SIDEWALKS.....	91
ITEM # 0921002A CONCRETE SIDEWALKS – 8” THICK.....	91
ITEM # 0921005A CONCRETE SIDEWALK RAMPS.....	91
ITEM # 0922001A BITUMINOUS CONCRETE SIDEWALK.....	94
ITEM # 0922501A BITUMINOUS CONCRETE DRIVEWAY.....	94
ITEM # 0944000A FURNISHING AND PLACING TOPSOIL.....	96
ITEM # 0950005A TURF ESTABLISHMENT.....	97
ITEM # 0952001A SELECTIVE CLEARING AND THINNING.....	100
ITEM # 0970006A TRAFFICPERSON (MUNICIPAL POLICE OFFICER).....	101
ITEM # 0970007A TRAFFICPERSON (UNIFORMED FLAGGER).....	101
ITEM # 0971001A MAINTENANCE AND PROTECTION OF TRAFFIC.....	102
ITEM # 0979003A CONSTRUCTION BARRICADE TYPE III.....	123
ITEM # 1010052A CAST IRON HANDHOLE COVER.....	124
ITEM # 1206023A REMOVAL AND RELOCATION OF EXISTING SIGNS.....	125
ITEM # 1208928A SIGN FACE SHEET ALUMINUM (TYPE III REFLECTIVE SHEETING).....	126
ITEM # 1210101A 4” WHITE EPOXY RESIN PAVEMENT MARKINGS.....	128
ITEM # 1210102A 4” YELLOW EPOXY RESIN PAVEMENT MARKINGS.....	128
ITEM # 1210105A EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS.....	128
ITEM # 1220013A CONSTRUCTION SIGNS – BRIGHT FLUORESCENT SHEETING.....	130

GRISWOLD HOUSE HARRIS INTERSECTION IMPROVEMENTS
SPECIAL PROVISIONS

BID #GL-2015-21

ITEM # 1302060A	ADJUST GATE BOX (GAS).....	133
ITEM # 1302061A	ADJUST GATE BOX (WATER).....	134

SECTION 1.05 – CONTROL OF THE WORK

Article 1.05.02 - Plans, Working Drawings and Shop Drawings is supplemented as follows:

Subarticle 1.05.02 - (2) is supplemented by the following:

Traffic Signal Items:

When required by the contract documents or when ordered by the Engineer, The Contractor shall prepare and submit catalog cuts, working drawings and/or shop drawings for all traffic signal items, including Mast Arm Assemblies to Alfred Benesch & Company for approval before fabrication. The packaged set of catalog cuts, working drawings and/or shop drawings shall be submitted either in paper (hard copy) form or in an electronic portable document format (.pdf). The package submitted in paper form shall include one (1) set. Catalog cuts shall be printed on ANSI A (8 ½" x 11"; 216 mm x 279mm; letter) sheets. Working drawings and shop drawings shall be printed on ANSI B (11" x 17"; 279 mm x 432 mm; ledger/tabloid) sheets.

Stephen R. Ulman, P.E.
Senior Project Engineer
Alfred Benesch & Company
90 National Drive
Glastonbury, CT 06468

and one (1) set to the Town of Glastonbury Public Works Department.

Daniel A. Pennington, P.E.,
Manager of Physical Services/Town Engineer
Town of Glastonbury
2155 Main Street
Glastonbury, CT 06033-6523

and one (1) set of the approved copy to the Connecticut Department of Transportation .

Lisa N. Conroy, P.E.
Transportation Supervising Engineer
Connecticut Department of Transportation
Division of Traffic Engineering – Electrical
2800 Berlin Turnpike
P.O. Box 317546
Newington, Connecticut 06131 7546

The packaged set submitted in an electronic portable document format (.pdf) shall be in an individual file with appropriate bookmarks for each item. The electronic files for catalog cuts shall be created on ANSI A (8 ½" x 11"; 216 mm x 279mm; letter) sheets. Working drawings and shop drawings shall be created on ANSI B (11" x 17"; 279 mm x 432 mm; ledger/tabloid) sheets.

Please send the pdf documents via email to: sulman@benesch.com

When these items are included in the project, the submission for Steel Span Poles and Mast Arm Assemblies shall follow the format and be sent to the "Engineer of Record" as described in the Steel Span Pole and Steel Mast Arm Assembly special provision.

SECTION 1.06 – CONTROL OF MATERIALS

Article 1.06.01 - Source of Supply and Quality:

Add the following:

Traffic Signal Items:

For the following traffic signal items the contractor shall submit a complete description of the item, working drawings, catalog cuts and other descriptive literature which completely illustrates such items presented for formal approval. Such approval shall not change the requirements for a certified test report and materials certificate as may be called for. All shop drawings shall be submitted at one time, unless otherwise approved by the engineer.

Aluminum Pedestals	Time Clock
Traffic Signal Housings and Hardware	Wireless Vehicle Detection
Flasher Cabinet	Transceiver
LED Traffic Signal Lamp Unit	Receiver
Pedestrian Signals Housing and Hardware	Freeway Sensor
Pedestrian Pushbuttons and Type of Sign	Intersection Sensor
Accessible Pedestrian Signal & Detector	Master Contact Closure Card (MCCC)
Traffic Signal Controller Unit	Expansion Contact Closure Card
Traffic Controller Cabinet	Master Contact Closure Ethernet Access Box
Controller Unit	CAT6 Cable
Solid State Time Switch	Siren Pre-Emption Equipment
Solid State Load Switch	Siren Detector
Conflict Monitor	Phase Selector (Audio)
Solid State Flasher	Confirmation Light
Flash Transfer Relay	Video Vehicle Detection
Auxiliary Termination Cabinet	Camera Assembly
Optical Pre-Emption Equipment	Camera Extension Bracket
Vehicle Emitter	Video Detector Processor
Phase Selector	Camera Cable
Detector (Type)	Monitor
Pre-Emption System Chassis	Cable Closure
Detector Cable (Optical)	Communication Cable
Test Equipment	Auxiliary Equipment Cabinet
Microwave Vehicle Detector	Rectangular Rapid Flashing Beacon
Pre-Fabricated Loop Detector	Internally Illuminated Sign
Loop Vehicle Detection	
Loop Detector	
Loop Sealant	
Loop Wire	
Loop Lead-in Wire	

Article 1.06.07 - Certified Test Reports and Materials Certificate.

Add the following:

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

Steel Span Pole Anchor Bolts	Steel Combination Span Poles
Steel Span Poles	Steel Combination Span Pole Anchor Bolts
Steel Mast Arm Anchor Bolts	
Steel Mast Arm Assembly	

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

Aluminum Pedestals	Time Clock
Traffic Signal Housings and Hardware	Wireless Vehicle Detection
Flasher Cabinet	Transceiver
LED Traffic Signal Lamp Unit	Receiver
Pedestrian Signals Housing and Hardware	Freeway Sensor
Pedestrian Pushbuttons and Type of Sign	Intersection Sensor
Accessible Pedestrian Signal & Detector	Master Contact Closure Card (MCCC)
Traffic Signal Controller Unit	Expansion Contact Closure Card
Traffic Controller Cabinet	Master Contact Closure Ethernet Access Box
Controller Unit	CAT6 Cable
Solid State Time Switch	Siren Pre-Emption Equipment
Solid State Load Switch	Siren Detector
Conflict Monitor	Phase Selector (Audio)
Solid State Flasher	Confirmation Light
Flash Transfer Relay	Video Vehicle Detection
Auxiliary Termination Cabinet	Camera Assembly
Optical Pre-Emption Equipment	Camera Extension Bracket
Vehicle Emitter	Video Detector Processor
Phase Selector	Camera Cable
Detector (Type)	Monitor
Pre-Emption System Chassis	Cable Closure
Detector Cable (Optical)	Communication Cable
Test Equipment	Auxiliary Equipment Cabinet
Microwave Vehicle Detector	Rectangular Rapid Flashing Beacon
Pre-Fabricated Loop Detector	Internally Illuminated Sign
Loop Vehicle Detection	
Loop Detector	
Loop Sealant	
Loop Wire	
Loop Lead-in Wire	

SECTION 1.07 - LEGAL RELATIONS AND RESPONSIBILITIES

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

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

Town of Glastonbury
Daniel A. Pennington, PE
Manager of Physical Services/Town Engineer
2155 Main Street
Glastonbury, CT 06033-6523

Fiber Technologies Networks, LLC
Mr. Mark Schnauber,
Controller
300 Meridian Center
Rochester, New York 14624
(585) 697-5107

Connecticut Natural Gas Corporation, Engineering
Department
Mr. Vasant C. Patel,
Manager - Utility Coordination
76 Meadow Street, 1st Floor
East Hartford, CT 06108
(860) 727-3114
vpatel@ctgcorp.com

Spectra Energy Operating Company, LLC (formerly:
Algonquin Gas
Transmission Company)
Mr. Bradley E. Franzese,
Area Manager
252 Shunpike Road
Cromwell, CT 06416
(860) 635-0800 EXT: FAX: (860) 635-2632
befranzese@spectraenergy.com

AT&T Connecticut (The Southern New England
Telephone Company)
Mr. Eric Clark,
Manager OSP Engineering
1441 North Colony Road
Meriden, CT 06450-4101
(203) 238-7407 EXT: FAX: (203) 237 8902
ec9795@att.com

CoxCom, Inc.
Mr. Thomas Derway,
Capital/Utility Coordinator
801 Parker Street
Manchester, CT 06045
(860) 432-5040 FAX: (860) 512-5115
thomas.derway@cox.com

Northeast Utilities Service Company
Mr. Wayne D. Gagnon,
Engineering Manager System Projects
107 Selden Street
Berlin, CT 06037
(860) 665-2473, FAX (860) 665-2002
gagnowd@nu.com

SECTION 1.08 - PROSECUTION AND PROGRESS

Article 1.08.03 - Prosecution of Work: Add the following:

The project will be constructed in various phases as described herein.

Phase 1 – Organization Phase - up to 60 Calendar Days.

The first phase is to afford the Contractor time for the administrative/engineering/procurement function required for the project. This would include such items as performing construction staking, digging test pits, submitting catalog cuts or shop drawings and purchasing materials. Actual construction is not permitted during this period unless specifically requested by the Contractor and approved by the Town. The Town makes no guarantee of granting such approval unless doing so is deemed to be in the best interest of the Town. The Contractor is to use this time to fully prepare for the successive phases so that construction can proceed quickly and efficiently. During the phase, after the construction staking is complete and underground utilities are marked out the Contractor, the designer, the Town of Glastonbury and the Engineer will walk the project to determine if there are test pits necessary or if there are any apparent conflicts with private property, utilities, or other roadside appurtenances such as obstructions, rocks, large trees, etc. Those conflicts will be resolved prior to ordering equipment for the specific area where the conflict exists.

Phase 2 – Construction Phase - 110 Calendar Days

The Construction Phase shall begin no later than day 61 of the Contract, or immediately after completion of the Organization Phase if all work under Phase 1 is completed by the Contractor in less than 60 days and approval to proceed with Phase 2 is granted by the Engineer. At this time all shop drawings shall have been reviewed and approved, all apparent conflicts shall have been identified and resolved, and written commitments shall have been received from suppliers that all equipment and materials will be received within 30 days.

Once commencement of construction begins, the Contractor will have one hundred ten (110) consecutive calendar days to complete the work, including cleanup. That work, once started, must be completed within the time established for the original construction phase, and liquidated damages, as specified elsewhere in the Contract, will be assessed against the Contractor per calendar day from that day until the date on which the work is complete. If unforeseen situations arise, the Contractor may request an extension of time for an individual location and, if justified, the Engineer may grant an extension of time for that location. Granting an extension of time for one location will not entitle the Contractor to extensions of time for other locations in the project.

New Work

Additional work, including work at a separate location, may be added to the contract in accordance with Article 1.04.05 of the Standard Specifications. This work may result in a contract extension, which would require an organization phase and a construction phase for the new location. If a contract extension is granted for the additional work, liquidated damages for this portion of the work will be negotiated with the Contractor. Such an extension of time would not affect the time allowed for the original work in the contract. Original work, once started must be completed within the original construction phase, and liquidated damages will be assessed for any days beyond that phase which the Contractor takes to complete the original work.

SECTION 10.00 - GENERAL CLAUSES FOR HIGHWAY ILLUMINATION AND TRAFFIC SIGNAL PROJECTS

Article 10.00.10 Section 3. Functional Inspection, first paragraph after the 2nd sentence: Add the following:

The contractor shall have a bucket truck with crew on site during the Functional Inspection to make any necessary aerial signal adjustments as directed by the Engineer.

Article 10.00.12 - Negotiations with utility company: Add the following:

The contractor shall give notice to utility companies a minimum of 30 days prior to required work or services to the utility company. Refer to Section 1.07 – Legal Relations and Responsibilities for the list of utility companies and representatives the contractor shall use.

The Contractor shall perform all work in conformance with Rules and Regulations of Public Utility Regulatory Authority (PURA) concerning Traffic Signals attached to Public Service Company Poles. The Contractor is cautioned that there may be energized wires in the vicinity of the specified installations. In addition to ensuring compliance with NESC and OSHA regulations, the Contractor and/or its Sub-Contractors shall coordinate with the appropriate utility company for securing/protecting the site during the installation of traffic signal mast arms, span poles or illumination poles.

When a span is attached to a utility pole, the Contractor shall ensure the anchor is in line with the proposed traffic signal span wire. More than 5 degree deviation will lower the holding strength and is not allowed. The Contractor shall provide any necessary assistance required by the utility company, and ensure the anchor and guy have been installed and properly tensioned prior to attaching the span wire to the utility pole.

SECTION M.04 - BITUMINOUS CONCRETE

Section M.04 is being deleted in its entirety and replaced with the following:

M.04.01—Bituminous Concrete Materials and Facilities

M.04.02—Mix Design and Job Mix Formula (JMF)

M.04.03—Production Requirements

M.04.01—Bituminous Concrete Materials and Facilities: Each source of material, and facility or plant used to produce and test bituminous concrete must be qualified on an annual basis by the Engineer. Test Procedures and Specifications referenced herein are in accordance with the latest AASHTO and ASTM Standard Test Procedures and Specifications. Such references when noted with an (M) have been modified by the Engineer and are detailed in Table M.04.03-7.

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

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

1. Coarse Aggregate:

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

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

2. Fine Aggregate:

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

prohibited from mixing two or more sources of fine aggregate on the ground for the purpose of feeding into a plant.

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

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

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

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

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

The Contractor shall submit all test results to the Engineer for review. The Contractor shall also include a washed sieve analysis in accordance with AASHTO T 27/T 11. Any fine aggregate component or final combined product shall have 100% passing the 3/8 inch sieve and a minimum of 95% passing the # 4. The G_{sa}, G_{sb}, and P_{w_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.

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

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

3. Mineral Filler:

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

4. Performance Graded Asphalt Binder:

- a. General:
 - i. Liquid PG binders shall be uniformly mixed and blended and be free of contaminants such as fuel oils and other solvents. Binders shall be properly heated and stored to prevent damage or separation.
 - ii. The blending at mixing plants of PG binder from different suppliers is strictly prohibited. Contractors who blend PG binders will be classified as a supplier and will be required to certify the binder in accordance with AASHTO R 26(M). The binder shall meet the requirements of AASHTO M 332 and shall be graded or verified in accordance with AASHTO R 29. The Contractor shall submit a Certified Test Report and bill of lading representing each delivery in accordance with AASHTO R 26(M). The Certified Test Report must also indicate the binder specific gravity at 77°F; rotational viscosity at 275°F and 329°F and the mixing and compaction viscosity-temperature chart for each shipment.
 - iii. The Contractor shall submit the name(s) of personnel responsible for receipt, inspection, and record keeping of PG binder materials. Contractor plant personnel shall document specific storage tank(s) where binder will be transferred and stored until used, and provide binder samples to the Engineer upon request. The person(s) shall assure that each shipment (tanker truck) is accompanied by a statement certifying that the transport vehicle was inspected before loading and was found acceptable for the material shipped and that the binder will be free of contamination from any residual material, along with two (2) copies of the bill of lading.
 - iv. Basis of Approval: The request for approval of the source of supply shall list the location where the material will be manufactured, and the handling and storage methods, along with necessary certification in accordance with AASHTO R 26(M). Only suppliers/refineries that have an approved "Quality Control Plan for Performance Graded Binders" formatted in accordance with AASHTO R 26(M) will be allowed to supply PG binders to Department projects.

b. Neat Performance Grade (PG) Binder:

- i. PG binder shall be classified by the supplier as a "Neat" binder for each lot and be so labeled on each bill of lading. Neat PG binders shall be free from modification with: fillers, extenders, reinforcing agents, adhesion promoters, thermoplastic polymers, acid modification and other additives such as re-refined motor oil, and shall indicate such information on each bill of lading and certified test report.
- ii. The asphalt binder shall be PG 64S-22.

c. Modified Performance Grade (PG) Binder:

Unless otherwise noted, the asphalt binder shall be Performance Grade PG 64E-22 asphalt modified solely with a Styrene-Butadiene-Styrene (SBS) polymer. The polymer modifier shall be added at either the refinery or terminal and delivered to the bituminous concrete production facility as homogenous blend. The stability of the modified binder shall be verified in accordance with ASTM D7173 using the Dynamic Shear Rheometer (DSR). The DSR $G^*/\sin(\delta)$ results from the top and bottom sections of the ASTM D7173 test shall not differ by more than 10%. The results of ASTM D7173 shall be included on the Certified Test Report. The binder shall meet the requirements of AASHTO M 332 (including Appendix X1) and AASHTO R 29.

d. Warm Mix Additive or Technology:

- i. The warm mix additive or technology must be listed on the NEAUPG Qualified Warm Mix Asphalt (WMA) Technologies List at the time of bid, which may be accessed online at http://www.neaupg.uconn.edu/wma_info.html.
- ii. The warm mix additive shall be blended with the asphalt binder in accordance with the manufacturer's recommendations.
- iii. The blended binder shall meet the requirements of AASHTO M 332 and shall be graded or verified in accordance with AASHTO R 29 for the specified binder grade. The Contractor shall submit a Certified Test Report showing the results of the testing demonstrating the binder grade. In addition, it must include the grade of the virgin binder, the brand name of the warm mix additive, the manufacturer's suggested rate for the WMA additive, the water injection rate (when applicable) and the WMA Technology manufacturer's recommended mixing and compaction temperature ranges.

5. Emulsified Asphalts:

a. General:

- i. Emulsified asphalts shall be homogeneous and be free of contaminants such as fuel oils and other solvents. Emulsions shall be properly stored to prevent damage or separation.
- ii. The blending at mixing plants of emulsified asphalts from different suppliers is strictly prohibited. Contractors who blend emulsified asphalts will be classified as a supplier and will be required to certify the emulsion in accordance with AASHTO PP 71. The emulsified asphalt shall meet the requirements of AASHTO M 140(M) or AASHTO M 208 as applicable.

b. Supplier Approval:

- i. The request for approval of the source of supply shall list the location where the material is manufactured, the handling and storage methods, and certifications in accordance with AASHTO PP 71. Only suppliers that have an approved "Quality Control Plan for Emulsified Asphalt" formatted in accordance with AASHTO PP 71 will be allowed to supply emulsified asphalt to Department projects.
- ii. The supplier shall submit to the Division Chief a Certified Test Report representing each lot in accordance with AASHTO PP 71. The Certified Test Report shall include test results for each specified requirement for the grade delivered and shall also indicate the density at 60°F.

Additionally, once a month one split sample for each emulsified asphalt grade shall be submitted.

c. Basis of Approval

- i. Each shipment of emulsified asphalt delivered to the project site shall be accompanied with the corresponding SDS and Certified Test Report listing Saybolt viscosity, residue by evaporation, penetration of residue, and weight per gallon at 60°F.
- ii. Anionic emulsified asphalts shall conform to the requirements of AASHTO M-140(M). Materials used for tack coat shall not be diluted and meet grade RS-1 or RS-1H. When ambient temperatures are 80°F and rising, grade SS-1 or SS-1H may be substituted if permitted by the Engineer.
- iii. Cationic emulsified asphalt shall conform to the requirements of AASHTO M-208. Materials used for tack coat shall not be diluted and meet grade CRS-1. The settlement and demulsibility test will not be performed unless deemed necessary by the Engineer. When ambient temperatures are 80°F and rising, grade CSS-1 or CSS-1H may be substituted if permitted by the Engineer.

6. Reclaimed Asphalt Pavement (RAP):

- a. Requirements: RAP shall consist of asphalt pavement constructed with asphalt and aggregate reclaimed by cold milling or other removal techniques approved by the Engineer. For bituminous concrete mixtures containing RAP, the Contractor shall submit a JMF in accordance with Article M.04.02 to the Engineer for review.
- b. Basis of Approval: The RAP material will be accepted on the basis of one of the following criteria:
 - i. When the source of all RAP material is from pavements previously constructed on Department projects, the Contractor shall provide a materials certificate listing the detailed locations and lengths of those pavements and that the RAP is only from those locations listed.
 - ii. When the RAP material source or quality is not known, the Contractor shall test the material and provide the following information along with a request for approval to the Engineer at least 30 calendar days prior to the start of the paving operation. The request shall include a material certificate stating that the RAP consists of aggregates that meet the specification requirements of sub articles M.04.01-1 through 3 and that the binder in the RAP is substantially free of solvents, tars and other contaminants. The Contractor is prohibited from using unapproved material on Department projects and shall take necessary action to prevent contamination of approved RAP stockpiles. Stockpiles of unapproved material shall remain separate from all other RAP materials at all times. The request for approval shall include the following:
 1. A 50-pound sample of the RAP to be incorporated into the recycled mixture.
 2. A 25-pound sample of the extracted aggregate from the RAP.
 3. A statement that RAP material has been crushed to 100% passing the ½ inch sieve and remains free from contaminants such as joint compound, wood, plastic, and metals.

7. Crushed Recycled Container Glass (CRCG):

- a. Requirements: The Contractor may propose to use clean and environmentally-acceptable CRCG in an amount not greater than 5% by weight of total aggregate.
- b. Basis of Approval: The Contractor shall submit to the Engineer a request to use CRCG. The request shall state that the CRCG contains no more than 1% by weight of contaminants such as paper, plastic and metal and conform to the following gradation:

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

8. Joint Seal Material:

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

9. Recycled Asphalt Shingles (RAS)

- a. Requirements: RAS shall consist of processed asphalt roofing shingles from post-consumer asphalt shingles or from manufactured shingle waste. The RAS material under consideration for use in bituminous concrete mixtures must be certified as being asbestos free and shall be entirely free of whole, intact nails. The RAS material shall meet the requirements of AASHTO MP 23.

The producer shall test the RAS material to determine the asphalt content and the gradation of the RAS material. The producer shall take necessary action to prevent contamination of RAS stockpiles.

10. Plant Requirements:

- a. Mixing Plant and Machinery: The mixing plant used in the preparation of the bituminous concrete shall comply with AASHTO M 156/ASTM D 995 for a Batch Plant or a Drum Dryer Mixer Plant, and be approved by the Engineer.
- b. Storage Silos: For all mixes, the Contractor may use silos for short-term storage of Superpave mixtures with prior notification and approval of the Engineer. A silo must have heated cones and an unheated silo cylinder if it does not contain a separate internal heating system. Prior approval must be obtained for storage times greater than those indicated. When multiple silos are filled, the Contractor shall discharge one silo at a time. Simultaneous discharge of multiple silos is not permitted.

<u>Type of silo cylinder</u>	<u>Maximum storage time for all classes (hr)</u>	
	HMA	WMA/PMA
Open Surge	4	Mfg Recommendations
Unheated – Non-insulated	8	Mfg Recommendations
Unheated – Insulated	18	Mfg Recommendations
Heated – No inert gas	TBD by the Engineer	

- c. Documentation System: The mixing plant documentation system shall include equipment for accurately proportioning the components of the mixture by weight and in the proper order, controlling the cycle sequence and timing the mixing operations. Recording equipment shall monitor the batching sequence of each component of the mixture and produce a printed record of these operations on each delivery ticket, as specified herein. Material feed controls shall be automatically or manually adjustable to provide proportions within the tolerances listed below for any batch size.

An asterisk (*) shall be automatically printed next to any individual batch weight(s) exceeding the tolerances in ASTM D 995 section 8.7.3. The entire batching and mixing interlock cut-off circuits shall interrupt and stop the automatic batching operations when an error exceeding the acceptable tolerance occurs in proportioning.

There must be provisions so that scales are not manually adjusted during the printing process. In addition, the system shall be interlocked to allow printing only when the scale has come to a complete rest. A unique printed character (m) shall automatically be printed on the truck and batch plant printout when the automatic batching sequence is interrupted or switched to auto-manual or full manual during proportioning. For each day's production, each project shall be provided a clear, legible copy of these recordings on each delivery ticket.

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

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

- f. RAP: The Contractor shall indicate the percent of RAP, the moisture content (as a minimum determined twice daily prior to production and halfway through production), and the net dry weight of RAP added to the mixture on each delivery ticket. For each day of production, the production shall conform to the job mix formula and RAP percentage and no change shall be made without the prior approval of the Engineer.
- g. Asphalt Binder: The last day of every month, a binder log shall be submitted when the monthly production for the Department exceeds 5000 tons. Blending of PG binders from different suppliers or grades at the bituminous concrete production facility is strictly prohibited.
- h. Warm mix additive: For mechanically foamed WMA, the maximum water injection rate shall not exceed 2.0% water by total weight of binder and the water injection rate shall be constantly monitored during production.
- i. Field Laboratory: The Contractor shall furnish the Engineer an acceptable field laboratory at the production facility to test bituminous concrete mixtures during production. The field laboratory shall have a minimum of 300 square feet, have a potable water source and drainage in accordance with the CT Department of Public Health Drinking Water Division, and be equipped with all necessary testing equipment as well as with a PC, printer, and telephone with a dedicated hard-wired phone line. In addition, the PC shall have a high speed internet connection with a minimum upstream of 384 Kbps and a functioning web browser with unrestricted access to <https://ctmail.ct.gov>. This equipment shall be maintained in clean and good working order at all times and be made available for use by the Engineer.

The laboratory shall be equipped with a suitable heating system capable of maintaining a minimum temperature of 65°F. It shall be clean and free of all materials and equipment not associated with the laboratory. Windows shall be installed to provide sufficient light and ventilation. During summer months adequate cooling or ventilation must be provided so the indoor air temperature shall not exceed the ambient outdoor temperature. Light fixtures and outlets shall be installed at convenient locations, and a telephone shall be within audible range of the testing area. The laboratory shall be

equipped with an adequate workbench that has a suitable length, width, and sampling tables, and be approved by the Engineer.

The field laboratory testing apparatus, supplies, and safety equipment shall be capable of performing all tests in their entirety that are referenced in AASHTO R 35, *Standard Practice for Superpave Volumetric Design for Hot-Mix Asphalt (HMA)* and AASHTO M 323, *Standard Specification for Superpave Volumetric Mix Design*. In addition, the quantity of all equipment and supplies necessary to perform the tests must be sufficient to initiate and complete the number of tests identified in Table M.04.03-2 for the quantity of mixture produced at the facility on a daily basis. The Contractor shall ensure that the Laboratory is adequately supplied at all times during the course of the project with all necessary testing materials and equipment.

The Contractor shall maintain a list of laboratory equipment used in the acceptance testing processes including but not limited to, balances, scales, manometer/vacuum gauge, thermometers, gyratory compactor, clearly showing calibration and/or inspection dates, in accordance with AASHTO R 18. The Contractor shall notify the Engineer if any modifications are made to the equipment within the field laboratory. The Contractor shall take immediate action to replace, repair, and/or recalibrate any piece of equipment that is out of calibration, malfunctioning, or not in operation.

M.04.02—Mix Design and Job Mix Formula (JMF)

1. Curb Mix:

- a. Requirements: When curb mix is specified, the Contractor shall develop a bituminous concrete mix design that includes a JMF consisting of target values for gradation, binder content and air voids as shown in Table M.04.02-1. The Contractor may use RAP in 5% increments up to a maximum of 30% provided a new JMF is accepted by the Engineer.
- b. Basis of Approval: The Contractor shall submit to the Engineer a request for approval of the JMF annually in accordance with one of the methods described herein. Prior to the start of any paving operations, the JMF must be accepted by the Engineer, and the Contractor must demonstrate the ability to meet the accepted JMF. Additionally, the fraction of material retained between any two consecutive sieves shall not be less than 4%.

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

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

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

**TABLE M.04.02 – 1:
Master Ranges for Curb Mix Mixtures**

Notes: (a) Compaction Parameter 50gyration N_{des} . (b) The percent passing the #200 sieve shall not exceed the percentage of bituminous asphalt binder determined by		
Mix	Curb Mix	Production Tolerances from JMF target
Grade of PG Binder content %	PG 64S-22 6.5 - 9.0	0.4
Sieve Size		
# 200	3.0 – 8.0 (b)	2.0
# 50	10 - 30	4
# 30	20 - 40	5
# 8	40 - 70	6
# 4	65 - 87	7
1/4"		
3/8 "	95 - 100	8
1/2 "	100	8
3/4"		8
1"		
2"		
Additionally, the fraction of material retained between any two consecutive sieves shall not be less than 4%		
Mixture Temperature		
Binder	325°F maximum	
Aggregate	280-350° F	
Mixtures	265-325° F	
Mixture Properties		
VOIDS %	0 – 4.0 (a)	

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

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

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

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

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

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

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

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

- ii. Superpave Mixtures with RAP: Use of approved RAP may be allowed with the following conditions:
 - RAP amounts up to 15% may be used with no binder grade modification.
 - RAP amounts up to 20% may be used provided a new JMF is approved by the Engineer. The JMF submittal shall include the grade of virgin binder added. The JMF shall be accompanied by a blending chart and supporting test results in accordance with AASHTO M 323 Appendix X1, or by test results that show the combined binder (recovered binder from the RAP, virgin binder at the mix design proportions, warm mix asphalt additive and any other modifier if used) meets the requirements of the specified binder grade.
 - Two representative samples of RAP shall be obtained. Each sample shall be split and one split sample shall be tested for binder content in accordance with AASHTO T 164 and the other in accordance AASHTO T 308.

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

- iii. Superpave Mixtures with RAS: Use of RAS may be allowed solely in HMA S1 mixtures with the following conditions:
 - RAS amounts up to 3% may be used.
 - RAS total binder replacement up to 15% may be used with no binder grade modification.
 - RAS total binder replacement up to 20% may be used provided a new JMF is approved by the Engineer. The JMF submittal shall include the grade of virgin binder added. The JMF shall be accompanied by a blending chart and supporting test results in accordance to AASHTO M 323 appendix X1 or by test results that show the combined binder (recovered binder from the RAP, virgin binder at the mix design proportions, warm mix asphalt additive and any other modifier if used) meets the requirements of the specified binder grade.
 - Superpave Mixtures with RAS shall meet AASHTO PP 78 design considerations. The RAS asphalt binder availability factor (F) used in AASHTO PP 78 Equation 2 shall be 0.85.
 - iv. Superpave Mixtures with CRCG: In addition to the requirements in M.04.02 – 2 a through c, for bituminous concrete mixtures that contain CRCG, the Contractor shall submit a materials certificate to the Engineer stating that the CRCG complies with requirements stated in Article M.04.01, as applicable. Additionally, 1% hydrated lime, or other accepted non-stripping agent, shall be added to all mixtures containing CRCG. CRCG material shall not be used with any other recycling option.
- b. Basis of Approval: On an annual basis, the Contractor shall submit to the Engineer any bituminous concrete mix design, and JMF anticipated for use on Department projects. Prior to the start of any paving operations, the mix design and JMF must be approved by the Engineer. Bituminous concrete mixture supplied to the project without an approved mix design and JMF will be rejected. The following information must be included in the mix design submittal:
- a. Gradation, consensus properties and specific gravities of the aggregate, RAP, and RAS.
 - b. Average asphalt content of the RAP and RAS by AASHTO T 164.
 - c. Source of RAP and RAS and percentage to be used.
 - d. Warm mix Technology and manufacturer's recommended additive rate and tolerances.
 - e. TSR test report, and, if applicable, anti-strip manufacturer and recommended dosage rate.
 - f. Mixing and compaction temperature ranges for the mix with and without the warm-mix technology incorporated.
 - g. JMF ignition oven correction factor by AASHTO T 308.

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

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

The Contractor shall not change any component source of supply including consensus properties after a JMF has been accepted. Before a new source of materials is used, a revised JMF shall be submitted to the Engineer for approval. Any approved JMF applies only to the plant for which it was submitted. Only one mix with one JMF will be approved for production at any one time. Switching

between approved JMF mixes with different component percentages or sources of supply is prohibited.

- c. Mix Status: Each facility will have each type of bituminous concrete mixture evaluated based on the previous year of production, for the next construction paving season, as determined by the Engineer. Based on the rating a type of mixture receives it will determine whether the mixture can be produced without the completion of a PPT. Ratings will be provided to each bituminous concrete producer annually prior to the beginning of the paving season.

The rating criteria are based on compliance with Air Voids and Voids in Mineral Aggregate (VMA) as indicated in Table M.04.03-3: *Superpave Master Range for Bituminous Concrete Mixture Production*, and are as follows:

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

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

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

Ratings are defined as:

"A" – Approved:

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

"PPT" – Pre-Production Trial:

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

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

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

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

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

Option B: When the Contractor or their representative performs a "PPT" test without being witnessed by an inspector, the Contractor shall submit the test results and a split sample including 2 gyratory molds, 5,000 grams of boxed bituminous concrete for binder and gradation determination, and 5,000 grams of cooled loose bituminous concrete for Gmm determination for verification testing and approval. Passing verifications will designate the

bituminous concrete type to be on an "A" status. Failing verifications will require the contractor to submit additional trials.

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

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

"U" – No Acceptable Mix Design on File:

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

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

Notes: ⁽¹⁾ Minimum Pb as specified in Table M.04.02-5. ⁽²⁾ Voids in Mineral Aggregates shall be computed as specified in AASHTO R 35. ⁽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.								
Sieve	S0.25		S0.375		S0.5		S1	
	CONTROL POINTS ⁽³⁾		CONTROL POINTS ⁽³⁾		CONTROL POINTS ⁽³⁾		CONTROL POINTS ⁽³⁾	
inches	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)
2.0	-	-	-	-	-	-	-	-
1.5	-	-	-	-	-	-	100	-
1.0	-	-	-	-	-	-	90	100
3/4	-	-	-	-	100	-	-	90
1/2	100	-	100	-	90	100	-	-
3/8	97	100	90	100	-	90	-	-
#4	-	90	-	90	-	-	-	-
#8	32	67	32	67	28	58	19	45
#16	-	-	-	-	-	-	-	-
#30	-	-	-	-	-	-	-	-
#50	-	-	-	-	-	-	-	-
#100	-	-	-	-	-	-	-	-
#200	2.0	10.0	2.0	10.0	2.0	10.0	1.0	7.0
Pb ⁽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 – 350°F		280 – 350°F		280 – 350°F		280 – 350°F	
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							

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 and Elongated Particles ASTM D 4791	Sand Equivalent AASHTO T 176
-----	(million)			>#4	-----
1*	< 0.3	55/- -	40	10	40
2	0.3 to < 3.0	75/- -	40	10	40
3	≥ 3.0	95/90	45	10	45
	Design ESALs are the anticipated project traffic level expected on the design lane, projected over a 20 year period, regardless of the actual expected design life of the roadway.	Criteria presented as minimum values. 95/90 denotes that a minimum of 95% of the coarse aggregate, by mass, shall have one fractured face and that a minimum of 90% shall have two fractured faces.	Criteria presented as minimum percent air voids in loosely compacted fine aggregate passing the #8 sieve.	Criteria presented as maximum Percent by mass of flat and elongated particles of materials retained on the #4 sieve, determined at 5:1 ratio.	Criteria presented as minimum values for fine aggregate passing the #8 sieve.

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

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

Traffic Level	Design ESALs	Number of Gyration by Superpave Gyrotory Compactor			Percent Density of Gmm from HMA/WMA specimen			Voids Filled with Asphalt (VFA) Based on Nominal mix size – inch			
		Nini	Ndes	Nmax	Nini	Ndes	Nmax	0.25	0.375	0.5	1
1*	< 0.3	6	50	75	≤ 91.5	96.0	≤ 98.0	70 - 80	70 - 80	70 - 80	67 - 80
2	0.3 to < 3.0	7	75	115	≤ 90.5	96.0	≤ 98.0	65 - 78	65 - 78	65 - 78	65 - 78
3	≥ 3.0	8	100	160	≤ 90.0	96.0	≤ 98.0	73 - 76	73 - 76	65 - 75	65 - 75

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

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

Mix Type	Level	Binder Content Minimum ⁽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. Standard Quality Control Plan (QCP) for Production:

The QCP for production shall describe the organization and procedures which the Contractor shall use to administer quality control. The QCP shall include the procedures used to control the production process, to determine when immediate changes to the processes are needed, and to implement the required changes. The QCP must detail the inspection, sampling and testing protocols to be used, and the frequency for each.

Control Chart(s) shall be developed and maintained for critical aspect(s) of the production process as determined by the Contractor. The control chart(s) shall identify the material property, applicable upper and lower control limits, and be updated with current test data. As a minimum, the following quality characteristics shall be included in the control charts: percent passing #4 sieve, percent passing #200 sieve, binder content, air voids, Gmm and VMA. The control chart(s) shall be used as part of the quality control system to document variability of the bituminous concrete production process. The control chart(s) shall be submitted to the Engineer the first day of each month.

The QCP shall also include the name and qualifications of a Quality Control Manager. The Quality Control Manager shall be responsible for the administration of the QCP, including compliance with the plan and any plan modifications.

The Contractor shall submit complete production testing records to the Engineer within 24 hours in a manner acceptable to the Engineer.

The QCP shall also include the name and qualifications of any outside testing laboratory performing any QC functions on behalf of the Contractor. The QCP must also include a list of sampling & testing methods and frequencies used during production, and the names of all Quality Control personnel and their duties.

Approval of the QCP does not imply any warranty by the Engineer that adherence to the plan will result in production of bituminous concrete that complies with these specifications. The Contractor shall submit any changes to the QCP as work progresses.

2. Acceptance Sampling & Testing Methods:

i. General:

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

The Contractor shall submit all acceptance tests results to the Engineer within 24 hours or prior to the next day's production. All acceptance test specimens and supporting documentation must be retained by the Contractor. Verification testing will be performed by the Engineer in accordance with the Department's QA Program for Materials. Labeled Acceptance test specimens shall be retained at the production facilities and may be disposed of with the approval of the Engineer. All Quality Control specimens shall be clearly labeled and separated from the Acceptance specimens.

Should the Department be unable to verify the Contractor's acceptance test result(s) due to a failure of the Contractor to retain acceptance test specimens or supporting documentation, the Contractor shall review its quality control plan, determine the cause of the nonconformance and respond in writing within 24 hours to the Engineer describing the corrective action taken at the plant. In addition, the Contractor must provide supporting documentation or test results to validate the subject acceptance test result(s). The Engineer may invalidate any positive adjustments for material corresponding to the acceptance test(s). Failure of the Contractor to adequately address quality control issues at a facility may result in suspension of production for Department projects at that facility.

Contractor personnel performing acceptance sampling and testing must be present at the facility prior to, during, and until completion of production, and be certified as a NETTCP HMA Plant Technician or Interim HMA Plant Technician and be in good standing. Production of material for use on State projects must be suspended by the Contractor if such personnel are not present.

Technicians found by the Engineer to be non-compliant with NETTCP or Department policies may be removed by the Engineer from participating in the acceptance testing process for Department projects until their actions can be reviewed.

Anytime during production that testing equipment becomes inoperable, production can continue for a maximum of 1 hour. The Contractor shall obtain box sample(s) in accordance with Table M.04.03-1 to satisfy the daily acceptance testing requirement for the quantity shipped to the project. The box sample(s) shall be tested once the equipment issue has been resolved to the satisfaction of the Engineer. Production beyond 1 hour may be considered by the Engineer. Production will not be permitted beyond that day until the subject equipment issue has been resolved.

ii. Curb Mix Acceptance Sampling and Testing Procedures:

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

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

TABLE M.04.03 – 2: Curb Mix Acceptance Test Procedures

Protocol	Reference	Description
1	AASHTO T 30(M)	Mechanical Analysis of Extracted Aggregate
2	AASHTO T 168	Sampling of Bituminous Concrete
3	AASHTO T 308	Binder content by Ignition Oven method (adjusted for aggregate correction factor)
4	AASHTO T 209(M)	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
5	AASHTO T 312	Superpave Gyratory molds compacted to N_{des}
6	AASHTO T 329	Moisture Content of Hot-Mix Asphalt (HMA) by Oven Method

a. Determination of Off-Test Status:

- i. The test results of AASHTO T 308 and T 30(M) will be used to determine if the mixture is within the tolerances shown in Table M.04.02-1. Curb Mixtures are considered “off test” when the test results indicate that any single value for bitumen content or gradation are not within the tolerances shown in Table M.04.02-1 for that mixture. If the mix is “off test”, the Contractor must take immediate actions to correct the deficiency and a new acceptance sample shall be tested on the same day or the following day of production.
- ii. When multiple plants and silos are located at one site, mixture supplied to one project is considered as coming from one source for the purpose of applying the “off test” status.
- iii. The Engineer may cease supply from the plant when test results from three consecutive samples are not within the JMF tolerances or the test results from two consecutive samples not within the master range indicated in Table M.04.02-1 regardless of production date.

b. JMF Changes

- i. If a test indicates that the bitumen content or gradation are outside the tolerances, the Contractor may make a single JMF change as allowed by the Engineer prior to any additional testing. A JMF change shall include the date and name of the Engineer that allowed it. Consecutive test results outside the requirements of Table M.04.02-1 JMF tolerances may result in rejection of the mixture.
- ii. Any modification to the JMF shall not exceed 50% of the JMF tolerances indicated in Table M.04.02-1 for any given component of the mixture without approval of the Engineer. When such an adjustment is made to the bitumen, the corresponding production percentage of bitumen shall be revised accordingly.

iii. Superpave Mix Acceptance Sampling and Testing Procedures:

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

The number of sub lots/acceptance tests is based on the total production per day as indicated in Table M.04.03-1. Quantities of the same type/level mix per plant may be combined daily for multiple state projects

to determine the number of sub lots. The Engineer may direct that additional acceptance samples be obtained to represent materials actually being delivered to the project.

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

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

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

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

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

TABLE M.04.03– 3: Superpave Acceptance Testing Procedures

Protocol	Reference	Description
1	AASHTO T 168	Sampling of bituminous concrete
2	AASHTO R 47	Reducing samples to testing size
3	AASHTO T 308	Binder content by Ignition Oven method (adjusted for aggregate correction factor)
4	AASHTO T 30	Gradation of extracted aggregate for bituminous concrete mixture
5	AASHTO T 312	⁽¹⁾ Superpave Gyrotory molds compacted to N _{des}
6	AASHTO T 166	⁽²⁾ Bulk specific gravity of bituminous concrete
7	AASHTO R 35	⁽²⁾ Air voids, VMA
8	AASHTO T 209(M)	Maximum specific gravity of bituminous concrete (average of two tests)
9	AASHTO T 329	Moisture content of Production bituminous concrete

Notes: ⁽¹⁾ One set equals two six-inch molds. Molds to be compacted to N_{max} for PPTs and to N_{des} for production testing. The first subplot of the year will be compacted to N_{max} ⁽²⁾ Average value of one set of six-inch molds.

If the average corrected Pb content differs by 0.3% or more from the average bituminous concrete facility production delivery ticket in five (5) consecutive tests regardless of the production date (moving average), the Contractor shall immediately investigate, determine an assignable cause and correct the issue. When two consecutive moving average differences are 0.3% or more, the Engineer may require a new aggregate correction factor.

The test specimen must be ready to be placed in an approved ignition furnace for testing in accordance with AASHTO T 308 within thirty minutes of being obtained from the hauling vehicle and the test shall start immediately after.

The Contractor shall perform moisture susceptibility (TSR) testing annually for all design levels of HMA-, WMA-, and PMA- S0.5 plant-produced mixtures, in accordance with the latest version of AASHTO T 283(M).

If any material source changes from the previous year, or during the production season, a mix design TSR as well as a production TSR is required for the new mixture. The AASHTO T 283(M) test shall be performed at an AASHTO Materials Reference Laboratory (AMRL) by NETTCP Certified Technicians. The test results and specimens shall be submitted to the Engineer for review. This shall be completed within 30 days from the start of production. Superpave mixtures that require anti-strip additives (either liquid or mineral) shall continue to meet all requirements specified herein for binder and bituminous concrete. The Contractor shall submit the name, manufacturer, percent used, technical datasheet and SDS for the anti-strip additive (if applicable) to the Engineer. In addition, compaction of samples shall be accomplished utilizing an accepted Superpave 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. Superpave mixes shall be considered "off test" when any Control Point Sieve, VA, VMA, and Gmm values are outside of the limits specified in Table M.04.03-4 and the computed binder content (Pb) established by AASHTO T308 or as documented on the vehicle delivery ticket is below the minimum binder content stated in sub article M.04.02-5. Note that further testing of samples or portions of samples not initially tested for this purpose cannot be used to change the status.
- ii. Any time the bituminous concrete mixture is considered Off-test:
 1. The Contractor shall notify the Engineer (and project staff) when the plant is "off test" for a type of mixture. When multiple plants and silos are located at one site, mixture supplied to one project is considered as coming from one source for the purpose of applying the "off test" determination.
 2. The Contractor must take immediate actions to correct the deficiency, minimize "off test" production to the project, and obtain an additional Process Control (PC) test after any corrective action to verify production is in conformance to the specifications. A PC test will not be used for acceptance and is solely for the use of the Contractor in its quality control process.

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

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

1. Bituminous concrete mixture is "off test" on three (3) consecutive tests for any combination of VMA or Gmm, regardless of date of production.

2. Bituminous concrete mixture is "off test" on two (2) consecutive tests for the Control Point sieves in one day's production.

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

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

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

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

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

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

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

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

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

A JMF change shall be submitted every time the plant target RAP and/or bin percentage deviates by more than 5% and/or the plant target binder content deviates by more than 0.15% from the active JMF.

TABLE M.04.03– 4: Superpave Master Range for Bituminous Concrete Mixture Production

Notes: (1) 300°F minimum after October 15. (2) Minimum Pb as specified in Table M.04.02-5 (3) Control point range is also defined as the master range for that mix. (4) JMF tolerances shall be defined as the limits for production compliance. VA & Pb payment is subject to adjustments, as defined in sub-article 4.06.04 - 2. (5) For WMA, lower minimum aggregate temperature will require Engineer's approval. (6) For WMA and/or polymer modified asphalt, the mix temperature shall meet manufacturer's recommendations. In addition, for WMA, the maximum mix temperature shall not exceed 325°F once the WMA technology is incorporated.									
	S0.25		S0.375		S0.5		S1		Tolerances
Sieve	CONTROL POINTS (4)		CONTROL POINTS (4)		CONTROL POINTS (4)		CONTROL POINTS (4)		From JMF Targets (4)
inches	Min(%)	Max(%)	Min(%)	Max(%)	Min(%)	Max(%)	Min(%)	Max(%)	±Tol
1.5	-	-	-	-	-	-	100	-	
1.0	-	-	-	-	-	-	90	100	
3/4	-	-	-	-	100	-	-	90	
1/2	100	-	100	-	90	100	-	-	
3/8	97	100	90	100	-	90	-	-	
#4	-	90	-	90	-	-	-	-	
#8	32	67	32	67	28	58	19	45	
#16	-	-	-	-	-	-	-	-	
#200	2.0	10.0	2.0	10.0	2.0	10.0	1.0	7.0	
Pb(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		

**TABLE M.04.03– 5:
JMF Tolerances for Application
of Positive Adjustments**

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

**TABLE M.04.03– 6:
Superpave Master Range for Traffic Levels and Design Volumetric Properties**

Traffic Level	Design ESALs	Number of Gyration by Superpave Gyratory Compactor	
	(million)	Nini	Ndes
1*	< 0.3	6	50
2	0.3 to < 3.0	7	75
3	≥3.0	8	100

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

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

AASHTO Standard Specification	
Reference	Modification
M 140	Emulsified Asphalt grade RS-1H shall meet all the requirements of the emulsified asphalt grade RS-1 except for the penetration requirement of the residue that will change from 100 to 200 penetration units (0.1 mm) to 40 to 90 penetration units (0.1 mm).
AASHTO Standard Method of Test	
Reference	Modification
T 30	Section 7.2 thru 7.4 Samples are not routinely washed for production testing
T 168	Samples are taken at one point in the pile. Samples from a hauling vehicle are taken from only one point instead of three as specified. 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. 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.
T 195	Section 4.3 only one truck load of mixture is sampled. Samples are taken from opposite sides of the load.
T 209	Section 7.2 The average of two bowls is used proportionally in order to satisfy minimum mass requirements. 8.3 Omit Pycnometer method.
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 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 26	<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. 7. All AASHTO M 320 references shall be replaced with AASHTO M 332. 8. Each year, in April and September, the supplier shall submit test results for two BBR testing at two different temperatures in accordance with AASHTO R 29. <p>Suppliers shall provide AASHTO M 332 testing results and split samples at a minimum of once per lot.</p>

(Rev. Date 01/28/2015)

ITEM # 0201001A **CLEARING AND GRUBBING**

General: The Contractor shall furnish all labor, materials, tools, and equipment necessary and shall do all work to prepare the site as indicated on the drawings and as herein specified.

Construction Methods:

Tree Removal: Removal of trees as indicated on the plans shall be performed by workman skilled in the area of tree removal under the supervision of a Connecticut Licensed Arborist. The Contractor shall mark all trees, shrubs, and plants to be removed in accordance with the plans and these specifications. The Engineer shall have 7 days to field review the markings and make any adjustments prior to the start of the clearing operation.

Trees and shrubs within the right-of-way or within any property owned by the Town of Glastonbury that are designated for removal must be posted as such by the Glastonbury Tree Warden (Mr. Greg Foran of the Parks and Recreation Department, 652-7686) for a period of 10 days prior to removal. **No trees or shrubs within the Town of Glastonbury right-of-way shall be cut or removed until such posting has been completed and subsequent approval given by the Tree Warden.**

In general, no trees, etc. in public streets and highways are to be cut or damaged in any way except as noted on the plans. Trees, bushes, and growing crops on other lands may be cut, removed, or trimmed only to the extent provided in the terms of the rights-of-way or access rights possessed by the Town, and also only within the limits and in the manner, if any, indicated by the Engineer or by the drawings or Special Conditions.

Tree Trimming: Trimming of trees with supervision by a Connecticut Licensed Arborist is included under this item as required for clearance of construction equipment and pedestrians below the tree canopy. When the canopy of a tree must be elevated for clearance above the proposed improvements, trimming shall be done around the entire circumference of the tree.

Tree Protection and Care of Property: The Contractor shall install high visibility construction fence at the drip line of the tree canopy as directed by the Engineer to protect existing trees that are not to be cut from damage during construction. The Engineer, at his sole discretion, may also direct the Contractor to enclose the trunks of trees adjacent to his work that are not to be cut with substantial wooden boxes of such height as may be necessary to protect them from injury from piled material, from equipment, from his operations, or otherwise due to his work. Excavating machinery and cranes shall be of suitable type and be operated with care to prevent injury to trees not to be cut, and particularly to overhanging branches and limbs.

Branches, limbs, and roots shall not be cut except by permission of the Engineer. All cutting shall be smoothly and neatly done without splitting or crushing. In case of cutting or unavoidable injury to branches, limbs, and trunks of trees, the cut or injured portions shall be neatly trimmed and covered with an application of grafting wax or tree-healing paint, as directed.

Cultivated hedges, shrubs, and plant that might be injured by the Contractor's operations shall be protected by suitable means or shall be dug up and temporarily replanted and maintained. After the construction operations have been substantially completed, they shall be replanted in their original positions and cared for until growth is re-established. If cultivated hedges, shrubs, and plants are injured to such a degree as to affect their growth or diminish their beauty or usefulness, they shall be replaced by items of kind and quality at least equal to the kind and quality existing at the start of the work.

On paved surfaces, the Contractor shall not use or operate tractors, bulldozers, or other power-operated equipment, the treads of wheels that are so shaped as to cut or otherwise injure such surfaces.

Clearing: From areas to be cleared, the Contractor shall cut or otherwise remove all trees, saplings, brush, vines, and other vegetable matter such as snags, sawdust, bark, etc., and refuse. The area to be cleared shall be confined to the width shown on the plans or as stipulated in the Proposal. Vines, brush, and similar undergrowth shall be cut as close to the ground as practicable. Trees may be cut leaving a longer stump to facilitate their removal by power-operated equipment. No trees shall be cut or trimmed unless they are so indicated on the drawings.

Clearing shall also include removal and disposal of all items shown on the plans to be removed, or directed by the Engineer to be removed as part of the project, including, but not limited to, removal and disposal of existing concrete sidewalk, concrete steps, retaining walls, drainage structures, fences, and any and all other structures or materials not specifically listed in the Bid Proposal but required to be removed to accomplish the work.

All road signs, mail boxes, etc., shall be removed and reset as directed.

Grubbing: Grubbing shall consist of the complete removal of all tree stumps and roots larger than two inches in diameter to a minimum depth of 12-inches below the subgrade surface. All excavations made below the finished surface by the removal of trees, stumps, etc. shall be filled with suitable material and thoroughly compacted in such a manner that its surface will conform to the surrounding surface.

Stump grinding shall be used for stump removal where the potential for damage to adjacent improvements or underground utilities exists due to the excavation of stumps, or as directed by the Engineer. The requirements for grubbing noted above shall also apply to stump grinding operations.

Disposal: All materials removed during trimming, tree removal, and clearing and grubbing operations shall be disposed of by the Contractor in a manner satisfactory to the Engineer.

Measurement and Payment: Except as provided otherwise in the Bid Proposal or Special Conditions, this work shall be paid for at the Contract Lump Sum Price for "Clearing and Grubbing", which price shall include protection of existing trees and vegetation, installation of high visibility construction fence, tree removal and tree trimming under the supervision of a Connecticut Licensed Arborist, clearing and grubbing within the limits of the work, stump grinding, removal and disposal of trees, roots, stumps, brush, concrete steps, and other objects, leveling of areas to accommodate the work, and all labor, materials, tools, and equipment necessary thereto.

(Rev. 10/01/12)

ITEM # 0202000A EARTH EXCAVATION

ITEM # 0202513A REMOVAL OF CONCRETE SIDEWALK

General: This item shall conform to Section 2.02 ROADWAY EXCAVATION, FORMATION OF EMBANKMENT AND DISPOSAL OF SURPLUS MATERIAL, of the Form 816 amended as follows:

Replace Part 3 of Section 2.02.03 Construction Methods with the following:

3. Topsoil and other organic material shall be excavated and disposed of by the contractor within the limits of grading for the project. The excavated material may not be used in the construction of embankments.

Section 2.02.05 Basis of Payment shall be amended as follows:

Basis of Payment:

Earth Excavation within the limits of full depth road construction and other areas of designated removal of existing bituminous pavement as shown on the plans shall be paid for at the contract unit price per cubic yard as listed in the bid proposal. The contract price for earth excavation shall include all labor equipment, materials, transportation, fuel, disposal, etc., for excavation of earth, on site relocation of earth products and transportation and/or disposal of surplus earth materials. All surplus earth materials, including topsoil, shall be hauled off-site by the contractor and shall become property of the contractor. There shall be no separate payment for transportation or disposal of any surplus materials.

Removal and disposal of existing drainage structures shall be paid for at the contract unit price as listed in the bid proposal for "Remove Existing Drainage Structure" as described elsewhere in these specifications.

Removal and disposal of existing concrete sidewalk slabs shall be paid for at the contract unit price per square yard for the item "Removal of Concrete Sidewalk." Sawcutting of concrete sidewalks shall not be measured for payment, but rather included in the contract unit price per square yard for "Removal of Concrete Sidewalk".

Other earth excavation necessary for sidewalk and driveway construction will not be measured for payment, but rather included in the unit cost for sidewalk or driveway construction as described elsewhere in these specifications.

ITEM # 0202100A ROCK EXCAVATION AND DISPOSAL

General: The Contractor shall excavate rock (as defined below), if encountered, to the lines and grades indicated on the drawings or as directed, shall dispose of the excavated material, and shall furnish acceptable material for backfill in place of the excavated rock.

In general, rock in pipe trenches shall be excavated so as to be not less than 6 inches from the pipe after it has been laid. Before the pipe is laid, the trench shall be backfilled to the correct subgrade with thoroughly compacted, suitable material or, when so specified or indicated on the drawings, with the same material as that required for bedding the pipe, furnished and placed at the expense of the Contractor.

Definition of Rock: The work "rock", whenever used as the name of an excavated material or material to be excavated, shall mean only boulders and pieces of concrete or masonry exceeding one-half (½) cubic yard in volume, or solid ledge 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 that 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 filings or elsewhere, and no rock exterior to the maximum limits of measurement allowed that may fall into the excavation will be measured or allowed as "rock".

Construction Methods:

Excess Rock Excavation: If rock is excavated beyond the limits of payment indicated on the drawings, specified, or authorized in writing by the Engineer, the excess excavation, whether resulting from overbreakage or other causes, shall be backfilled by and at the expense of the Contractor as specified before in this Section.

In pipe trenches, excess excavation below the elevation of the top of the bedding cradle or envelope shall be filled with material of the same type, placed and compacted in the same manner as specified for the bedding, cradle, or envelope.

In excavations for structures, excess excavation in the rock beneath foundations shall be filled with concrete which shall be Class A or Class C, at the option of the Contractor. Other excess excavation shall be filled with earth as specified in Item #0205001A Special Provision in the section entitled "Backfilling Around Structures".

Blasting: If explosives are used, all requirements for transportation, use and storage of Local, State, and Federal laws and regulations must be complied with and all necessary permits and licenses obtained by the Contractor at his expense. Permits and licenses must be shown to the Engineer upon request. Permits are issued through the Town of Glastonbury Fire Marshalls Office, and may require a pre / post blast survey.

Explosives must be carefully transported, stored, handled, and used. The Contractor will keep on the job only such quantities of explosives as may be needed for the work underway and only during such time as they are being used. Explosives shall be stored in a secure manner in locked containers and separate from all tools. Caps and detonators shall be stored separately from other explosives. When the need for explosives is ended, all such material remaining on the job shall be promptly removed from the premises. Care must be taken that no explosives, caps, or detonators are stolen or get into the hands of unauthorized persons, or left unguarded where they may cause accidents.

Explosives shall be of such power and placed and used in such quantities as will not make the excavation unduly large or shatter unnecessarily the rock upon or against which the main or structure is to be built, or injure adjacent persons or property, those portions of the new work or structure as may already be in place,

or other adjacent pipes, ducts, or other structures. The quantity of explosives fired at one blast must be small enough and the tie for blasting selected to avoid undue annoyance to persons owning or occupying the premises near the work.

The rock must be completely matted when blasts are fired to prevent damage or injury to persons or property or the scattering of broken fragments on the adjacent ground. Adequate warning shall be given to all persons in the vicinity before any blast is discharged.

When blasting is required, the operation shall be conducted with such care as not to cause damage to any of the existing underground utilities. Should such occur, the cost of repairs shall be the sole responsibility of the Contractor.

The Contractor shall notify each public utility or others having structures in proximity to the site, and others who may be affected, of his intention to use explosives. Said notice shall be given in accordance with the applicable regulations therefore, and sufficiently in advance to enable the involved agencies/companies/persons and the Contractor to take such steps as may be necessary to protect life and property. Such notice shall not, in any way, relieve the Contractor of responsibility for any damage resulting from his blasting operations.

When in sufficiently close proximity to existing gas, water, sanitary, storm, or other utilities and structures, and all services connected thereto, the Contractor shall remove the rock by methods other than blasting, if necessary, in order to protect said utilities and their services from damage. Approved methods other than blasting are barring and wedging, jackhammer, drilling, rock jacks, or other such hand or machinery methods that will not damage the adjacent utility.

No explosives shall be brought into, stored, or used on the site of any job by the Contractor unless and until he shall have furnished the Engineer with a satisfactory Certificate of Insurance showing that the risks arising from the presence of and use of explosives, and from blasting, are included within the insurance provided by the Contractor to secure his obligations to the Town. Insurance should also cover damage to underground utilities or other underground facilities.

When blasting for trench excavation, each shot sequence shall begin sufficiently ahead of completed work to prevent damage to the completed work, which must be properly protected prior to each shot.

The provisions herein shall apply where soil formation resembles rock, whether in trench, structure, or general excavation, even if it is of such nature that it is not classified and paid for as rock excavation and, if so ordered by the Engineer, will apply to openings cut through masonry, nested boulders, or other materials not herein classified as rock.

Blasting Records: An accurate blasting log must be maintained continuously for the duration of the Contract. The log shall record, for each shot, the location, amount of holes, depth, spacing, exact date and time of the blast, amount of explosives per hole, and the number of caps used. In addition, a sketch showing displacement of direct and delay caps for each shot shall be recorded.

Test Blasting and Monitoring Program: The Contractor shall employ an acceptable, independent vibration/blasting consultant to conduct test blasting prior to production blasting to devise suitable blasting procedures for production blasting, and to monitor production blasting. The vibration/blasting consultant shall be a Registered Professional Engineer in the State of Connecticut and shall have a minimum of ten years experience as a vibration/blasting consultant. The Contractor shall submit the name of the vibration/blasting consultant to the Engineer prior to starting the work.

The purpose of the test blasting is to develop control procedures for production blasting so that no disturbance or damage shall be done to utilities, equipment, buildings, structures, groundwater wells, or the aquifer.

Based on the results of the test blasting, the vibration/blasting consultant shall develop a suitable blasting program and distance-quantity of explosive tables of the production blasting. The blasting program and the distance-quantity tables shall be submitted to the Engineer 21 days prior to the commencement of production blasting. All production blasting operations shall be in accordance with the blasting program.

The vibration/blasting consultant shall also perform continuous monitoring of all initial blasting operations and intermittent monitoring of subsequent blasting, as deemed necessary by the vibration/blasting consultant. Blasts shall be monitored with a minimum of two 3-component seismometers that record the entire particle velocity wave train and not just peak velocities. Accurate, legible seismometer records of all monitored blasts shall be obtained, and one copy of all blast records shall be submitted to the Engineer within seven days after blasting.

Wells: The Contractor's attention is directed to the existence of active groundwater supply wells near the area of construction. The Contractor shall locate all wells within or near the project area that could be affected by his operations.

The Contractor shall conduct his operations so that no disturbance or damage shall be done to the groundwater supply wells or to the aquifer from which they draw water. The aquifer is herein defined as underlying soil and rock formations within a distance of 1,500 feet from the wells and the groundwater within those formations.

The Contractor shall be fully responsible for determining the methods and controls necessary so that his construction operations do not disturb groundwater wells or the aquifer, and do not change the quality or quantity of water reaching the well.

If evidence of a change in well water quality or well yield, or disturbance or damage to any utility, equipment, building, or structure is observed or reported to the Contractor, he shall immediately notify the Engineer and all blasting operations shall be discontinued and the Contractor's vibration/blasting consultant shall recommend revised blasting procedures. The Contractor shall initiate the revised procedures, once approved by the Engineer, before blasting is continued.

The Contractor shall furnish potable water to any home where the well is disrupted or the water is declared unfit for human consumption. The water shall be supplied in such quantity as necessary to allow the homeowner to function on a normal day-to-day basis without any significant inconvenience or expense. The water shall be delivered as frequently as necessary to assure its freshness. The Contractor shall continue to furnish water until the problem is resolved.

The Contractor shall be fully responsible for the restoration or replacement of all water supply wells, utilities, equipment, buildings, or structures damaged by his operations at no cost to the Town.

Shattered Rock: If the rock below normal depth is shattered due to drilling or blasting operations of the Contractor and the Engineer considers such shattered rock to be unfit for foundations, the shattered rock shall be removed and the excavation shall be backfilled with concrete as required, except that in pipe trenches, screened gravel may be used for backfill, if approved. All such removal and backfilling shall be done by and at the expense of the Contractor.

Preparation of Rock Surfaces: Whenever so directed during the progress of the work, the Contractor shall remove all dirt and loose rock from designated areas and shall clean the surface of the rock thoroughly using steam to melt snow and ice, if necessary. Water in depressions shall then be removed, as required, so that the whole surface of the designated area can be inspected to determine whether seams or other defects exist.

The surfaces of rock foundations shall be left sufficiently rough to bond well with the masonry and embankments to be built thereon and, if required, shall be cut to rough benches or steps.

Before any masonry or embankment is built on or against the rock, the rock shall be scrupulously freed from all vegetation, fragments, ice, snow, and other objectionable substances. Picking, barring, wedging, streams of water under sufficient pressure, stiff brushes, hammers, steam jets, and other effective means shall be used to accomplish this cleaning. All free water left on the surface of the rock shall be removed.

Removal of Boulders: Piles of boulders or loose rock encountered within the limits of earth embankments shall be removed to a suitable place of disposal.

Disposal of Excavated Rock: Excavated rock may be used in backfilling trenches subject to the following limitations:

Pieces of rock larger than permitted under the section entitled "Backfilling Pipe Trenches" shall not be used for this purpose.

The quantity of rock used as backfill in any location shall not be so great as to result in the formation of voids.

Rock backfill shall not be placed within 18 inches of the surface of the finished grade.

Surplus excavated rock shall be disposed of as specified for surplus excavated earth.

Backfilling Rock Excavations: Where the rock has been excavated and the excavation is to be backfilled, the backfilling above normal depth shall be done as specified. If material suitable for backfilling is not available in sufficient quantity from other excavations, the Contractor shall, at his own expense, furnish suitable material from outside sources.

Compaction of Backfill Material: Consolidation of backfill material in a trench where rock has been blasted shall be obtained through the use of a water-jetting method, or as approved by the Engineer.

Measurement and Payment: Where rock (as defined in this Section) is encountered, it shall be stripped of the overlying material and the Engineer will measure the same. All rock excavated before the Engineer shall have examined it shall be estimated by the Engineer based on obvious evidence of rock.

This work shall be paid for at the contract unit price for "Rock Excavation" as listed in the bid proposal. The quantity of rock excavation to be paid for shall be the number of cubic yards of rock in place, as if measured before excavation, that would have been removed if the excavation had been made everywhere exactly to the lines of payment shown in the table entitled "Maximum Trench Widths for Various Pipe Sizes" as described in the Special Provision for Earth Trench Excavation.

At manholes, catch basins, or other structures, rock excavation will be paid for on lines 12 inches beyond the outermost dimension of the structure.

ITEM # 0202451A **TEST PIT EXCAVATION**

Description: Excavate and backfill a designated area to determine the exact location of utility facilities which are near a proposed foundation.

Materials:

Compacted Granular Fill: Article M.02.02
Bituminous Concrete Materials: Article M.04

Construction Methods:

Keep affected utility owner apprised of proposed test pit excavation.

Excavate only as authorized and as directed by the Engineer. The size, depth and location will be as authorized by the Engineer.

If rock greater than 0.5 c.y. is encountered, the Engineer will determine if it must be removed and the method. Do not use explosives. See the pertinent construction methods of Section 2.02.03. When concrete must be removed, reinforced or not, it shall be considered, measured, and paid for as rock in foundation excavation.

If unsuitable backfill material is excavated, dispose as directed by the Engineer. Replace with suitable backfill and compact in accordance with Section 2.14.

Repair all damaged bituminous pavement in accordance with Section 4.06.03. Sawcut the edges to neat lines if there will be no subsequent excavation at the test pit for a foundation.

Method of Measurement:

Test pit excavation will be measured at the contract unit price per cubic yard for the material actually removed from within the limits specified as directed by the engineer.

When necessary, rock in foundation excavation will be measured at the contract price per vertical foot (vertical meter) for the rock actually removed in accordance with Article 10.02.04.

Basis of Payment:

This work will be paid for at the contract unit price per cubic yard for "Test Pit Excavation", which price shall include excavation, unsuitable material disposal, compacted backfill, bituminous pavement, sawcut, pavement repair, all utility costs, all equipment, tools, labor and work incidental thereto. The volume excludes the volume of material that is measured as Rock In Foundation Excavation.

ITEM # 0205001A EARTH TRENCH EXCAVATION

General: The Contractor shall make excavations of normal depth in earth for trenches and structures; shall backfill such excavations to the extent necessary; shall furnish the necessary material and construct embankments and fills; and shall make miscellaneous earth excavations and do miscellaneous grading. All such work shall be done as indicated on the drawings and as herein specified.

The program of excavation, dewatering, sheeting and bracing shall be carried out in such manner as to eliminate all possibility of undermining or disturbing the foundations of existing structures or of work previously completed under this contract.

Excavation in general shall be in open trenches. Tunneling shall be done only to pass under obstructions such as pipes or duct or only as indicated on contract drawings, or in Special Provisions, or on written permission of the Engineer, and then only in accordance with those sections hereof which describe tunnel excavation, and subject to such further conditions as may have been described by drawings, Special Provisions, or as the Engineer may specify.

The Contractor shall make excavations in such manner and to such widths as will give suitable room for building the structures or laying and jointing the piping; shall furnish and place all sheeting, bracing, and supports; shall do all coffer damming, pumping and draining; and shall render the bottom of the excavations firm and dry and acceptable in all respects.

Construction Methods:

Trench Excavation: Where pipe is to be laid in gravel bedding or concrete cradle, the trench may be excavated by machinery to or to just below, the designated subgrade, provided that the material remaining at the bottom of the trench is no more than slightly disturbed.

Where pipe is to be laid directly on the trench bottom, the lower part of trenches in earth shall not be excavated to subgrade by machinery, but, just before the pipe is to be placed, the last of the material to be excavated shall be removed by means of hand tools to form a flat or shaped bottom, true to grade, so that the pipe will have a uniform and continuous bearing and support on firm and undisturbed material between joints except for limited areas where the use of pipe slings may have disturbed the bottom.

Depth of Trench: Trenches shall be excavated to such depths as will permit the pipe to be laid at the elevations, slopes or depths of cover indicated on the drawings, and at uniform slopes between indicated elevations.

Width of Trench: The methods and equipment used for excavation must be adapted to the conditions at the site and the dimensions of the required trench. The width of ground or street surfaces cut or disturbed shall, in general, be kept as small as practicable to accommodate the work and shall not be widened by scraping or loosening materials from the sides. Every effort shall be made to keep the sides of the trenches firm and undisturbed until backfilling has been completed and consolidated.

Width of pipe trenches shall be wide enough to provide sufficient space for shoring, for foundations, for drainage, for laying, jointing, inspecting, and backfilling of sides of pipe, or for building the required structures, and as near as feasible to the above described minimums, in order to reduce the load of backfill upon the top of the sewer; to provide lateral support for the fill and haunching on the sides of the pipe, and to insure that the pipe will not be pushed out of line while placing backfill.

For surface restoration work related to trench excavation, the limits of payment by the Town varies with the diameter of the pipe (see table 403-1). Where the Contractor chooses not to use trench supports, the Contractor will still be paid for related surface restoration work as per the maximum trench widths or actual trench width, whichever is the least.

Excavation for Special Foundations: Where concrete, stone or underdrain is required or ordered, excavation shall be carried down to the depth and lines required for such foundation or underdrain. If required by contract drawings or Special Provisions as part of the structure and included in the price, no additional payment for this additional excavation, as excavation, will be made. If the foundation is paid by the cubic yard or other specific item of proposal, such price for foundation shall include excavation therefore. Excavation for underdrain is included in price for underdrain.

Where the plans, Proposal or Special Provisions indicate certain foundations, they will be constructed and paid for as indicated.

Where the soil in subgrade is found to be soft, loose or freshly-filled earth, or unstable or unsuitable as a base for the proposed sewer or structure, the Engineer may, in his discretion, order it excavated to such depth and width as he may deem proper and replaced with gravel, crushed stone, concrete, plank or similar materials as he may direct.

If the excavation for foundation is made wider or deeper than required or ordered, or if excavation for concrete on sides of pipe is made wider than required or ordered, then no additional payment for the additional quantities of excavation or for additional foundation or side filling materials will be made, if being assumed that the added space was excavated for the convenience of, or by error of, the contractor.

Length of Trench and Space Occupied: Trenches must be constructed with a minimum of inconvenience and danger to the public and all other parties. To that end, the length of trench opened at any time, from point where ground is being broken to completed backfill and temporary surfacing, and also the amount of space in streets or public and private lands occupied by trench soil banks, equipment and supplies, shall not exceed the space or spaces considered reasonably necessary and expedient by the Engineer. In determining the length of open trench, the space for equipment, materials, supplies, etc. needed, the Engineer will consider the nature of the street or land where work is being done, depth and width of trench, types and methods of construction and equipment being used, inconvenience to the public or to private parties, possible dangers, limits or rights-of-way and other proper matters.

The Contractor must keep streets and premises near the work free from unnecessary obstructions, debris, etc. The Engineer may, at any time order all equipment, materials, surplus from excavations, debris, etc., lying outside reasonable limits of space, promptly removed; and should the Contractor fail to remove such materials within three days after notice to remove same, the Engineer may cause any part or all of such materials to be removed by such persons as he may employ, at the Contractor's expense, and may deduct the costs thereof from payment which may be or may become due to the contractor under this Contract. In any cases when public safety urgently demands it, the Engineer may cause such materials to be removed without prior notice.

Trenches shall be excavated with approximately vertical sides between the elevation of the center of the pipe and an elevation one foot above the top of the pipe.

Dimensions of Trenches: Trenches shall be excavated to the lines indicated on contract drawings or as described for any particular structure by any contract document. In general, room shall be allowed for installing the pipe or other structure, for making and inspecting joints in pipe, for placing and compacting fill around and on both sides of pipe, for draining and pumping as needed, for removal of unsuitable materials, and for any other purpose incidental to the fulfillment of the Contract and these specifications.

Care must be taken to excavate to correct line, grade and width at all points.

In general, sides of trenches must be not less than four inches from outside of barrel of all pipe eight inches or less in size, six inches from outside of barrel of pipe ten inches or larger in size, or as shown by contract drawings. Except as otherwise provided, excavation shall conform closely to the form and grade of the bottom of the pipe or foundation required. To accomplish this, the Engineer may require that no earth shall be excavated by machinery nearer than six inches to the finished subgrade, and the last six inches of excavation in earth shall be carefully removed by hand labor to the exact lines and grade required, immediately prior to laying pipe or underdrain or building bottom of structure.

Maximum trench width for various pipe sizes are described below. Where the Contractor chooses not to use trench supports the Contractor will still be paid for any restoration work specified elsewhere in the contract as per maximum trench widths described below.

TABLE 403-1
MAXIMUM TRENCH WIDTHS FOR VARIOUS PIPE SIZES

Size Pipe Nominal Inside Diameter	Maximum Width of Trench
6"	2.5 Feet
8"	4.0 Feet
10"	4.0 Feet
12"	4.0 Feet
15"	4.0 Feet
18"	4.0 Feet
21"	4.3 Feet
24"	4.5 Feet
27"	4.8 Feet
30"	5.1 Feet
33"	5.4 Feet
36"	5.7 Feet
39"	5.9 Feet
42"	6.3 Feet

Extent of Open Excavation: The extent of excavation open at any one time will be controlled by the conditions, but shall always be confined to the limits prescribed by the Engineer. At no time shall the extend of the open excavation go beyond two structures.

Trench Excavation in Fill: If pipe is to be laid in embankments or other recently filled material, the material shall first be placed to the top of the fill or to a height of at least one foot above the top of the pipe, whichever is the lesser. Particular care shall be taken to ensure maximum consolidation of material under the pipe location. The pipe trench shall be excavated as though in undisturbed material.

Unauthorized Excavation: If the bottom of any excavation is taken out beyond the limits indicated or prescribed, the resulting void shall be backfilled at the Contractor's expense with ¾" crushed stone if the excavation was for a pipeline not having a concrete cradle or encasement, or with Class C concrete if the excavation was for a masonry structure.

Cutting of Pavement: When the trench lies within a paved area, the trench shall be cut with an approved tool. All cuts shall be made to straight lines and shall be parallel and/or perpendicular to the center line of the trench.

Bridging Trenches: The Contractor shall, at no cost, provide suitable and safe bridges and other crossings where required for the accommodation of travel, and to provide access to private property during construction, and shall remove said structures thereafter.

Obstacles: Some obstructions, obstacles, or difficulties in the path of the work anticipated, or in the performance of the work, may have been indicated by drawings, Special Provisions, or in other contract documents. The omission of any indication or mention of any obstruction, obstacle or difficulty which a reasonable and careful contractor, bidder, or estimator might have anticipated, or any question as to adequacy of such indication as given, shall not entitle the Contractor to any extra or additional compensation for any loss or expense occasioned directly or indirectly by such obstruction, etc., not to any extension of time or waiver of any requirement of the Contract and Specifications. The Contractor shall be understood to have entered into the Contract with full knowledge that in any work involving excavation, operation in public highways or adjacent to other developments, some unforeseen obstacle, difficulties, unforeseen soil or ground water conditions, etc., may be encountered, and that the Contractor has included in the bid and contract obligations the assumptions of the risks and cost to which such obstacles, etc. may subject the bid.

The Town will make arrangements for clearance or avoidance of permanent obstruction by pipes and structures of public utilities and of public bodies, except as otherwise indicated on drawings or contract documents, where such obstruction is found in the space to be occupied by the pipe or structure to be built under the Contract. The Town will not assume the cost of temporary removal, support, protection, etc. of pipes, poles, and other structures which do not occupy the space to be occupied by the pipe or structure to be built for the Town, where removal, support, protection, etc. of such pipes, poles or structures is desired for the convenience of, or to save expense to, or to accommodate the equipment of the Contractor.

Ends of Certain Pipes to be Sealed: If any pipe, drain, culvert, connection or similar conduit is encountered and cut off or cut through incidental to the construction of the work, and if the said drain, etc. is not to continue to function or be used, the open end or ends of such pipes shall be securely and tightly closed by an adequate cover or bulkhead as directed by the Engineer. Except as a specific price for such closings was fixed in the Proposal, the cost of such covers, bulkheads, and the setting of them shall have been included in the price of prices bid for various other portions of the work in the Proposal and no additional payment will be made therefore.

In removing existing pipes or other structures, the Contractor shall use care to avoid damage to materials, and the Engineer shall include for payment only those new materials which are necessary to replace those unavoidably damaged.

The structures to which the provisions of the preceding three paragraphs shall apply include pipes, wires, and other structures which (a) are not indicated on the drawings or otherwise provided for, (b) encroach upon or are encountered near the substantially parallel to the edge of the excavation, and (c) in the opinion of the Engineer will impede progress to such an extent that satisfactory construction cannot proceed until they have been changed in location, removed (to be later restored), or replaced.

When fences interfere with the Contractor's operations, the Contractor shall remove and (unless otherwise specified) later restore them to at least as good condition as that in which they were found immediately before the work was begun, all without additional compensation. The restoration of fences shall be done as promptly as possible and not left until the end of the construction period.

Excavation Near Existing Structures: Attention is directed to the fact that there are pipes, drains, and other utilities in certain locations. Some of these have been indicated on the drawings, but no attempt has been made to show all of the services, and the completeness or accuracy of the information given is not guaranteed.

As the excavation approaches pipes, conduits, or other underground structures, digging by machinery shall be discontinued and the excavation shall be done by means of hand tools, as directed. Such manual

excavation, when incidental to normal excavation, shall be included in the work to be done under items involving normal excavation.

Where determination of the exact location of a pipe or other underground structure is necessary for doing the work properly, the Contractor may be required to excavate test pits to determine such locations. When such test pits may be properly considered as incidental to other excavation, the Contractor shall receive no additional compensation, the work being understood to be included as a part of the excavation. When the Engineer orders test pits beyond the limits of excavation considered as part of the work, such test pits shall be paid for as specified under Item #0202451A Special Provision.

Protection of Existing Structures: All existing pipes, poles, wires, fences, curbing, property-line markers, and other structures which the Engineer decides must be preserved in place without being temporarily or permanently relocated shall be carefully supported and protected from injury by the Contractor. Should such items be injured, they shall be restored by the Contractor, without compensation therefore, to at least as good condition as that in which they were found immediately before the work was begun.

Relocation and Replacement of Existing Structures: Whenever the Contractor encounters certain existing structures as described below and is so ordered in writing, the Contractor shall do the whole or such portions of the work as he may be directed, to change the location of, remove and later restore, replace such structures, or to assist the owner thereof in so doing. For all such work, the Contractor shall be paid under such items of work as may be applicable, otherwise as Extra Work.

Backfilling and Consolidation: In general, and unless other material is indicated on the drawings or specified, material used for backfilling trenches and excavations around structures shall be suitable material which was removed in the course of making the construction excavations.

Frozen materials shall not be placed in the backfill nor shall backfill be placed upon frozen material. Previously frozen material shall be removed, or shall be otherwise treated as required before new backfill is placed.

Backfilling around Structures: The Contractor shall not place backfill against or on structures until they have attained sufficient strength to support the loads (including construction loads) to which they will be subjected without distortion, cracking, or other damage. As soon as practical after the structures are structurally adequate and other necessary work has been done, special leakage tests, if required, shall be made. Promptly after the completion of such tests, the backfilling shall be started and then shall proceed until its completion. The best of the excavated materials shall be used in backfilling within two feet of the structure. Unequal soil pressures shall be avoided by depositing the material evenly around the structure.

Backfilling Pipe Trenches: As soon as practicable after the pipes have been laid and the joints have acquired a suitable degree of hardness, if applicable, or the structures have been built and are structurally adequate to support the loads, including construction loads to which they will be subjected, the backfilling shall be started, and thereafter it shall proceed until its completion in accordance with pipe manufacturer recommendations.

With the exception mentioned below in this paragraph, trenches shall not be backfilled at pipe joints until after that section of the pipeline has successfully passed any specified tests required. Should the contractor wish to minimize the maintenance of lights and barricades and the obstruction of traffic, the contractor may, at his own risk, backfill the entire trench, omitting or including backfill at joints as soon as practicable after the joints have acquired a suitable degree of hardness, if applicable, and the related structures have acquired a suitable degree of strength. The contractor shall, however, be responsible for removing and later replacing such backfill at no cost should the contractor be ordered to do so in order to locate and repair or replace leaking or defective joints or pipe.

Materials: The nature of the materials will govern both their acceptability for backfill and the methods best suited for their placement and compaction in the backfill. The materials and methods shall both be subject to the approval and direction of the Engineer. No stone or rock fragment larger than 12 inches in greatest dimension shall be placed in the backfill nor shall large masses of backfill material be dropped into the trench in such a manner as to endanger the pipeline. If necessary, a timber grillage shall be used to break the fall of material dropped from a height of more than five feet. Pieces of bituminous pavement shall be excluded from the backfill unless their use is expressly permitted, in which case they shall be broken up as directed.

Ho Pac Trench Consolidation: Where the trench backfill is consolidated by the "Ho Pac" method and the depth of the trench from the road or ground surface to the top of the pipe exceeds ten feet, the trench backfill shall be placed and consolidated in two lifts of equal depth.

The approved backfill material shall be placed and compacted at a moisture content between four and eight percent (based on dry density, by weight), or with two percent of the optimum moisture content as determined by the moisture density relationship test specified in ASTM D 1557, at the option of the Engineer. Compaction shall be by a "Ho Pac" vibratory compactor or approved equal, operating at a frequency between ten and 40 Hertz, placed directly on the backfill surface, and applied with the maximum practical force applicable by the backhoe to which it is attached. Compaction effort shall be continued until no further visible settlement occurs.

Miscellaneous Requirements: Whatever method of compacting backfill is used, care shall be taken that stones and lumps shall not become nested and that all voids between stones shall be completely filled with fine material. Only approved quantities of stone and rock fragments shall be used in the backfill. The Contractor shall, as part of the work done under the items involving earth excavation and rock excavation as appropriate, furnish and place all other necessary backfill material.

All voids left by the removal of sheeting shall be completely backfilled with suitable materials, thoroughly compacted.

Where required, excavated material which is acceptable to the Engineer for surfacing or pavement sub base shall be placed at the top of the backfill to such depths as may be specified elsewhere or as directed. The surface shall be brought to the required grade and stones raked out and removed.

Embankments Over Pipe: Where the top of the pipe is less than three feet below the surface of the ground, additional fill shall be placed to form an embankment to cover and protect the pipe. The top of such embankment shall not be less than three feet above the top of the pipe and not less than one foot wider than the outside diameter of the pipe, with side slopes no steeper than one and one half horizontal to vertical, or of such section as may have been indicated by drawings. Such embankments shall be made of suitable dry earth, well compacted. Embankments must be maintained to the full required dimensions during the maintenance period of the Contract, and any settlement, washout, or deficiency occurring or found during that time shall be rectified and embankments brought up to the required height, width and slopes.

In general, such embankments may be made with materials excavated on the job and not used for backfill elsewhere. Should there not be sufficient surplus material for embankments, or should it be unsuitable or inconveniently located, the Contractor shall secure and provide sufficient suitable material. In any case, where the Town has provided borrow pits from which the Contractor may obtain filling material, the Contractor must conform to the conditions for excavating and moving such material as established by acts of the Town in obtaining such rights, and by indications on drawings or in other contract documents.

Openings through embankments for the passage of water and other purposes will be provided as indicated on drawings or elsewhere, or as ordered.

Grass shall be seeded or turf placed on embankments if, where, and as provided in contract documents. In general, if grassing is not required, the Contractor may, at his option, grass embankments to facilitate his maintenance. The Engineer may order grassing where not otherwise required under the general provisions for additional work if he deems proper.

Care shall be taken that sewer and appurtenances are not damaged by equipment or methods used for making and maintaining embankments.

Except as specific provisions may have been made in the Proposal for a particular contract, no payment other than prices bid for pipe will be paid for building and maintaining embankments or securing material therefore.

If, however, a price per cubic yard was established by the Proposal for filling material placed in embankments and/or in fills at side of embankment to avoid the formation of depressions there, the quantity of such filling material will be estimated and paid as the actual quantity placed, up to, but not exceeding the lines or sections required, measured after the embankment or fill has been made.

Material for Filling and Embankments: Approved selected materials available from the excavations and not required for backfill around pipes or against structures may be used for filling and building embankments, except as otherwise specified. Material needed in addition to that available from construction operations shall be obtained from approved gravel banks or other approved deposits. The Contractor shall furnish, at no cost, all borrowed material needed on the work.

All material, whether from the excavations or from borrow, shall be of such nature that after it has been placed and properly compacted it will make a dense, stable fill. It shall not contain vegetation, masses of roots, individual roots more than 18 inches long or more than one half inch in diameter, stones over six inches in diameter, or porous matter. Organic matter shall not exceed minor quantities and shall be well distributed.

Preparation of Subgrade: The Contractor shall remove loam and topsoil, loose vegetable matter, stumps, large roots, etc. from areas upon which embankments will be built or material will be placed for grading. The subgrade shall be shaped as indicated on the drawings and shall be so prepared by forking, furrowing, or plowing so that the first layer of the new material placed thereon will be well bonded to it.

Placing and Compacting Material: After the subgrade has been prepared as hereinbefore specified, the material shall be placed thereon and built up in successive layers until it has reached the required elevation.

Layers shall not exceed 12 inches in thickness before compaction. In embankments at structures, the layers shall have a slight downward slope away from the structure. In other embankments, the layers shall be slightly dished toward the center. In general, the finer and less pervious materials shall be placed against the structures or in the center, and the coarser and more pervious materials, upon the outer parts of embankments.

Each layer of material shall be compacted by the use of approved rollers or other approved means so as to secure a dense, stable and thoroughly compacted mass. At such points as cannot be reached by mobile mechanical equipment, the materials shall be thoroughly compacted by the use of suitable power driven tampers.

Previously placed or new materials shall be moistened by sprinkling, if required, to ensure proper bond and compaction. No compacting shall be done when the material is too wet, from either rain or too great an application of water, to compact it properly. At such times, the work shall be suspended until the previously placed and new materials have dried out sufficiently to permit proper compaction.

Trench Dewatering: To ensure proper conditions at all time during construction, the Contractor shall provide and maintain ample means and devices (including spare units kept ready for immediate use in case of breakdown) with which to intercept and/or remove promptly and dispose properly of all water entering trenches and other excavations. Such excavations shall be kept dry until the structures, pipes, and appurtenances to be built therein have been completed to such extent that they will not be floated or otherwise damaged.

All water pumped or drained from the work shall be disposed in a manner consistent with Section 1.10 Environmental Compliance of the Form 816, without undue interference with other work, damage to pavements, other surfaces, or property. Suitable temporary pipes, flumes, or channels shall be provided for water that may flow along or across the site of the work.

Temporary Underdrains: Temporary Underdrains, if used, shall be laid in trenches beneath the grade of the structure. Trenches shall be of suitable dimensions to provide room for the chosen size of underdrain and its surrounding gravel. Underdrain pipe shall be acceptable PVC or ADS pipe of standard thickness. Sewer pipe of the quality known as "seconds" will be acceptable.

Underdrains, if used, shall be laid at an approved distance below the bottom of the normal excavation wrapped in goetextile fabric (separation, medium survivability as per Qualified Products List for Connecticut Department of Transportation Projects, latest edition) and entirely surrounded by graded gravel or crushed stone to prevent the admission of sand or other soil into the underdrains. The distance between the top of the bell of the underdrain pipe shall be at least three (3) inches unless otherwise permitted. The space between the underdrain and the pipe or structure shall be filled and crushed stone which shall be rammed, if necessary, and left with a surface suitable for laying the pipe or building the structure.

Drainage Wellpoint System: If required, the Contractor shall dewater the excavations by means of an efficient drainage system which will drain the soil and prevent saturated soil from flowing into the excavation. The wellpoints shall be designed especially for this type of service. The pumping unit shall be designed for use with the wellpoints and shall be capable of maintaining a high vacuum and of handling large volumes of air and water at the same time.

If required, the installation of the wellpoints and pump shall be done under the supervision of a competent representative of the manufacturer. The Contractor shall do all special work such as surrounding the wellpoints with sand or gravel or other work which is necessary for the wellpoint system to operate for the successful dewatering of the excavations.

Payment: This item will not be paid for separately. Rather, payment for earth trench excavation, trench support (including sheeting, shoring or bracing as required by soil conditions), dewatering, backfilling, compacting, and disposal of surplus excavated material shall be included in the unit price or lump sum price of the item associated therewith.

ITEM # 0210017A STORMWATER INFILTRATION SYSTEM (SITE NO. 1)

ITEM # 0210018A STORMWATER INFILTRATION SYSTEM (SITE NO. 2)

General: Stormwater Infiltration Systems shall consist of a series of pre-cast concrete leaching galleries of the size and type shown on the plans, arranged in a linear fashion, surrounded by an envelope of 1.5-inch stone, and protected with an approved geotextile, as shown in the construction details. Each infiltration system shall also include a manhole riser, frame, and cover as shown on the construction drawings, and a length of 6" PVC pipe connected to the nearest catch basin.

Materials: Pre-cast concrete leaching galleries shall be designed in conformance with ASTM C913 and shall be designed to support HS-20 loading. Concrete shall have a 28 day compressive strength of 4,000 PSI. Deformed steel reinforcing shall conform to ASTM A615-68 (Grade 60)

6" PVC Pipe: Shall be schedule 40, suitable for drainage applications.

1.5-INCH STONE: Shall conform to ConnDOT Form 816, M.01.01 for No. 4 Stone.

GEOTEXTILE (SUBSURFACE DRAINAGE CLASS A): Shall be an approved product as listed in the "QUALIFIED PRODUCT LIST FOR CONNECTICUT DEPARTMENT OF TRANSPORTATION PROJECTS, Report No. CT-211-19-13-1" published by the Connecticut Department of Transportation.

MANHOLE FRAMES AND COVERS: Manhole frames and covers shall conform to Town of Glastonbury Standards, as published on the Town of Glastonbury Engineering Division website. The Contractor shall furnish all cast-iron manhole frames and covers conforming to the details shown on the drawings, or as herein specified. The castings shall be of good quality, strong, tough, even-grained cast iron, smooth, free from scale, lumps, blisters, sand holes, and defects of every nature which would render them unfit for the service for which they are intended.

Contact surfaces of covers and frames seats shall be machined to prevent rocking of covers.

All castings shall be thoroughly cleaned and subject to a careful hammer inspection.

Storm drainage manhole covers shall have the word "STORM" or "DRAIN" embossed in three-inch letters as shown on the standard details.

Castings shall be at least Class 25 Conforming to the ASTM Specification for gray Iron Castings, Designation A48 as amended to date.

Construction Methods: Trench excavation, support, dewatering, and backfill for infiltration systems shall be according to Item 0205001A EARTH TRENCH EXCAVATION of these specifications.

Excavation shall be made to the depths indicated on the plans as required for installation of the infiltration units and associated crushed stone bedding. Geotextile shall be placed at the bottom and sides of the trench as shown in the details, with sufficient material remaining to completely enclose the completed infiltration system. Crushed stone shall be placed to the depth indicated, forming a firm and level base suitable for installation of the precast concrete leaching galleries. Leaching galleries shall be carefully set to form a continuous linear infiltration system as shown in the plans and as directed by the Engineer. Crushed stone shall be placed along the sides of each leaching gallery to a level even with the top of the gallery. Remaining length of geotextile shall then be wrapped over the top of crushed stone and precast concrete to create a completely sealed envelope around the infiltration system, including a minimum of 18" overlap of

the geotextile. The infiltration system shall then be backfilled to grade using existing excavated material or other suitable backfill material approved by the Engineer.

Setting Manhole Frames and Covers: Manhole frames shall be set with the tops conforming accurately to the grade of the pavement or finished ground surface or as indicated on the drawings as directed. Frames shall be set concentric with the top of the masonry and in a full bed of mortar so that the space between the top of the manhole masonry and the bottom flange of the frame shall be completely filled and made watertight. A thick ring of mortar extending to the outer edge of the masonry shall be placed all around the bottom and over the top of the flange. The mortar shall be smoothly finished and have a slight slope to shed water away from the frame.

Manhole covers shall be left in place in the frames on completion of other work at the manholes. Manholes located off of the traveled roadway shall have their frames lagged to the manhole wall.

Method of Measurement: There will be no direct measurement for earth trench excavation in the installation of the infiltration systems, rather the cost of this work shall be included in the contract lump sum price for each infiltration system.

There will be no direct measurement of pre-cast concrete galleries, PVC pipe, 1.5-inch stone, geotextile, concrete brick / block, or manhole frames and covers, rather the cost of these items shall be included in the lump sum price for each infiltration system.

Basis of Payment: The work under these items shall be paid for at the contract lump sum price for each infiltration system, complete in place, shall include all materials, tools, equipment, and labor necessary to complete the excavation and installation of units in conformity with the plans, or as specified.

ITEM # 0210100A ANTI-TRACKING PAD

General: Work of this item shall generally consist of the installation and maintenance of a stone construction entrance as located and detailed on the contract drawings. Work shall include base preparation and excavation as necessary.

Materials:

Stone shall consist of No. 3. stone as per section Section M01.01 of the Form 816.

Geotextile Fabric (Separation, High Survivability) shall be an approved product as listed in the "QUALIFIED PRODUCT LIST FOR CONNECTICUT DEPARTMENT OF TRANSPORTATION PROJECTS, Report No. CT-211-19-13-1" published by the Connecticut Department of Transportation.

Measurement and Payment: The work under this item shall be paid at the contract lump sum price for the stone anti-tracking pad completed, and in place as per contract drawings. The unit price shall include all materials, equipment, labor, excavation, and tools incidental to the construction and maintenance of this item.

ITEM # 0212300A PROCESSED STONE BASE

This item shall conform to Section 3.04 PROCESSED AGGREGATE BASE, of the Form 816, amended as follows:

Materials: The material for this item shall conform to the requirements of Article M.05.01, except that coarse aggregate shall be broken stone, and fine aggregate shall be stone sand, screenings, or a combination thereof. Reclaimed miscellaneous aggregate shall not be used.

NOTE: Basis of payment for this item shall include fine grading prior to paving. No separate payment shall be provided for such work.

ITEM # 0219011A SEDIMENTATION CONTROL SACK

General: This work shall consist of furnishing, installing, maintaining, and removing a sedimentation control sack for control of sediment entering catch basins within the project area as directed by the Engineer or as shown on the contract drawings.

Materials: Sediment control sacks shall be Siltsack® as manufactured by SI® Geosolutions or approved equal, and shall be manufactured from a specially designed woven polypropylene geotextile.

The sediment control sack shall be manufactured to fit the opening of the catch basin or drop inlet to be protected. Sediment control sack shall have the following features: two dump straps attached at the bottom to facilitate emptying; lifting loops shall be included as an integral part of the system to be used to lift the sedimentation control sack from the basin; sediment control sack shall have a restraint cord approximately halfway up the sack to keep the sides away from the catch basin walls, this yellow cord is also a visual means of indicating when the sack should be emptied. Once the strap is covered with sediment, sediment control sack should be emptied, cleaned and placed back into the basin.

Construction Sequence: To install the sediment control sack in the catch basin, remove the grate and place the sack in the opening. Hold out approximately six inches of the sack outside the frame. This is the area of the lifting straps. Replace the grate to hold the sack in place.

When the restraint cord is no longer visible, the sediment control sack is full and should be emptied.

To remove the sediment control sack, take two pieces of 1" diameter rebar and place through the lifting loops on each side of the sack.

To empty the sediment control sack, place it where the contents will be collected. Place the rebar through the lift straps (connected to the bottom of the sack) and lift. This will turn the sedimentation control sack inside out and empty the contents. Clean out and rinse. Return the sedimentation control sack to its original shape and place back in the basin.

The sediment control sack is reusable. Once the construction cycle is complete, the sedimentation control sack shall be removed from the basin and cleaned. The sedimentation control sack shall then be provided to the Town for re-use.

Basis of Payment: Sediment control sacks shall be paid for as a unit for each sedimentation control sack provided and installed. Maintenance of the sediment control sacks and cleaning after completion of construction as described herein shall also to be included in this bid price.

ITEM # 0404101A BITUMINOUS CONCRETE PATCHING – PARTIAL DEPTH

General: The Contractor shall furnish all labor, materials, tools, and equipment necessary and shall construct partial depth pavement patches in areas as directed by the Engineer to replace pavement deteriorated sections of pavement base course or other paved areas that need to be patch after milling operations have been completed. Pavement shall match thickness of surrounding pavement after milling is completed, to a maximum of 4" thickness.

Prior to excavation in paved areas, the Contractor shall cut the surface of the existing pavement with a pneumatic cutter or its equal. The pavement shall be cut in as straight a line as possible on both sides of the proposed patch for the entire length of the job.

Materials:

All materials for Bituminous Concrete Patching shall be as per Section 4.06 Special Provisions included in this contract.

Construction Methods:

The following procedure shall be followed when making a partial depth pavement patch:

- a. The existing pavement base course shall be saw cut and removed.
- b. The patch area shall be fine graded and compacted with additional processed stone applied to the surface.
- c. The area immediately adjacent to the edges of the trench must be swept clean so that no loose sand, temporary patch, or other debris remains, and the exposed edges of the pavement cuts coated with a tack coat approved by the Engineer.
- d. Bituminous base course consisting of HMA 0.5" or HMA 1.0" as directed shall be placed and compacted to match the depth indicated.

All depth measurements shall be considered to be compacted depths. Bituminous material shall be compacted to 90% density.

The Contractor shall remove and acceptably dispose of all excavated material before proceeding with the remainder of the work.

Measurement and Payment: Partial Depth Pavement Patch will be measured and paid by the square yard complete in place to the depth as indicated within these specifications or as directed by the Engineer. This item shall include removal of pavement, excavation, fine grading, process stone, bituminous concrete, saw cutting, compaction, tack coat, and all other labor, equipment, and materials incidental thereto.

ITEM # 0406170 **HMA S1.0**

ITEM # 0406171 **HMA S0.5**

ITEM # 0406173 **HMA S0.25**

SECTION 4.06 - BITUMINOUS CONCRETE

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

4.06.01—Description

4.06.02—Materials

4.06.03—Construction Methods

4.06.04—Method of Measurement

4.06.05—Basis of Payment

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1. Materials Supply: The bituminous concrete mixture must be from one source of supply and originate from one Plant unless authorized by the Engineer. Bituminous Concrete plant QCP requirements are defined in Section M.04.

2. Recycled Materials: Reclaimed Asphalt Pavement (RAP), Crushed Recycled Container Glass (CRCG), Recycled Asphalt Shingles (RAS), or crumb rubber (CR) from recycled tires may be incorporated in bituminous concrete mixtures in accordance with Section M.04 and Project Specifications. CRCG and RAS shall not be used in the surface course.

4.06.03—Construction Methods:

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

Delivery tickets shall include the following information:

- a. State of Connecticut printed on ticket.
- b. Name of producer, identification of plant, and specific storage bin (silo) if used.
- c. Date and time of day.
- d. Mixture Designation; Mix type and level Curb mixtures for machine-placed curbing must state "curb mix only".
- e. If RAP is used, the plant printouts shall include the RAP dry weight, percentage and daily moisture content.
- f. If RAS is used, the plant printouts shall include the RAS dry weight and percentage daily moisture content.
- g. The delivery ticket for all mixes produced with Warm Mix Technology must indicate the additive name, and the injection rate (water or additive) incorporated at the HMA plant. The delivery ticket for all mixes produced with pre-blended WMA additive must indicate the name of the WMA Technology.
- h. Net weight of mixture loaded into truck (When RAP and/or RAS is used the moisture content shall be excluded from mixture net weight).
- i. Gross weight (Either equal to the net weight plus the tare weight or the loaded scale weight).
- j. Tare weight of truck – Daily scale weight.
- k. Project number, purchase order number, name of Contractor (if Contractor other than Producer).
- l. Truck number for specific identification of truck.

- m. Individual aggregate, Recycled Materials, and virgin asphalt high/target/low weights. For drum plants and silo loadings, the plant printouts shall be produced at 5 minute intervals maintained by the vendor for a period of three years after the completion of the project.
- n. For every mixture designation the running daily total delivered and sequential load number.

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

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

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

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

The State reserves the right to check the gross and tare weight of any delivery truck. A variation of 0.4 percent or less in the gross or tare weight shown on the delivery ticket and the certified scale weight shall be considered evidence that the weight shown on the delivery ticket is correct. If the gross or tare weight varies from that shown on the delivery ticket by more than 0.4 percent, the Engineer will recalculate the net weight. The Contractor shall take action to correct discrepancy to the satisfaction of the Engineer.

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

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

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

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

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

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

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

Pneumatic tire rollers shall be self-propelled and equipped with wide-tread compaction tires capable of exerting an average contact pressure from 60 to 90 pounds per square inch uniformly over the surface, adjusting ballast and tire inflation pressure as required. The Contractor shall furnish evidence regarding tire size; pressure and loading to confirm that the proper contact pressure is being developed and that the loading and contact pressure is uniform for all wheels.

Lighting: For paving operations, which will be performed during hours of darkness, the paving equipment shall be equipped with lighting fixtures as described below, or with approved lighting fixtures of equivalent light output characteristics. Lighting shall maximize the illumination on each task and minimize glare to passing traffic. The Contractor shall provide generators on rollers and pavers of the type, size, and wattage, to adequately furnish electric power to operate the specified lighting equipment. The lighting options and minimum number of fixtures are listed in Tables 4.06-1 and 4.06-2:

TABLE 4.06-1: Paver Lighting

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

TABLE 4.06-2: Roller Lighting

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

*All fixtures shall be mounted above the roller.

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

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

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

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

Material Transfer Vehicle (MTV): A MTV shall be used when placing a bituminous concrete surface course as indicated in the contract documents. A surface course is defined as the total thickness of the same bituminous concrete mix that extends up to and includes the final wearing surface whether it is placed in a single or multiple lifts, and regardless of any time delays between lifts.

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

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

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

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

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

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

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

Permanent Transitions: A permanent transition is defined as any transition that remains as a permanent part of the work. All permanent transitions, leading and trailing ends shall meet the following length requirements:

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

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

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

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

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

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

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

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

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

The Contractor shall inspect the newly placed pavement for defects in the mixture or placement before rolling is started. Any deviation from standard crown or section shall be immediately remedied by placing

additional mixture or removing surplus mixture. Such defects shall be corrected to the satisfaction of the Engineer.

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

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

- a) Thickness- Where the total thickness of the lift of mixture exceeds that shown on the plans beyond the tolerances shown in Table 4.06-3, the longitudinal limits of such variation including locations and intervals of the measurements will be documented by the Engineer for use in calculating an adjustment in accordance with Article 4.06.04.

TABLE 4.06-3: Thickness Tolerances

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

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

- b) Area- Where the width of the lift exceeds that shown on the plans by more than the specified thickness of each lift, the longitudinal limits of such variation including locations and intervals of the measurements will be documented by the Engineer for use in calculating the adjustment in Article 4.06.04.
- c) Delivered Weight of Mixture - When the delivery ticket shows that the truck exceeds the allowable gross weight for the vehicle type the quantity of tons representing the overweight amount will be documented by the Engineer for use in calculating an adjustment in accordance with Article 4.06.04.

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

Tack Coat Application: Immediately before application, the area to be tacked shall be cleaned by sweeping or by other means acceptable to the Engineer. A thin uniform coating of tack coat shall be applied to the pavement immediately before overlaying and be allowed sufficient time to break (set) prior to any paving equipment or haul vehicles driving on it. All surfaces in contact with the bituminous concrete that have been in place longer than 3 calendar days shall have an application of tack coat. The tack coat shall be applied by a non-gravity pressurized spray system that results in uniform overlapping coverage at an application rate of 0.03 to 0.05 gallons per square yard for a non-milled surface and an application rate of 0.05 to 0.07 gallons per square yard for a milled surface. For areas where both milled and un-milled surfaces occur, the tack coat shall be an application rate of 0.03 to 0.05 gallons per square yard. The Engineer must approve the equipment and the method of measurement prior to use. The material for tack coat shall not be heated in excess of 160°F and shall not be further diluted.

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

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

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

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

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

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

Surface Requirements: 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 ¼ inch from a Contractor-supplied 10 foot straightedge. For all other lifts of bituminous concrete, the tolerance shall be ⅜ inch. Such tolerance will apply to all paved areas.
- b) Uniformity- The paved surface of the mat and joints shall not exhibit segregation, rutting, cracking, disintegration, flushing or vary in composition as determined by the Engineer.

7. Longitudinal Joint Construction Methods: The Contractor shall use Method I- Notched Wedge Joint (see Figure 4.06-1) when constructing longitudinal joints where lift thicknesses are between 1½ and 3 inches, except for S1mixes. Method II Butt Joint (see Figure 4.06-2) shall be used for lifts less than 1½ inches or greater than 3 inches, and S1mixes. During placement of multiple lifts of bituminous concrete, the longitudinal joint shall be constructed in such a manner that it is located at least 6 inches from the joint in the lift immediately below. The joint in the final lift shall be at the centerline or at lane lines. Each longitudinal joint shall maintain a consistent offset from the centerline of the roadway along its entire length. The difference in elevation between the two faces of any completed longitudinal joint shall not exceed ¼ of an inch in any location.

Method I - Notched Wedge Joint:

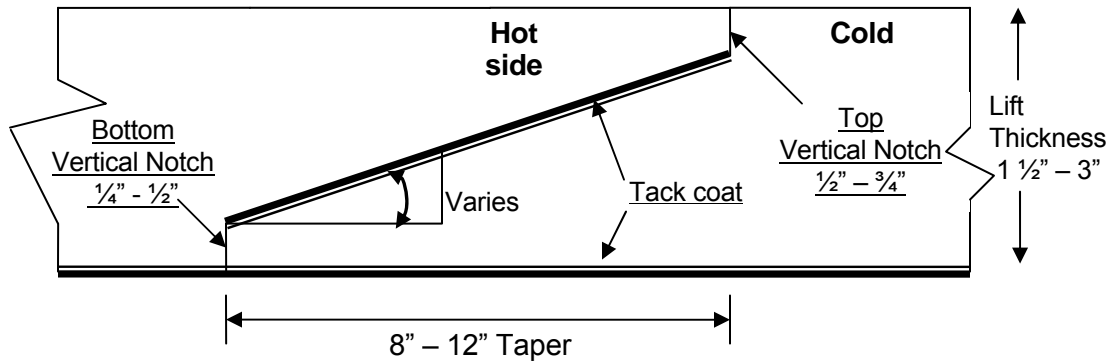


FIGURE 4.06-1: Notched Wedge Joint

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

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

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

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

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

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

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

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

Method II - Butt Joint:

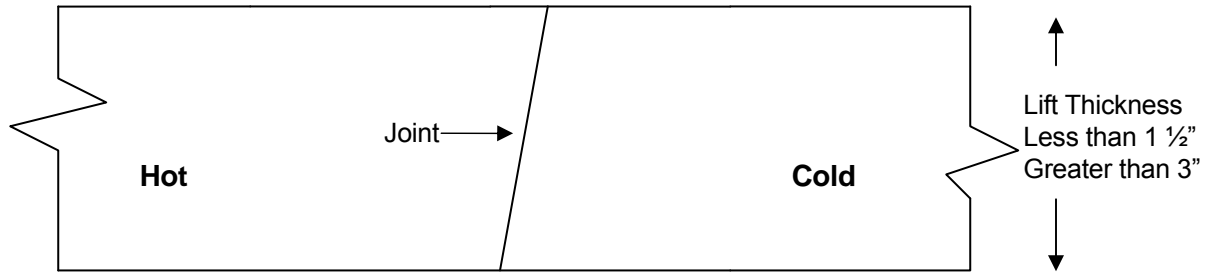


FIGURE 4.06-2: Butt Joint

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

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

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

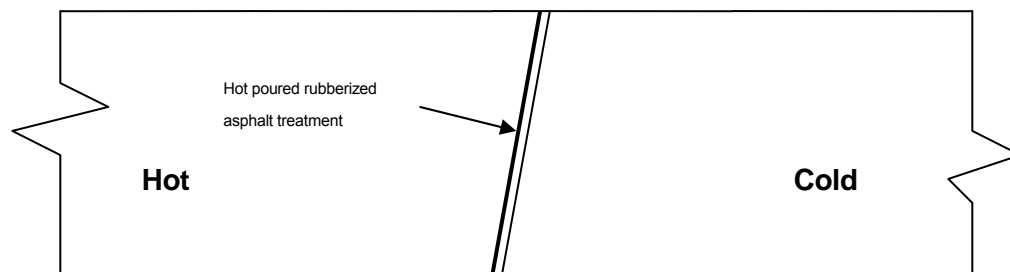


FIGURE 4.06-3: Butt Joint with Hot Poured Rubberized Asphalt Treatment

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

8. Contractor Quality Control (QC) Requirements:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

10. Density Testing of Bituminous Concrete Utilizing Core Samples: This procedure describes the frequency and the method the Contractor shall use to obtain pavement cores for acceptance from the project.

Coring shall be performed on each lift specified to a thickness of one and one-half (1 ½) inches or more. All material placed in a lift shall be compacted to the degree specified in Tables 4.06-9 and 4.06-10. The density of each core will be determined using the production lot's average maximum theoretical specific gravity (Gmm) established during the testing of the parent material at the plant. When there was no testing of the parent material or any Gmm exceeds the specified tolerances in the Department's current QA Program for Materials, the Engineer will determine the maximum theoretical density value to be used for density calculations. Bituminous concrete HMA S1 mixes are excluded from the longitudinal joint density requirements.

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

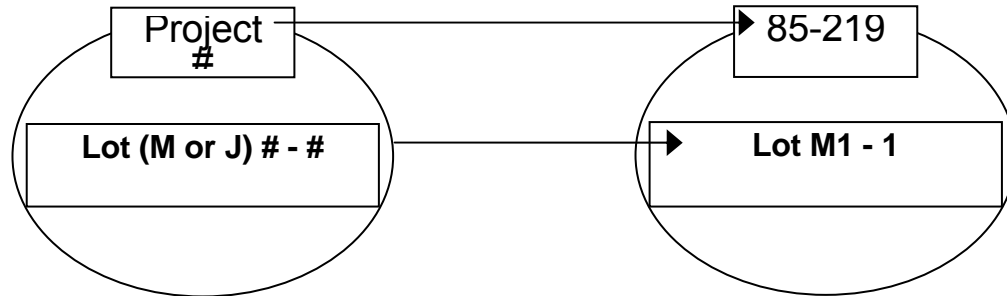


FIGURE 4.06-4: Labeling of Cores

Frequency of sampling is in accordance with the following tables:

TABLE 4.06-4: Testing Requirement for Bridge Density Lot

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

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

TABLE 4.06-5A: Testing requirement for Density Lots ≥ 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')	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

Notes:

⁽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.

⁽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.

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

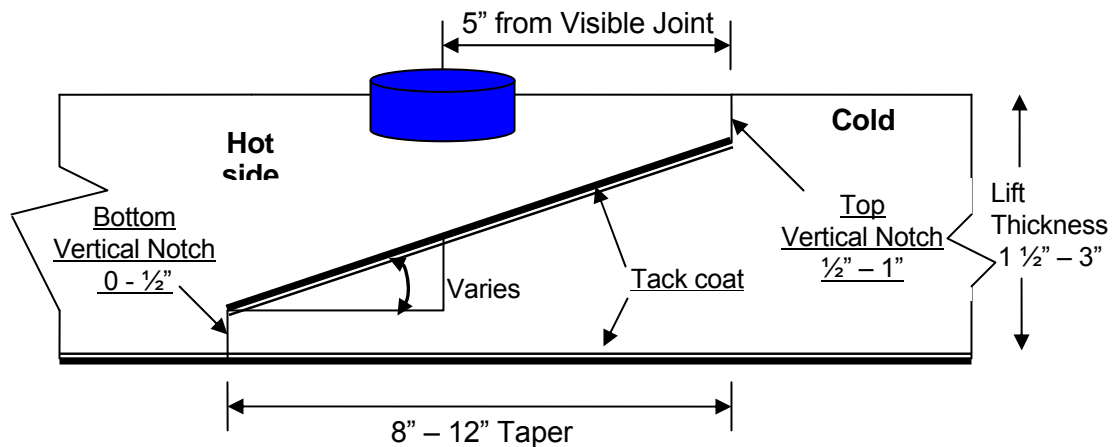


FIGURE 4.06-5: Notched Wedge Joint Cores

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

All cores must be cut within 5 calendar days of placement. Any core that is damaged or obviously defective while being obtained will be replaced with a new core from a location within 2 feet measured in a longitudinal direction.

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

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

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

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

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

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

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

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

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

- a) Propose a corrective procedure to the Engineer for review and approval prior to any corrective work commencing. The proposal shall include:
 - Limits of pavement to be replaced or corrected, indicating stationing or other landmarks that are readily distinguishable.
 - Proposed work schedule.
 - Construction method and sequence of operations.
 - Methods of maintenance and protection of traffic.
 - Material sources.
 - Names and telephone numbers of supervising personnel.
- b) Perform all corrective work in accordance with the Contract and the approved corrective procedure.

14. Protection of the Work: The Contractor shall protect all sections of the newly finished pavement from damage that may occur as a result of the Contractor's operations for the duration of the Project. Prior to the Engineer's authorization to open the pavement to traffic, the Contractor is responsible to protect the pavement from damage.

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

4.06.04—Method of Measurement:

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

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

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

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

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

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

Tons Adjusted for Area (T_A) = [(L x W_{adj})/9] x (t) x 0.0575 Tons/SY/inch = (-) Tons

Where: L = Length (ft)
(t) = Actual thickness (inches)
W_{adj} = (Designed width (ft) + tolerance /12) - Measured Width

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

Tons Adjusted for Thickness (T_T) = A x t_{adj} x 0.0575 = (-) Tons

Where: A = Area = {[L x (Designed width + tolerance (lift thickness)/12)] / 9}
t_{adj} = Adjusted thickness = [(Dt + tolerance) - Actual thickness]
Dt = Designed thickness (inches)

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

Tons Adjusted for Weight (T_w) = GVW – DGW= (-) Tons

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

- d) Mixture Adjustment: The quantity of bituminous concrete representing the production lot will be adjusted based on test results and values listed in Tables 4.06-6 and 4.06-7 , . The Department's Division of Material Testing will calculate the daily adjustment value for T_{SP}.

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

Tons Adjusted for Superpave Design (T_{SD}) = [(AdjAV_t + AdjPB_i) / 100] X Tons

Percent Adjustment for Air Voids = AdjAV_t = [AdjAV₁ + AdjAV₂ + AdjAV_i + ... + 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 4.06-6: Adjustment Values for Air Voids

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

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

Percent Adjustment for Liquid Binder = AdjPB_t = [(AdjPB₁ + AdjPB₂ + AdjPB_i + ... + AdjPB_n)] / n

Where: AdjPB_t = 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 4.06-7: Adjustment Values for Binder Content

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

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

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

Tons Adjusted for Density (T_D) = [(PA_M x .50) + (PA_J x .50)] / 100 X 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 tack coat based on the density at 60°F for the material furnished. The number of gallons furnished will be determined by weighing the material on scales furnished by and at the expense of the Contractor, or from the automated metering system on the delivery vehicle.

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

4.06.05—Basis of Payment:

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

- All costs associated with providing illumination of the work area are included in the general cost of the work.
- All costs associated with cleaning the surface to be paved, including mechanical sweeping, are included in the general cost of the work. All costs associated with constructing longitudinal joints are included in the general cost of the work.
- All costs associated with obtaining cores for acceptance testing and dispute resolution are included in the general cost of the work.

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

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

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

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

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

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

The Bituminous Concrete Adjustment Cost item if included in the bid proposal or estimate is not to be altered in any manner by the Contractor. If the Contractor should alter the amount shown, the altered figure will be disregarded and the original estimated cost will be used for the Contract.

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

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

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

GRISWOLD HOUSE HARRIS INTERSECTION IMPROVEMENTS
SPECIAL PROVISIONS

BID #GL-2015-21

<u>Pay Item*</u>	<u>Pay Unit*</u>	
HMA S 1.0	ton	
HMA S 0.5	ton	
HMA S0.25	ton	
Bituminous Concrete Adjustment Cost		est.
Material for Tack Coat		gal.

*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.

(Rev. 01/28/2015)

ITEM # 0406285A FINE MILLING OF HOT MIX ASPHALT (HMA) (0 TO 4 INCHES)

Description: This work shall consist of the milling, removal, and disposal of existing bituminous concrete pavement.

Materials: The existing bituminous concrete surface shall be disposed of offsite by the Contractor at an approved disposal facility unless otherwise stated in the Contract.

Construction Methods: The Contractor shall remove the bituminous concrete material using means acceptable to the Engineer. The pavement surface shall be removed to the line, grade, and existing or typical cross-section shown on the plans or directed by the Engineer.

Any milled surface, or portion thereof, that is exposed to traffic shall be paved within five (5) calendar days unless otherwise stated in the plans or Contract.

The equipment for milling the pavement surface shall be designed and built for milling bituminous concrete pavements. It shall be self propelled with sufficient power, traction, and stability to maintain depth and slope and shall be capable of removing the existing bituminous concrete pavement.

The milling machine shall be equipped with a built-in automatic grade averaging control system that can control the longitudinal profile and the transverse cross-slope to produce the specified results. The longitudinal controls shall be capable of operating from any longitudinal grade reference, including string line, contact ski (30 feet minimum), non-contact ski (20 feet minimum), or mobile string line (30 feet minimum). The transverse controls shall have an automatic system for controlling cross-slope at a given rate. The Engineer may waive the requirement for automatic grade or slope controls where the situation warrants such action.

The machine shall be able to provide a 0 to 4 inch deep cut in one pass. The rotary drum of the machine shall use carbide or diamond tip tools spaced not more than 5/16 inch apart. The forward speed of the milling machine shall be limited to no more than 45 feet/minute. The tools on the revolving cutting drum must be continually maintained and shall be replaced as warranted to provide a uniform pavement texture.

The machine shall be equipped with an integral pickup and conveying device to immediately remove material being milled from the surface of the roadway and discharge the millings into a truck, all in one operation. The machine shall also be equipped with a means of effectively limiting the amount of dust escaping from the milling and removal operation.

When milling smaller areas or areas where it is impractical to use the above described equipment, the use of a lesser equipped milling machine may be permitted when approved by the Engineer.

Protection shall be provided around existing catch basin inlets, manholes, utility valve boxes, and any similar structures. Any damage to such structures as a result of the milling operation is the Contractor's responsibility and shall be repaired at the Contractor's expense.

To prevent the infiltration of milled material into the storm drainage system, the Contractor shall take special care to prevent the milled material from falling into the inlet openings or inlet grates. Any milled material that has fallen into inlet openings or inlet grates shall be removed at the Contractor's expense.

Surface Tolerance: The milled surface shall provide a satisfactory riding surface with a uniform textured appearance. The milled surface shall be free from gouges, longitudinal grooves and ridges, oil film, and other imperfections that are a result of defective equipment, improper use of equipment, or poor workmanship. The Contractor, under the direction of the Inspector, shall perform random spot-checks with

a Contractor supplied ten-foot straightedge to verify surface tolerances at a minimum of five (5) locations per day. The variation of the top of two ridges from the testing edge of the straightedge, between any two ridge contact points, shall not exceed $\frac{1}{4}$ inch. The variation of the top of any ridge to the bottom of the groove adjacent to that ridge shall not exceed $\frac{1}{4}$ inch. Any unsatisfactory surfaces produced are the responsibility of the Contractor and shall be corrected at the Contractor's expense and to the satisfaction of the Engineer.

The depth of removal will be verified by taking measurements every 250 feet per each pass of the milling machine, or as directed by the Engineer. These depth measurements shall be used to monitor the average depth of removal.

Where a surface delamination between bituminous concrete layers or a surface delamination of bituminous concrete on Portland cement concrete causes a non-uniform texture to occur, the depth of milling shall be adjusted in small increments to a maximum of $\pm \frac{1}{2}$ inch to eliminate the condition.

When removing bituminous concrete pavement entirely from an underlying Portland cement concrete pavement, all of the bituminous concrete pavement shall be removed leaving a uniform surface of Portland cement concrete, unless otherwise directed by the Engineer.

Any unsatisfactory surfaces produced by the milling operation are the Contractor's responsibility and shall be corrected at the Contractor's expense and to the satisfaction of the Engineer.

No vertical faces, transverse or longitudinal, shall be left exposed to traffic unless the requirements below are met. This shall include roadway structures (catch basins, manholes, utility valve boxes, etc.). If any vertical face is formed in an area exposed to traffic, a temporary paved transition shall be established according to the requirements shown on the plans. If the milling machine is used to form a temporary transition, the length of the temporary transition shall conform to Special Provision Section 4.06 –Bituminous Concrete, "Transitions for Roadway Surface," the requirements shown on the plans, or as directed by the Engineer. At all permanent limits of removal, a clean vertical face shall be established by saw cutting prior to paving.

Roadway structures shall not have a vertical face of greater than one (1) inch exposed to traffic as a result of milling. All structures within the roadway that are exposed to traffic and greater than one (1) inch above the milled surface shall receive a transition meeting the following requirements:

For roadways with a posted speed limit of 35 mph or less*:

1. Round structures with a vertical face of greater than 1 inch to 2.5 inches shall be transitioned with a hard rubber tapered protection ring of the appropriate inside diameter designed specifically to protect roadway structures.
2. Round structures with a vertical face greater than 2.5 inches shall receive a transition of bituminous concrete formed at a minimum 24 to 1 (24:1) taper in all directions.
3. All rectangular structures with a vertical face greater than 1 inch shall receive a transition of bituminous concrete formed at a minimum 24 to 1 (24:1) taper in all directions.

*Bituminous concrete tapers at a minimum 24 to 1 (24:1) taper in all directions may be substituted for the protection rings if approved by the Engineer.

For roadways with a posted speed limit of 40, 45 or 50 mph: All structures shall receive a transition of bituminous concrete formed at a minimum 36 to 1 (36:1) taper in the direction of travel. Direction of travel includes both the leading and trailing side of a structure. The minimum taper shall be 24 to 1 (24:1) in all other directions.

For roadways with a posted speed limit of greater than 50 mph: All structures shall receive a transition of bituminous concrete formed at a minimum 60 to 1 (60:1) taper in the direction of travel. Direction of travel

includes both the leading and trailing side of a structure. The minimum taper shall be 24 to 1 (24:1) in all other directions.

All roadway structure edges and bituminous concrete tapers shall be clearly marked with fluorescent paint. The paint shall be maintained throughout the exposure to traffic.

The milling operation shall proceed in accordance with the requirements of the "Maintenance and Protection of Traffic" and "Prosecution and Progress" specifications, or other Contract requirements. The more stringent specification shall apply.

Prior to opening an area which has been milled to traffic, the pavement shall be thoroughly swept with a sweeper truck. The sweeper truck shall be equipped with a water tank and be capable of removing the millings and loose debris from the surface. The sweeper truck shall operate at a forward speed that allows for the maximum pickup of millings from the roadway surface. Other sweeping equipment may be provided in lieu of the sweeper truck where acceptable by the Engineer.

Any milled area that will not be exposed to live traffic for a minimum of 48 hours prior to paving shall require a vacuum sweeper truck in addition to, or in lieu of, mechanical sweeping. The vacuum sweeper truck shall have sufficient power and capacity to completely remove all millings from the roadway surface including any fine particles within the texture of the milled surface. Vacuum sweeper truck hose attachments shall be used to clean around pavement structures or areas that cannot be reached effectively by the main vacuum. Compressed air may be used in lieu of vacuum attachments if approved by the Engineer.

Method of Measurement: This work will be measured for payment by the number of square yards of area from which the milling of asphalt has been completed and the work accepted. No area deductions will be made for minor unmilled areas such as catch basin inlets, manholes, utility boxes and any similar structures.

Basis of Payment: This work will be paid for at the Contract unit price per square yard for "Fine Milling of Bituminous Concrete (0 to 4 Inches)." This price shall include all equipment, tools, labor, and materials incidental thereto.

No additional payments will be made for multiple passes with the milling machine to remove the bituminous surface.

No separate payments will be made for cleaning the pavement prior to paving; providing protection and doing handwork removal of bituminous concrete around catch basin inlets, manholes, utility valve boxes and any similar structures; repairing surface defects as a result of the Contractors negligence; providing protection to underground utilities from the vibration of the milling operation; removal of any temporary milled or paved transition; removal and disposal of millings; furnishing a sweeper truck and sweeping after milling. The costs for these items shall be included in the Contract unit price.

Pay Item	Pay Unit
Fine Milling of Bituminous Concrete (0 to 4 Inches)	S.Y.

(Rev 11/17/14)

ITEM # 0507003A REMOVE EXISTING CATCH BASIN

ITEM # 0507084A SPECIAL TYPE "C" CATCH BASIN

ITEM # 0507120A TYPE "C" CATCH BASIN WITH 3' SUMP

These items shall conform to Section 5.07 CATCH BASINS, MANHOLES, AND DROP INLETS of the Form 816, modified as follows:

Construction Methods: Trench excavation, dewatering, and backfill for these items shall be according to the special provisions for EARTH TRENCH EXCAVATION included under Item #0201500A Special Provision.

Manholes shall not be included under this item, but shall conform to the special provisions for MANHOLES and RESET MANHOLE provided elsewhere in these specifications.

Method of Measurement: There will be no measurement for trench excavation in the installation or removal of the various drainage appurtenances.

Basis of Payment: The work under these items shall be paid for at the unit contract price each for type of catch basins and drop inlets complete in place and shall include all materials, tools, equipment, and labor necessary to complete the excavation and installation of units in conformity with the plans, or as specified.

The work associated with removal and disposal of existing catch basins shall be measured and paid for each catch basin removed under the item "Remove Existing Catch Basin" as listed in the bid proposal. When existing drainage pipes associated with a catch basin are also identified to be removed on the plans, this work will not be measured and paid for separately, but rather shall be included in the cost of the removal of the catch basin associated therewith. The payment for removal and disposal of existing catch basin shall include all materials, tools, equipment, and labor necessary to complete the excavation and removal of these units, including associated drainage pipes, in conformity with the plans, or as specified.

ITEM # 0507601A **MANHOLE**

Description: The Contractor shall furnish all materials and shall construct all the sanitary or storm drain manholes required as part of this Contract, including the frames, covers, steps, inverts, and materials necessary for fastening the frame to the concrete manhole structure.

Materials: Manholes shall conform in shape, size, dimensions, materials, and other respects to the details indicated on the drawings, or as ordered by the Engineer.

All manholes shall have concrete bases. Invert channels will be formed of brick and mortar at the base unless otherwise specified by the Engineer.

Manhole walls (barrels) shall be either of Class A concrete or pre-cast concrete sections. The top three feet of manholes (the dome) shall be built of either Class A concrete or a precast concrete section. Should the Contractor elect to build the domes of manholes in streets with Class A concrete or a precast concrete section, the top six inches of the dome shall be built of brick to permit adjustment of the frame to meet the street surface.

The inverts shall conform accurately to the size of the adjoining pipes. Side inverts shall be curved and main inverts (where direction changes) shall be laid out in smooth curves of the longest possible radius which is tangent to the centerlines of adjoining sewers.

The cast-iron frames and covers shall be the standard frame and cover as indicated on the drawings. The frames and covers shall be set by the Contractor to conform accurately to the grade of the finished pavement, existing ground surface, or as shown on the drawings.

Class A concrete shall conform to the requirements specified under the Form 816..

Precast Concrete Sections and Bases:

- a) Precast concrete sections, if used, shall conform to the ASTM Tentative Specifications for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe Designation C76-63T, Class III, with the following exceptions and additional requirements:
- b) There shall be one line of circular reinforcement having an area of at least 0.25 square inches per linear foot of barrel.
- c) The barrel shall be not less than five inches thick.
- d) Type II cement shall be used except as otherwise approved.
- e) Manhole steps shall be as specified under "Manhole Steps". Steps shall be cast into the section as it is made.
- f) Sections shall be steam cured and shall not be shipped until at least seven days after having been cast.
- g) Precast manhole bases will have precast rubber boots designed to conform to the changes in the line as specified by the plans.
- h) No more than two lift holes may be cast or drilled in each section.

- i) The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside of the barrel.
- j) Acceptance of the sections will be on the basis of material tests and inspection of the completed product.
- k) All precast units shall have O-ring rubber or mastic gasket joints.
- l) Domes may be precast eccentric sections of similar construction. If precast concrete sections are used, the tops of the bases shall be suitably shaped by means of accurate bell-ring forms to receive the barrel sections.

Setting Precast Manhole Sections: Precast reinforced concrete manhole sections shall be set so as to be vertical and with sections and steps in true alignment. Joint surfaces of the base or previously set section shall be covered with lubricant and an O-ring installed before the new section is placed or an equivalent.

All holes in sections used for their handling shall be thoroughly plugged with non-shrink mortar. The non-shrink mortar shall be one part cement to one and one-half parts sand/mixed slightly damp to the touch (just short of "balling"); hammered into the holes until it is dense and an excess of paste appears on the surface; and then finished smooth and flush with the adjoining surfaces.

The non-shrink mortar for the above-noted use and for use in sealing of sewer pipe at manholes can be Embecco Mortar (premixed) as manufactured by Master Builders or an approved equal product.

Brick: The brick shall be sound, hard, and uniformly burned brick, regular and uniform in shape and size of compact texture and satisfactory to the Engineer.

Brick intended for use below ground level shall conform to ASTM Specifications for sewer brick, Serial Number C-32.

Rejected brick shall be immediately removed from the work and brick satisfactory to the Engineer substituted.

Mortar for Brickwork: The mortar shall be composed of Portland cement, hydrated lime, non-shrink agent, and sand in which the volume of sand shall not exceed three times the sum of the volumes of cement and lime. The proportions of cement and lime shall be as directed and may vary from 1:1/4 for dense, hard-burned brick to 1:3/4 for softer brick. In general, mortar for Grade SA Brick shall be mixed in the proportions of 1:1/2:4-1/2.

Cement shall be Type II Portland cement as specified for concrete masonry.

Hydrated lime shall be type S conforming to the ASTM Standard Specification for Hydrated Lime for Masonry Purposes, Designation C207-49. 4X Hydrate made by the New England Lime Co. will meet this specification.

The sand shall comply with the specifications for "Fine Aggregate" for concrete masonry except that all of the sand shall pass a No. 8 sieve.

Construction Methods:

Laying Brickwork: Only clean bricks shall be used in brickwork for manholes. The brick shall be moistened by suitable means as directed until they are neither so dry as to absorb water from the mortar nor so wet as to be slippery when laid.

Each brick shall be laid in a full bed and joint of mortar without requiring subsequent grouting, flushing, or filling and shall be thoroughly bonded as directed. All exposed interior brickwork shall be wiped clean once installed.

Manhole water tables are to be slightly sloped toward the invert (3/4-inch per foot).

Plastering and Curing Brick Masonry: Outside faces of brick masonry shall be plastered with mortar from 1/4-inch to 3/8-inch thick. If required, the masonry shall be properly moistened prior to application of the mortar. The plaster shall be carefully spread and troweled so that all cracks are thoroughly worked out. After hardening, the plaster shall be carefully checked by being tapped for bond and soundness. Unbonded or unsound plaster shall be removed and replaced.

Brick masonry and plaster shall be protected from too rapid drying by the use of burlaps kept moist, or by other approved methods, and shall be protected from the weather and frost, all as required.

Coating: The exterior surfaces of all manholes shall be given two coats of bituminous waterproofing material. The material shall be Minwax Fibrous Brush Coat made by the Minwax Co., Inc., New York, NY: Tremco 121 Foundation Coating made by the Tremco Manufacturing Co., Cleveland, OH: Inertol No. 7 made by the Inertol Co., Inc., Newark 5, NJ: or approved equal products. The waterproofing material shall be applied by brush or spray and in accordance with the instruction of the manufacturer. Time shall be allowed between coats to permit sufficient drying so that the application of the second coat has no effect on the first coat.

Alterations of Existing Manholes or Pipe: Where called for on the plans, directed by the Engineer, or necessary for the new construction, existing manholes and pipes shall be altered as required. Alterations shall include, but not be limited to, cutting new entrances into manhole for pipe, cutting or plugging existing pipe, making necessary changes in invert or steps, adjusting frames by raising or lowering, and proper control of waste material in active lines. Payment for this item will be made at the contract unit price. Payment shall include all costs and labor incidental to altering the structure to the required end result.

Manhole Frames and Covers: The Contractor shall furnish all cast-iron manhole frames and covers conforming to the details shown on the drawings, or as herein specified. The castings shall be of good quality, strong, tough, even-grained cast iron, smooth, free from scale, lumps, blisters, sandholes, and defects of every nature which would render them unfit for the service for which they are intended.

Contact surfaces of covers and frames seats shall be machined to prevent rocking of covers.

All castings shall be thoroughly cleaned and subject to a careful hammer inspection.

Sanitary sewer manhole covers shall have the word "SEWER" embossed in three-inch letters as shown on the standard details.

Storm drainage manhole covers shall have the word "STORM" or "DRAIN" embossed in three-inch letters as shown on the standard details.

Castings shall be at least Class 25 Conforming to the ASTM Specification for gray Iron Castings, Designation A48 as amended to date.

Setting Manhole Frames and Covers: Manhole frames shall be set with the tops conforming accurately to the grade of the pavement or finished ground surface or as indicated on the drawings as directed. Frames shall be set concentric with the top of the masonry and in a full bed of mortar so that the space between the top of the manhole masonry and the bottom flange of the frame shall be completely filled and made watertight. A thick ring of mortar extending to the outer edge of the masonry shall be placed all around the

bottom and over the top of the flange. The mortar shall be smoothly finished and have a slight slope to shed water away from the frame.

Manhole covers shall be left in place in the frames on completion of other work at the manholes. Manholes located off of the traveled roadway shall have their frames lagged to the manhole wall.

Stubs in Manholes: Stubs placed as specified and indicated on the drawings shall be either short pieces cut from the bell ends or shall be four feet, zero inch-length of reinforced concrete pipe with bulkheads. Stubs shall be set accurately to the required line and elevation and encased in the manhole masonry as shown on the drawings. Where booted-type manholes are used, no stub will be necessary. The boot shall be properly plugged. Any uncalled for boot shall be removed and the hole properly sealed with brick or a boot may be plugged if the Engineer so directs.

Drop Inlet to Manhole: Drops for sanitary sewer manholes shall be accomplished in conformity with the details found elsewhere within these documents and in accordance with the provisions of these specifications for the various materials and work which constitute the complete structure.

Manhole Steps: Unless otherwise indicated, manhole steps shall be installed as shown within the Town of Glastonbury details for plastic manhole steps or an approved equal product. The steps shall be thoroughly clean and dry before being built into the masonry.

Measurement: Where the bid item for manholes is broken into categories by height, the height of the manhole shall be measured by the linear foot of vertical height. The vertical height will be the difference in elevation between the top of the frame and the elevation of the invert measured along the vertical centerline of the manhole.

When drop inlets are included in the Contract, they shall also be broken down by height and will be measured per vertical linear feet. No measurement for payment will be made for excavation, backfilling, crushed stone base, sheeting, shoring and bracing ordered left in place, concrete, damp-proofing, manhole steps, manhole frames and covers, items incidental to the construction, but costs associated with these items shall be included in the contract unit price bid for each depth classification of the manhole.

Payment: Manholes will be paid for at the contract unit price for each manhole. This payment shall include all costs incidental to the construction of the manhole except for rock excavation which will be paid for at the respective contract unit price for this item.

ITEM # 0507781A **RESET MANHOLE**

General: Under this item shall be included the alteration or reconstruction of existing manholes in conformity with the lines, grades, dimensions, and details shown on the plans, or as ordered, and in accordance with the provisions of these specifications for the various materials and work which constitute the completed structure.

Construction Methods: Frames, covers and tops which are to be reset shall be removed from their present beds, the walls or sides shall be rebuilt to conform to the requirements of the new construction and the tops, frames and covers reset, or the grates or covers may be raised by extensions of suitable height approved by the Engineer.

Method of Measurement: Resetting tops, frames and covers will be measured as units. When resetting tops, frames and covers, there will be no measurement for excavation; cutting, removal and replacement of pavement; pervious material and backfill.

Payment: Reset Units will be paid for at the contract unit price each for "Reset Manhole," of the type specified, respectively, complete in place, which price shall include excavation, pervious material, backfill, cutting of pavement, removal and replacement of pavement structure, extensions, concrete masonry units, mortar, and all materials, equipment, tools and labor incidental thereto.

ITEM # 601369A **RESET SEGMENTAL RETAINING WALL**

Description: This work shall include the removal and resetting of an existing segmental retaining wall along the frontage of #217 Griswold Street. This wall must be removed and reset in its entirety to a new location shown on the contract plans as directed by the Engineer. Existing wall is approximately 10-inches tall (including cap stones) and 45 feet long. Reconstruction of the segmental retaining wall shall be performed according to manufacturer recommended installation practices and in such a manner as to provide a minimum of twelve (12) inches of horizontal separation between the face of the wall and the proposed sidewalk.

The work shall include the excavation, preparation of a level base, removal and re-installation of the segmental retaining wall blocks and cap stone according to manufacturer instructions, backfill with select materials, and related materials required for the construction and backfill to the lines, and grades shown on the plan or as directed by the Engineer.

Materials:

Segmental retaining wall (SRW) units shall be existing blocks from the project site. If additional blocks are required, they shall machine formed, Portland Cement concrete blocks specifically designed for retaining wall applications and as required to match the existing block materials.

Granular material for the prepared base shall conform to the requirements of Section M.02.01 of the Form 816 for broken or crushed stone.

Drainage aggregate for backfill behind the wall shall consist of ¾" stone.

Wall materials shall conform to the applicable ASTM testing standards and manufacturer minimum specifications for the item supplied. The concrete wall units shall have a 28-day compressive strength of 3,000 psi. The units shall be interlocked with non-corrosive pins or other system approved by the Engineer.

Construction Methods:

The Contractor shall excavate and prepare a suitable, level foundation to allow for construction of the wall to the line and grade shown on the plans or as directed by the Engineer.

Leveling pad shall be placed as shown on the plans with a minimum thickness of six inches. The leveling pad should extend laterally at least a distance of six inches from the toe and heel of the lower most SRW unit. Granular leveling pad material shall be compacted to provide a firm, level bearing surface on which to place the first course of units. Well-graded sand or stone dust can be used to smooth the top 1/4-to 1/2-inch of the leveling pad. Compaction shall be with mechanical plate compactor as required to achieve 95 percent of maximum standard Proctor density. Sub-soils not meeting acceptable standards shall be removed and replaced with suitable soils. Over-excavated areas shall be filled and properly compacted.

SRW units and cap stones shall be installed according to manufacturer's specifications. Drainage aggregate consisting of ¾" stone shall be installed in a layer 12' wide immediately behind the retaining wall.

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

Basis of Payment: This work will be paid for at the contract lump sum for "RESET SEGMENTAL RETAINING WALL", complete in place, which price shall include all work shown within the limits shown on the plans for the relocated retaining wall including excavation, wall construction, base preparation, drainage aggregate, backfill, and all materials, equipment, tools and labor incidental thereto.

ITEM # 0651251A 15" R.C. PIPE (CLASS V)

This item shall conform to Section 6.51 CULVERTS of the Form 816, modified as follows:

Construction Methods: Trench excavation, dewatering, and backfill for these items shall be according to the special provisions for EARTH TRENCH EXCAVATION included under Item #0201500A Special Provision.

Method of Measurement: There will be no direct measurement for trench excavation and there will be no measurement for payment for gravel fill, bedding material, or for the cost of modifications required to existing manholes or catch basins as required for connecting proposed drainage pipes with existing drainage structures, but the cost thereof shall be included in the contract unit price per linear foot for the size and type of pipe being installed.

Basis for Payment: The work under these items will be paid for at the contract unit price per linear foot of pipe and size specified, complete in place including trench excavation, gravel fill, bedding material and all other materials, equipment, tools, and labor incidental thereto.

ITEM # 0905014A RESET WOOD RAIL FENCE

Description: Work under this item shall include the removal of existing wood split rail fences and reinstallation in the locations shown on the plans and as directed by the Engineer. Wood rail fences shall be reset by workman normally engaged in the installation of fencing, and at a location a minimum of twelve (12) inches behind sidewalks.

Materials: The materials for this work shall be existing wood rail fences from the job site. Replacement materials, if required, shall conform to the requirements of Article M.10.03.

Construction Methods: The reset wood rail fence shall be built in the locations and in accordance with the dimensions and details shown on the plans or as ordered. The posts shall be set plumb and firm in the ground, braced, and the fittings shall be neatly and firmly attached. The whole shall be completed in a neat and workmanlike manner to the satisfaction of the Engineer.

Method of Measurement: This item will be measured for payment by the linear foot as measured along the top rail from center to center of end posts, complete in place. When rail is reset with no end post, measurement shall include the length of the top rail along that section.

Basis of Payment: This work will be paid for at the contract unit linear foot for "Reset Wood Rail Fence," complete in place, which price shall include all materials, tools, equipment, and labor incidental thereto, also all excavation, refilling and disposal of surplus material.

ITEM # 0905106A 6' STOCKADE FENCE

Description: Work under this item shall consist of installing prefabricated wooden stockade fence at locations shown on the plans and/or as directed by the Engineer. Fence construction and installation shall conform to manufacturer recommendations and the highest quality workmanship. Installation shall be by skilled workman normally engaged in the installation of fence. The work shall include all materials, labor and equipment necessary to complete the construction and erection of the 6' Stockade Fence.

The Contractor shall be responsible for field measurements and location of fencing. Layout drawing(s) indicating post locations and section lengths shall be submitted to the Engineer for review and approval, prior to fabrication. The Contractor shall submit shop drawings and/or catalog cuts including details illustrating fence height, sizes of posts, rails, sections and all appurtenances for approval, prior to fence fabrication.

Materials: Wood Pickets and rails to be Number 1 Cedar. Wood fence posts shall be Number 2 Pine Pressure Treated Lumber, or other approved species. Wood shall be marked to indicate the wood grade and preservative standard. All hardware shall be stainless steel or galvanized. Posts shall be ACQ treated and have a preservative retention level of 0.40 or an MCA of 0.16 pcf.

Fencing shall be 6 feet in height, selected for strength and decay resistance in its intended use. All wood shall be debarked. Wood members shall be sized for the sufficient strength.

Gate shall be a double swing gate, 12 feet wide.

Nail screws shall be high quality grade, of the type commonly used for its intended purpose. Nail screws shall be sized for long-life holding power and to prevent splitting wood members. Fencing shall be produced by a manufacturer normally producing wood fence products of this type.

Construction Methods: Posts and fence elements shall be set plumb in excavated holes backfilled with gravel unless otherwise directed by the Engineer. All wood members should be evenly sized within range of approximate limits, uniform and straight. Post tops shall be shaped into blunt curved end. A prefabricated picket/stockade fence system is required. Backing rails shall be shaped to provide flattened surface for picket attachment. Picket tops shall be curved points. Members shall be installed to form a sturdy, stockade-type visual screen.

The lines of the fence shall follow the fence lines as indicated on the drawings. Tops and bottoms shall be installed straight and level, stepped to any grade. All sections shall be plumb and straight. Posts and pickets shall be installed plumb and parallel to each other. Rails shall be installed perpendicular to posts and evenly spaced. Fence posts shall be evenly spaced approximately 8 feet on center and buried to a minimum depth of 3'-6", and as necessary to accommodate any changes in grade. Earth shall be properly compacted around posts for firm support. If unsuitable soil conditions occur such as rock, ledge and peat, notify the Engineer for acceptable alternate post setting customary in the trade.

Method of Measurement: 6' Stockade Fence will be measured for payment by the linear foot along the top horizontal rail of the fence from center to center of end posts, complete in place. The gate shall be measured from center to center of posts and included in the linear footage for payment under this item.

Basis of Payment: 6' Stockade Fence will be paid for at the Contract unit price per foot, which price shall include all labor, materials, equipment, excavation, and incidental costs required to complete the work. No separate payment will be made for line posts, end posts, gates, bracing, gravel borrow for post foundations, concrete footing and any required hardware.

ITEM # 0906206A ORNAMENTAL PICKET FENCE (4' HIGH)

Description: Work under this item shall consist of installing a 48-inch tall white aluminum ornamental picket fence with a single man-gate at the location shown on the plans and/or as directed by the Engineer. Fence construction and installation shall conform to manufacturer recommendations and the highest quality workmanship. Installation shall be by skilled workman normally engaged in the installation of fence. The work shall include all materials, labor and equipment necessary to complete the construction and erection of the fence.

The Contractor shall be responsible for field measurements and location of fencing. Layout drawing(s) indicating post locations and section lengths shall be submitted to the Engineer for review and approval, prior to fabrication. Fence shall be installed a minimum of twelve (12) inches away from sidewalks or traffic signal equipment.

The Contractor shall submit shop drawings and/or catalog cuts including details illustrating fence height, sizes of posts, rails, sections and all appurtenances for approval, prior to fence fabrication.

Materials:

Fence material shall be Active Yards Chestnut Scallop Haven Series white aluminum fence or approved equal.

Fence post cap shall be pyramid type.

Fencing shall be 4 feet in height.

Gate opening shall be 40 inches wide.

Hardware shall be stainless steel.

Construction Methods: Posts and fence elements shall be set plumb in excavated holes backfilled with gravel unless otherwise directed by the Engineer.

The lines of the fence shall follow the fence lines as indicated on the drawings. Tops and bottoms shall be installed straight and level, stepped to any grade. All sections shall be plumb and straight. Posts and pickets shall be installed plumb and parallel to each other. Rails shall be installed perpendicular to posts and evenly spaced.

Fence posts shall be evenly spaced approximately 8 feet on center and buried to a minimum depth of 3'-6" or as directed by the manufacturer installation instructions, and as necessary to accommodate any changes in grade. Earth shall be properly compacted around posts for firm support. If unsuitable soil conditions occur such as rock, ledge and peat, notify the Engineer for acceptable alternate post setting customary in the trade.

Method of Measurement: Ornamental Picket Fence (4' high) will be measured for payment by the foot along the top rail from center to center of end posts, complete in place. The gate shall be measured from center to center of posts and included in the linear footage for payment under this item.

Basis of Payment: Ornamental Picket Fence (4' high) will be paid for at the Contract unit price per foot, which price shall include all labor, materials, equipment, excavation, and incidental costs required to complete the work. No separate payment will be made for line posts, end posts, gates, bracing, gravel borrow for post foundations, hardware, concrete footing or any other required work or materials.

ITEM # 0913817A REMOVE CHAINLINK FENCE

This work shall conform to Section 9.13 CHAIN LINK FENCE of the Form 816, amended as follows:

Add the follow to Section 9.13.01 Description: This work shall also include the removal of an existing section of chain link fence at Station 26+83, 25 feet left, and the installation of new end posts and corner posts as required to support the modified fence. Fence rails and fabric shall be reinstalled to the new post as per the standard specifications.

Add the follow to Section 9.13.05 Basis of Payment: Removal of existing chain link fence and installation of new end post will be paid for at the Contract unit price per foot, which price shall include all labor, materials, equipment, excavation, and incidental costs required to complete the work. No separate payment will be made for posts, bracing, gravel borrow, foundations, concrete footing, or any required hardware or fittings as necessary.

ITEM # 0921001A CONCRETE SIDEWALKS

ITEM # 0921002A CONCRETE SIDEWALKS – 8” THICK

ITEM # 0921005A CONCRETE SIDEWALK RAMPS

General: The Contractor is to construct sidewalks to lines and grades as shown on the drawings or at locations as directed by the Engineer. The sidewalks shall be of monolithic construction and five inches thick, except at industrial and commercial driveways where it shall be eight inches thick and reinforced with 6” x 6” 10/10 steel mesh. Sidewalk construction shall include the removal of existing and construction of new house lateral walks where new sidewalk grades make it necessary. At street corners where the intersection is rounded with a radius of less than 25 feet to the curb, the sidewalk slabs will be a minimum of five feet in length and constructed of five-inch thick concrete. The sidewalk shall pitch to the street at a slope of ¼-inch per foot or as directed by the Engineer.

Concrete sidewalk ramps are to be constructed to the lines and grades shown on the plans at locations directed by the Engineer, and shall be a minimum of five inches thick. This work shall also include furnishing and installing Detectable Warning Strips in the locations and to the dimensions and details shown on the plans or as ordered by the Engineer.

Materials:

Base Course: The material used for base course construction shall conform to the requirements of Section M.02.01 of the Form 816 for broken or crushed stone. It shall consist of sound, tough, and durable stone and shall be free of thin or elongated pieces, lumps of clay, soil, loam, or vegetative matter. All material shall be approved by the Engineer prior to its use.

Forms: The forms used shall be five-inch steel or 2” x 6” wood firmly supported and staked to the line and grade given by the Engineer. The forms shall be free from warp and shall be of sufficient strength to resist springing out of shape. All forms shall be cleaned and oiled before use.

Concrete: The concrete furnished shall conform with respect to composition, transportation, mixing and placing, to Class F Cement Concrete 4,000 PSI, as specified by the State of Connecticut Department of Transportation in Form 816 and supplements thereto dated July 2014. An approved air-entraining admixture shall be used to entrain 5% to 7% air in the concrete.

Detectable Warning Strips: The Detectable Warning Strip shall be a prefabricated detectable warning surface tile as manufactured from Engineered Plastics Inc. 300 International Drive, Suite 100 Williamsville, NY 14221, telephone number (800) 682-2525 or the approved equal from ADA Fabricators, INC. P.O Box 179 North Billerica, MA 01862 telephone number (978) 262-9900. The tile shall conform to the dimensions shown on the plans and have a brick red homogeneous color throughout in compliance with Federal Standard 595A Color #22144 or approved equal.

The Detectable Warning Strip shall be set directly in poured concrete according to the plans and the manufacturer’s specifications or as directed by the Engineer. The Contractor shall place two 11.34 Kg concrete blocks or sandbags on each tile to prevent the tile from floating after installation in wet concrete.

Dowels: Smooth metal dowels, 5/8-inch in diameter, measuring 24 inches in length shall be installed using plastic sleeves within all expansion and contraction joints, concrete driveway aprons, at concrete sidewalk ramps, and at the last end section of each sidewalk slab poured at the end of each working day.

Plastic sleeves of the size required for accepting the 5/8-inch by 24-inch smooth metal dowels shall be "Speed Dowel" sleeves as manufactured by Greenstreak, 3400 Tree Court Industrial Blvd, St. Louis, MO 63122, telephone number (800) 551-5145 or approved equal. Plastic sleeves shall be installed according to manufacturer instructions and as directed by the Engineer.

Dowels are also to be installed between new and existing concrete slabs. Where new or repaired walks abut up against existing concrete sidewalks, the Contractor shall drill two holes measuring $\frac{3}{4}$ -inches in diameter and 12 inches in depth into the existing concrete slab. The dowels, with plastic sleeve, shall be set into the existing sidewalk slab prior to the placement of concrete. The dowels are to be level with the latitude pitch of the sidewalk and shall conform to details of these specifications.

Smooth metal dowels shall be 5/8-inch in diameter and 24 inches in length. All metal dowels shall conform to the requirements of ASTM A615 Grade 60.

Expansion Joints: At maximum intervals of 15 feet, an expansion joint shall be placed to the full depth of the concrete slab. The material for expansion joints shall be either $\frac{1}{4}$ -inch thick cork asphalt or $\frac{3}{8}$ -inch thick asphalt impregnated bonded cellular fiber, or approved equal. Expansion joints of the same material shall also be placed at points abutting existing structures.

Construction Methods:

Limits of Disturbance: The Contractor is to exercise caution to prevent unnecessary damage to lawns, trees, bushes, or any other existing improvements. If, in the opinion of the Engineer, existing improvements are damaged due to the carelessness of the Contractor, the same shall be repaired or replaced at the Contractor's expense.

Earthwork: The Contractor shall remove and dispose of grass, rubbish, and other objectionable materials within the limits of the sidewalk construction. The Contractor shall perform all excavation necessary to construct sidewalks to the grades as shown on the construction plans. Excavation shall include the saw cutting, removal, and disposal of bituminous concrete and concrete sidewalks, driveways, and pavements, including curbing and tree roots, where necessary, due to the new sidewalk grade and as shown on the plans or as directed by the Engineer. Existing house lateral walks and driveways adjacent to the sidewalk shall be removed and base graded and prepared for a smooth connection. The Contractor shall remove and dispose of all excess material.

Base Course Installation: The material for the base course shall be spread upon the prepared subgrade to such depth as to give a compacted thickness of eight inches. The material shall be uniformly spread in two layers of equal depth in the entire base course excavation and each layer shall be wetted and compacted to a firm even surface with a roller weighing not less than 500 pounds or by use of pneumatic tampers or vibratory compactors.

Concrete Work: The surface finish shall be struck off, forcing coarse aggregate below mortar surface. After strike-off, the surface shall be worked and floated with a wooded, aluminum, or magnesium float followed by steel troweling. The slab shall then be broomed cross-wise with a fine hair broom. The outside edges of the slab shall be edged with a $\frac{1}{4}$ -inch radius tool. All edging lines shall be removed.

The Contractor shall use a liquid membrane-forming curing compound. The curing compound shall be similar or equal to Demicon "Cure Hard" with fugitive dye and shall meet the latest ASTM Specification C-156. Waterproof paper or plastic membrane are acceptable alternatives.

Newly constructed sidewalk surfaces shall be protected from all foot or vehicular traffic for a period of seven days. The Contractor shall have on the job, at all times, sufficient polyethylene film or waterproof paper to provide complete coverage in the event of rain.

Temperature: No concrete is to be placed when air temperature is below 40°F, or at 45°F and falling, unless prior approval is given by the Engineer. In the event weather conditions may be such that concrete that is not completely cured is subject to freezing, the Contractor shall provide a minimum of a six-inch layer of hay, straw, or thermal blankets for protection. Any concrete laid during cold weather that is damaged by freezing shall be the responsibility of the Contractor and shall be replaced at his expense.

Final Grading: Upon completion of sidewalk construction, the Contractor is to re-grade the areas between sidewalks and curbs, if the typical section indicates a grass plot, and disturbed areas back of the sidewalk. The Contractor shall backfill and compact these areas so as to conform to the typical cross-section. The upper four inches of the backfill shall be loam or topsoil, loose and friable and free of sticks, rocks, roots, weeds, or other unsuitable material.

Basis of Payment: Concrete Sidewalk shall be measured and paid for at the Contract unit price per square foot as contained in the Bid Proposal, which price shall include the base course underneath sidewalks, excavation, grading, and all other materials and all labor, tools, and equipment necessary for completion of the work.

Concrete Sidewalk—8" Thick shall be measured and paid for at the Contract unit price per square foot as contained in the Bid Proposal, which price shall include the base course underneath sidewalks, excavation, grading, and all other materials and all labor, tools, and equipment necessary for completion of the work.

Concrete Sidewalk Ramps shall be measured and paid for as a unit at the Contract unit price for each ramp as contained in the Bid Proposal, which price shall include the base course underneath sidewalks, excavation, grading, detectable warning tile, and all other materials and all labor, tools, and equipment necessary for completion of the work.

Sawcutting of concrete sidewalk slabs will not be measured for payment. Removal, and disposal of existing concrete sidewalk sections shall be paid for at the contract unit price per square yard for "Removal of Concrete Sidewalk" as listed in the proposal, which price shall include all labor, material, tools, and equipment incidental thereto.

ITEM # 0922001A BITUMINOUS CONCRETE SIDEWALK

ITEM # 0922501A BITUMINOUS CONCRETE DRIVEWAY

Description: This item shall consist of bituminous concrete surfaced sidewalk or driveway constructed on a processed stone course in the locations and to the dimensions and details shown on the plans or as directed by the Engineer and in accordance with these specifications. This item shall also include the sawcutting, removal and disposal of existing bituminous pavement necessary for driveway replacement work.

Materials: Materials for this work shall conform to the following requirements:

1. Base Course: The material used for base course construction shall conform to the requirements of Section M.02.01 of the Form 816 for broken or crushed stone.
2. Bituminous Concrete Surface: Materials for this surface shall conform to the requirements of Section M.04, Class 2.

Construction Methods:

1. Sawcutting: Portions of the driveway or driveway aprons to be replaced shall be saw cut, and the existing pavement removed and disposed of by the Contractor.
2. Excavation: Excavation, including 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.
3. Forms: When the bituminous concrete is spread by hand, forms shall be used. Forms shall be of metal or wood, straight, free from warp and of sufficient strength to resist springing from the impact of the roller. If made of wood, they shall be of 2-inch (38-millimeter) surfaced plank except that at sharp curves thinner material may be used; if made of metal, they shall be of an approved section. All forms shall be of a depth equal to the depth of the sidewalks or driveways and shall be securely staked, braced, and held firmly to the required line and grade. All forms shall be cleaned and oiled each time they are used.
4. Base Course: Processed stone base course shall be uniformly spread to the required depth and thoroughly compacted with a roller with a mass of not less than 500 pounds (226 kilograms).
5. Bituminous Concrete Surface: The edges of existing pavement shall be painted with an asphalt emulsion prior to the placement of permanent pavement. Hot laid bituminous concrete shall be placed so as to give a three-inch compacted surface, or a surface that has a depth equal to the existing driveway surface, whichever is greater.

This surface shall be constructed in accordance with the requirements of Section 4.06, except that the material may be spread by hand and thoroughly compacted by multiple passes of a power-driven roller weighing (with a mass) of not less than 500 pounds (226 kilograms). The finished surface shall be free from waves or depressions.

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

the Engineer. In sections inaccessible to the roller, the base course, surface course and backfill shall be hand-tamped with tampers weighing not less than 12 pounds (with a mass of not less than 5.5 kilograms), the face of which shall not exceed 50 square inches (32,000 square millimeters) in area.

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

1. Bituminous Concrete Driveway—Bituminous Concrete Sidewalk: This work will be measured by the actual number of square yards of completed and accepted sidewalk or driveway.
2. Excavation: Excavation below the finished grade of the sidewalk or driveway, including removal and disposal of existing bituminous concrete, backfilling, and disposal of all surplus materials will not be measured for payment; but the cost shall be included in the price bid for the sidewalk or driveway. Excavation above the finished grade of a proposed sidewalk or driveway, when necessary for the proper installation, will be classified and paid for as described in the Section 2.02 of the Form 816.
3. Base Course: This work will not be measured for payment but the cost thereof shall be included in the price bid for the sidewalk or driveway.

Basis of Payment: This work will be paid for at the contract unit price per square yard for "Bituminous Concrete Sidewalk" or "Bituminous Concrete Driveway," as the case may be, complete in place, which price shall include all excavation as specified above, backfill, sawcutting, disposal of surplus material, processed stone base, and all equipment, tools, labor and materials incidental thereto.

ITEM # 0944000A **FURNISHING AND PLACING TOPSOIL**

Description: This work shall consist of furnishing, placing, and shaping topsoil in areas shown on the plans where directed by the Engineer. The topsoil shall be placed to the depth stated in the Contract or specifications.

Material: The material shall conform to the requirements of Article M.13.01.1 of the Form 816.

Construction Methods: The areas on which topsoil is to be placed shall be graded to a reasonably true surface and cleaned of all stones, brickbats, and other unsuitable materials. After areas have been brought to proper subgrade and approved by the Engineer or his agent, loam shall be spread to a depth as indicated in the Contract, or to a depth of no less than four inches, with due allowance made for settlement. All stones, roots, debris, sod, weeds, and other undesirable material shall be removed from the topsoil. After shaping and grading, all trucks and other equipment shall be excluded from the topsoiled area to prevent excessive compaction. The Contractor shall perform such work as required to provide a friable surface for seed germination and plant growth prior to seeding.

During hauling and spreading operations, the Contractor shall immediately remove any material dumped or spilled on the shoulders or pavement.

It shall be the Contractor's responsibility to restore to line, grade, and surface all eroded areas with approved material and to keep topsoiled areas in acceptable condition until the completion of the construction work.

Payment: This work will be measured for payment by the number of square yards of area on which the placing of the topsoil has been completed and the work accepted.

The limits of payment shall be to the slope limits as shown on the plans. In the absence of slope limits, the maximum area of measurement shall be the area extending two feet behind the sidewalk and the area between the sidewalk and edge of pavement. No payment shall be made outside of these limits unless the disturbance was directed or approved by the Engineer. No payment shall be made for areas disturbed for staging, storage of materials, or other area disturbed for the convenience of the Contractor.

This work will be paid for at the Contract unit price per square yard for "Furnishing and Placing Topsoil", which price shall include all materials, equipment, tools, labor, and work incidental thereto.

ITEM # 0950005A TURF ESTABLISHMENT

General: The work included in this item shall consist of providing an accepted uniform stand of established perennial turf grasses or wetland vegetation by furnishing and placing fertilizer, seed, and mulch on all areas to be treated as shown on the plans or where designated by the Engineer.

The work will also include the installation of erosion control matting of the type indicated where shown on the plans or as directed by the Engineer.

Materials: The materials for this work shall conform to the requirements of Section M.13 of the Form 816, except as noted below.

Seed mix for residential lawn areas shall consist of 30% Crest Kentucky Bluegrass, 30% Baron Kentucky Bluegrass, 20% Victory II Chewings Fescue, and 20% Perennial Rye Grass.

Seed mix for other roadside areas designated for turf establishment shall consist of 70% Red Fescue, 20% Kentucky Blue Grass, and 10% Perennial Rye Grass.

Erosion Control Matting shall be a product approved by the Connecticut Department of Transportation for the intended application as described in the "Qualified Products List" publication, latest edition.

Hydroseeding, when required by the Engineer, shall be performed using a homogenous slurry consisting of wood fiber mulch, fertilizer, live seed, and organic tackifiers conforming to Section M.13 of the Form 816.

Material certificates shall be provided for all materials supplied under this item.

Construction Methods: Construction Methods shall be those established as agronomically acceptable and feasible and which are approved by the Engineer.

1. Preparation of the Seedbed:

(a) Level areas, medians, interchanges and lawns: These areas shall be made friable and receptive for seeding by disking or by other approved methods to the satisfaction of the Engineer. In all cases the final prepared and seeded soil surface shall meet the lines and grades for such surface as shown in the plans, or as directed by the Engineer.

(b) Slope and Embankment Areas: These areas shall be made friable and receptive to seeding by approved methods which will not disrupt the line and grade of the slope surface. In no event will seeding be permitted on hard or crusted soil surface.

(c) All areas to be seeded shall be reasonably free from weeds taller than 3 inches. Removal of weed growth from the slope areas shall be by approved methods, including hand-mowing, which do not rut or scar the slope surface, or cause excessive disruption of the slope line or grade. Seeding on level areas shall not be permitted until substantially all weed growth is removed. Seeding on slope areas shall not be permitted without removal or cutting of weed growth except by written permission of the Engineer.

2. Seeding Season: The calendar dates for seeding shall be:

Spring—March 15 to June 15

Fall—August 15 to October 15

All disturbed soil areas shall be treated during the seeding seasons as follows:

(a) Areas at final grade: Seeding will be accomplished.
(b) "Out-of-season" seedings shall be performed in the same manner as "in-season" seedings. Since acceptable turf establishment is less likely, the Contractor shall be responsible for "in-season" reseeded until the turf stand conforms to this specification.

(c) During "out-of-season" periods unseeded areas shall be treated in accordance with Section 2.10, Water Pollution Control.

3. Seeding Methods: The seed mixture shall be applied by any agronomically acceptable procedure. The rate of application shall be no less than 175 pounds per acre or according to manufacturer instructions. Fertilizer conforming to M.13.03 shall be initially applied at a rate of 320 pounds per acre during or preceding seeding. When wood fiber mulch is used, it shall be applied in a water slurry at a rate of 2,000 pounds per acre with or immediately after the application of seed, fertilizer and limestone.

When hydroseeding is required by the Engineer, it shall be performed by a qualified Contractor who has a minimum of three year experience in the successful performance of this work and has been approved by the Engineer. Hydroseed mix shall be applied in a slurry consisting of wood fiber mulch, fertilizer, live seed, and organic tackifiers with each component applied at the rate described above. The slurry shall be hydraulically sprayed on the soil surface as required to form a blotter-like ground cover with a uniform coating. Contractor shall exercise special care as required to prevent slurry from being sprayed onto adjacent paved areas, sidewalks, buildings, or signs. All slurry sprayed onto adjacent surfaces shall be cleaned at the Contractor's expense.

When the grass seeding growth has attained a height of 6 inches, the specified areas designated herein shall be mowed to a height of 3 inches. Following mowing, all seeding grass areas (mowed and un-mowed) shall receive a uniform application of fertilizer hydraulically placed at the rate of 320 pounds per acre.

4. Compaction: The Contractor shall keep all equipment and vehicular and pedestrian traffic off areas that have been seeded to prevent excessive compaction and damage to young plants. Where such compaction has occurred, the Contractor shall rework the soil to make a suitable seedbed; then re-seed and mulch such areas with the full amounts of the specified materials, at no extra expense to the Town.

5. Stand of Perennial Turf Grasses: The Contractor shall provide and maintain a uniform stand of established turf grass or wetland vegetation having attained a height of 6 inches consisting of no less than 100 plants per square foot throughout the seeded areas until the entire project has been accepted.

6. Establishment: The Contractor shall keep all seeded areas free from weeds and debris, such as stones, cables, baling wire, and he shall mow at his own expense, on a one-time-only basis, all slopes 4:1 or less (flatter) and level turf established (seeded) areas to a height of 3 inches when the grass growth attains a height of 6 inches. Clean-up shall include, but not be limited to, the removal of all debris from the turf establishment operations on the shoulders, pavement, and/or elsewhere on adjacent properties publicly and privately owned.

7. Erosion Control Matting: Erosion control matting shall be installed following seeding where called for on the plans or as directed by the Engineer. Staples shall be installed as per Manufacturer's recommendations. Where two lengths of matting are joined, the end of the up-grade strip shall overlap the down-grade strip. The Contractor shall maintain and protect the areas with erosion control matting until such time as the turf grass is established. The Contractor shall replace or repair at his own expense any and all erosion control matting areas damaged by fire, water or other causes including the operation of construction equipment. No mowing will be required in the locations where erosion control matting is installed.

Method of Measurement: This work will be measured for payment by the number of square yards of surface area of accepted established perennial turf grass or wetland vegetation as specified or by the number of square yards surface area of seeding actually covered and as specified.

Restoration of areas disturbed for staging, storage of materials, or other area disturbed for the convenience of the Contractor will not be measured for payment.

Erosion control matting will be measured by the number of square yards of surface area of erosion control matting installed and accepted.

Basis of Payment: This work will be paid for at the contract unit price per square yard for "Turf Establishment", "Turf Establishment-Hydroseeding" or "Wetland Seeding", which price shall include all materials, mowing, maintenance, equipment, tools, labor, and work incidental thereto. Partial payment of up to 60% may be made for work completed, but not accepted.

Erosion control matting will be paid for at the contract unit price per square yard for "Erosion Control Matting" complete in place and accepted, which price shall include the hay mulch, netting, staples, maintenance, equipment, tools, labor, and work incidental thereto

ITEM # 0952001A **SELECTIVE CLEARING AND THINNING**

Section 9.52 is amended as follows:

Article 9.52.01 – Description is supplemented as follows:

This work shall consist of cutting, trimming and removal of trees, stumps, brush, rubbish and objectionable material as shown on the plans and as directed by the Engineer and Town of Glastonbury to provide required sight lines to proposed traffic control signal equipment and signage.

This work includes excavation of a tree protection trench adjacent to an existing or proposed sidewalk, conduit, traffic signal control equipment, and foundations by means of a chain-driven trenching machine with additional pruning of roots using hand methods as required. This is performed adjacent to the proposed sidewalk, conduit, traffic signal control equipment, and foundation excavation and within the drip line of an existing tree to cleanly sever roots prior to sidewalk excavation.

The services of a licensed arborist will be required to supervise the above referenced work and shall be included in the contract unit price.

Article 9.52.03 – Construction Methods is supplemented as follows:

All trees and limbs scheduled to be removed shall be visibly marked or flagged by the Contractor at least ten days prior to the cutting of such trees. The Town Tree Warden and the Engineer will inspect the identified trees and verify the limits of clearing and thinning prior to the Contractor proceeding with his cutting operation. **Prior to initiating any trimming, the contractor shall coordinate a meeting for the arborist responsible for the trimming with the Glastonbury Tree Warden (Mr. Greg Foran of the Parks and Recreation Department, 860-652-7686) for review of the trimming operation.**

Where directed by the Engineer, materials to be cut, trimmed or removed shall be those items that restrict visibility to a traffic signal or sign to less than 400 ft. All traffic signal indications will be visible for 400 ft measured from the center of the right-travel lane approaching the intersection, as viewed from a 3.5 ft height above the roadway.

Tree protection trench shall be installed in advance of the intended sidewalk, conduit, traffic signal control equipment or foundation construction during times where damage to trees will be minimized, as directed by the Engineer. The work area shall generally include the length of trench within the drip line of the canopy of the tree of concern. Extreme care shall be taken by the Contractor to identify and protect underground utilities within the work area, and any conflicts shall be immediately brought to the attention of the Engineer.

Where tree protection is called for on the plans, the Contractor shall use a chain-driven trenching apparatus to cleanly sever tree roots adjacent to the proposed sidewalk, conduit, traffic signal control equipment, and foundation excavation as directed by the Engineer. Additional pruning of roots using hand methods may also be required, as directed by the Engineer or licensed arborist supervising the work.

Article 9.52.03 – Method of Measurement is supplemented as follows:

Tree protection trench will not be measured for payment. Rather, this work shall be included in the contract lump sum price for “Selective Clearing and Thinning”.

ITEM # 0970006A TRAFFICPERSON (MUNICIPAL POLICE OFFICER)

ITEM # 0970007A TRAFFICPERSON (UNIFORMED FLAGGER)

This item shall conform to Section 9.70 TRAFFICPERSON, of the Form 816, amended as follows:

Description: Add the following to the first paragraph of Section 9.70.01

“Trafficpersons shall consist of uniformed flaggers meeting acceptable criteria or extra duty officers of the Glastonbury Police Department. The Contractor shall provide Uniformed Flaggers meeting the requirements of this specification as required for safe traffic operations in the project area. Extra-duty police officers will be used only when specifically required by the Police Chief, as the Local Traffic Authority, who will make this determination based on the Contractor’s proposed operations, traffic volumes, and traffic conditions.”

“All work under this item shall be paid only for the duration of the Contract as contained in the Special Conditions under ‘Time for Completion/Notice to Proceed’ and for any time extensions granted in writing by the Town. Payment for police officers required after the duration of the Contract and approved time extensions shall be made directly by the Town and such costs deducted from future payments due the Contractor.”

Basis of Payment: Replace Section 9.70.05 with the following:

“There will be no direct payment for safety garments or STOP/SLOW paddles. All costs associated with furnishing safety garments and STOP/SLOW paddles shall be considered included in the general cost of the item.

1. Trafficperson - Uniformed Flagger: Uniformed flaggers will be paid for at the contract unit price per hour for “Trafficperson (Uniformed Flagger)” as listed in the bid proposal, which price shall include all compensation, insurance benefits, and any other cost or liability incidental to the furnishing of the trafficpersons ordered.”

2. Trafficperson - Police Officer: The sum of money shown on the bid proposal as "Estimated Cost" for this work will be considered the bid price even though payment will be made as described below. The estimated cost figure is not to be altered in any manner by the bidder. Should the bidder alter the amount shown, the altered figures will be disregarded and the original price will be used to determine the total amount for the contract.

Police Officers will be paid for at the actual hourly rate charged for extra-duty police officers services by the Town (monthly statement or receipted bills) plus a 5% markup. Use of a Town police vehicle requested by the Engineer will be paid at the actual rate charged by the Town plus a 5% markup. The rate charged by the Town for use of a Uniformed Town Police Officer and/or an official Town Police vehicle shall not be greater than the rate it normally charges others for similar services.

ITEM # 0971001A MAINTENANCE AND PROTECTION OF TRAFFIC

Article 9.71.01 – Description is supplemented by the following:

The Contractor shall maintain and protect traffic as described by the following and as limited in the Special Provision "Prosecution and Progress":

The Town of Glastonbury CHIEF OF POLICE, acting in the capacity of the LOCAL TRAFFIC AUTHORITY, shall be the sole and final authority for the Maintenance and Protection of Traffic.

All Roadways

The Contractor shall maintain and protect a minimum of one lane of traffic in each direction, each lane on a paved travel path not less than 11 feet in width.

Excepted therefrom will be those periods, during the allowable periods, when the Contractor is actively working on the installation of utilities crossing the entire width of a roadway, at which time the Contractor shall maintain and protect at least an alternating one-way traffic operation, on a paved travel path not less than 11 feet in width. The length of the alternating one-way traffic operation shall not exceed 300 feet and there shall be no more than one alternating one-way traffic operation within the project limits without prior approval of the Engineer.

Excepted therefrom will be those periods, during the allowable periods, when the Contractor is actively working on the reconstruction of House Street between Station 4+40 and 5+50, at which time the Contractor shall maintain and protect at least an alternating one-way traffic operation, on a paved or unpaved travel path not less than 11 feet in width. The length of the alternating one-way traffic operation shall not exceed 300 feet and there shall be no more than one alternating one-way traffic operation within the project limits without prior approval of the Engineer.

Commercial and Residential Driveways

The Contractor shall maintain access to and egress from all commercial and residential driveways throughout the project limits. The Contractor will be allowed to close said driveways to perform the required work during those periods when the businesses are closed, unless permission is granted from the business owner to close the driveway during business hours. If a temporary closure of a residential driveway is necessary, the Contractor shall coordinate with the owner to determine the time period of the closure.

Article 9.71.03 - Construction Method is supplemented as follows:

General

The Contractor shall schedule operations such that all open excavations are backfilled or steel plated by the end of each active work period. The installation of steel plates shall be approved by the Town of Glastonbury Public Works Department prior to installation. Trenches and other excavations within the travelway that are backfilled shall be brought up to finished grade and paved with bituminous concrete pavement prior to reopening the roadway to vehicular traffic.

When the Contractor is excavating adjacent to the roadway, the Contractor shall provide a 3-foot shoulder between the work area and travel lanes, with traffic drums spaced every 20 feet. At the end of the workday, if

the vertical drop-off exceeds 3 inches, the Contractor shall provide a temporary traversable slope of 4:1 or flatter that is acceptable to the Engineer.

The Contractor, during the course of active construction work on overhead signs and structures, shall close the lanes directly below the work area for the entire length of time overhead work is being undertaken. At no time shall an overhead sign be left partially removed or installed.

If applicable, when an existing sign is removed, it shall be either relocated or replaced by a new sign during the same working day.

The Contractor shall not store any material on-site which would present a safety hazard to motorists or pedestrians (e.g. fixed object or obstruct sight lines).

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

Traffic Signals

Loop detectors disturbed by the Contractor's operations shall be made operational, in accordance Connecticut Department of Transportation standards, or temporary detection shall be provided within 24 hours of the termination of the existing loop detectors.

Existing Signing

The Contractor shall maintain all existing overhead and side-mounted signs throughout the project limits during the duration of the project. The Contractor shall temporarily relocate signs and sign supports as many times as deemed necessary, and install temporary sign supports if necessary and as directed by the Engineer.

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. 42-inch traffic cones and approved traffic drums are to be utilized for lane closures.

Requirements for Winter

The Contractor shall schedule a meeting with representatives from the Town of Glastonbury to determine what interim traffic control measures the Contractor shall accomplish for the winter to provide safety to the motorists and permit adequate snow removal procedures. This meeting shall be held prior to October 31 of each year and will include, but not be limited to, discussion of the status and schedule of the following items: lane and shoulder widths, pavement restoration, traffic signal work, pavement markings, and signing.

TRAFFIC CONTROL DURING CONSTRUCTION OPERATIONS

The following guidelines shall assist field personnel in determining when and what type of traffic control patterns to use for various situations. These guidelines shall provide for the safe and efficient movement of traffic through work zones and enhance the safety of work forces in the work area.

TRAFFIC CONTROL PATTERNS

Traffic control patterns shall be used when a work operation requires that all or part of any vehicle or work area protrudes onto any part of a travel lane or shoulder. For each situation, the installation of traffic control devices shall be based on the following:

- Speed and volume of traffic
- Duration of operation
- Exposure to hazards

Traffic control patterns shall be uniform, neat and orderly so as to command respect from the motorist.

In the case of a horizontal or vertical sight restriction in advance of the work area, the traffic control pattern shall be extended to provide adequate sight distance for approaching traffic.

If a lane reduction taper is required to shift traffic, the entire length of the taper should be installed on a tangent section of roadway so that the entire taper area can be seen by the motorist.

Any existing signs that are in conflict with the traffic control patterns shall be removed, covered, or turned so that they are not readable by oncoming traffic.

When installing a traffic control pattern, a Buffer Area should be provided and this area shall be free of equipment, workers, materials and parked vehicles.

Typical traffic control plans 19 through 25 may be used for moving operations such as line striping, pot hole patching, mowing, or sweeping when it is necessary for equipment to occupy a travel lane.

Traffic control patterns will not be required when vehicles are on an emergency patrol type activity or when a short duration stop is made and the equipment can be contained within the shoulder. Flashing lights and appropriate trafficperson shall be used when required.

Although each situation must be dealt with individually, conformity with the typical traffic control plans contained herein is required. In a situation not adequately covered by the typical traffic control plans, the Contractor must contact the Engineer for assistance prior to setting up a traffic control pattern.

PLACEMENT OF SIGNS

Signs must be placed in such a position to allow motorists the opportunity to reduce their speed prior to the work area. Signs shall be installed on the same side of the roadway as the work area. On multi-lane divided highways, advance warning signs shall be installed on both sides of the highway. On directional roadways (on-ramps, off-ramps, one-way roads), where the sight distance to signs is restricted, these signs should be installed on both sides of the roadway.

ALLOWABLE ADJUSTMENT OF SIGNS AND DEVICES SHOWN ON THE TRAFFIC CONTROL PLANS

The traffic control plans contained herein show the location and spacing of signs and devices under ideal conditions. Signs and devices should be installed as shown on these plans whenever possible.

The proper application of the traffic control plans and installation of traffic control devices depends on actual field conditions.

Adjustments to the traffic control plans shall be made only at the direction of the Engineer to improve the visibility of the signs and devices and to better control traffic operations.

Adjustments to the traffic control plans shall be based on safety of work forces and motorists, abutting property requirements, driveways, side roads, and the vertical and horizontal curvature of the roadway.

The Engineer may require that the traffic control pattern be located significantly in advance of the work area to provide better sight line to the signing and safer traffic operations through the work zone.

Table I indicates the minimum taper length required for a lane closure based on the posted speed limit of the roadway. These taper lengths shall only be used when the recommended taper lengths shown on the traffic control plans cannot be achieved.

TABLE I – MINIMUM TAPER LENGTHS

POSTED SPEED LIMIT MILES PER HOUR	MINIMUM TAPER LENGTH IN FEET FOR A SINGLE LANE CLOSURE
30 OR LESS	180
35	250
40	320
45	540
50	600
55	660
65	780

SECTION 1. WORK ZONE SAFETY MEETINGS

- 1.a) Prior to the commencement of work, a work zone safety meeting will be conducted with representatives of the Town Engineer, Municipal Police, the Contractor (Project Superintendent) and the Traffic Control Subcontractor (if different than the prime Contractor) to review the traffic operations, lines of responsibility, and operating guidelines which will be used on the project. Other work zone safety meetings during the course of the project should be scheduled as needed.

- 1.b) A Work Zone Safety Meeting Agenda shall be developed and used at the meeting to outline the anticipated traffic control issues during the construction of this project. Any issues that can't be resolved at these meetings will be brought to the attention of the District Engineer and the Office of Construction. The agenda should include:
 - Review Project scope of work and time
 - Review Section 1.08, Prosecution and Progress
 - Review Section 9.70, Trafficpersons
 - Review Section 9.71, Maintenance and Protection of Traffic
 - Review Contractor's schedule and method of operations.
 - Review areas of special concern: ramps, turning roadways, medians, lane drops, etc.
 - Open discussion of work zone questions and issues
 - Discussion of review and approval process for changes in contract requirements as they relate to work zone areas

SECTION 2. GENERAL

- 2.a) If the required minimum number of signs and equipment (i.e. one High Mounted Internally Illuminated Flashing Arrow for each lane closed, two TMAs, Changeable Message Sign, etc.) are not available; the traffic control pattern shall not be installed.
- 2.b) The Contractor shall have back-up equipment (TMAs, High Mounted Internally Illuminated Flashing Arrow, Changeable Message Sign, construction signs, cones/drums, etc.) available at all times in case of mechanical failures, etc. The only exception to this is in the case of sudden equipment breakdowns in which the pattern may be installed but the Contractor must provide replacement equipment within 24 hours.
- 2.c) Failure of the Contractor to have the required minimum number of signs, personnel and equipment, which results in the pattern not being installed, shall not be a reason for a time extension or claim for loss time.
- 2.d) In cases of legitimate differences of opinion between the Contractor and the Inspection staff, the Inspection staff shall err on the side of safety. The matter shall be brought to the Town Engineer for resolution immediately or, in the case of work after regular business hours, on the next business day.

SECTION 3. INSTALLING AND REMOVING TRAFFIC CONTROL PATTERNS

- 3.a) Lane Closures shall be installed beginning with the advanced warning signs and proceeding forward toward the work area.
- 3.b) Lane Closures shall be removed in the reverse order, beginning at the work area, or end of the traffic control pattern, and proceeding back toward the advanced warning signs.
- 3.c) Stopping traffic may be allowed:
 - As per the contract for such activities as blasting, steel erection, etc.
 - During paving, milling operations, etc. where, in the middle of the operation, it is necessary to flip the pattern to complete the operation on the other half of the roadway and traffic should not travel across the longitudinal joint or difference in roadway elevation.
 - To move slow moving equipment across live traffic lanes into the work area.
- 3.d) Under certain situations when the safety of the traveling public and/or that of the workers may be compromised due to conditions such as traffic volume, speed, roadside obstructions, or sight line deficiencies, as determined by the Engineer and/or State Police, traffic may be briefly impeded while installing and/or removing the advanced warning signs and the first ten traffic cones/drums only. Appropriate measures shall be taken to safely slow traffic. If required, traffic slowing techniques may be used and shall include the use of Truck Mounted Impact Attenuators (TMAs) as appropriate, for a minimum of one mile in advance of the pattern starting point. Once the advanced warning signs and the first ten traffic cones/drums are installed/removed, the TMAs and sign crew shall continue to install/remove the pattern as described in Section 5c and traffic shall be allowed to resume their normal travel.
- 3.e) The Contractor must adhere to using the proper signs, placing the signs correctly, and ensuring the proper spacing of signs.

- 3.f) Additional devices are required on entrance ramps, exit ramps, and intersecting roads to warn and/or move traffic into the proper travel path prior to merging/exiting with/from the main line traffic. This shall be completed before installing the mainline pattern past the ramp or intersecting roadway.
- 3.g) Prior to installing a pattern, any conflicting existing signs shall be covered with an opaque material. Once the pattern is removed, the existing signs shall be uncovered.
- 3.h) On limited access roadways, workers are prohibited from crossing the travel lanes to install and remove signs or other devices on the opposite side of the roadway. Any signs or devices on the opposite side of the roadway shall be installed and removed separately.

SECTION 4. USE OF HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

- 4.a) On limited access roadways, one Flashing Arrow shall be used for each lane that is closed. The Flashing Arrow shall be installed concurrently with the installation of the traffic control pattern and its placement shall be as shown on the traffic control plan. For multiple lane closures, one Flashing Arrow is required for each lane closed. If conditions warrant, additional Flashing Arrows should be employed (i.e.: curves, major ramps, etc.).
- 4.b) On non-limited access roadways, the use of a Flashing Arrow for lane closures is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to use the Flashing Arrow.
- 4.c) The Flashing Arrow shall not be used on two lane, two-way roadways for temporary alternating one-way traffic operations.
- 4.d) The Flashing Arrow board display shall be in the "arrow" mode for lane closure tapers and in the "caution" mode (four corners) for shoulder work, blocking the shoulder, or roadside work near the shoulder. The Flashing Arrow shall be in the "caution" mode when it is positioned in the closed lane.
- 4.e) The Flashing Arrow shall not be used on a multi-lane roadway to laterally shift all lanes of traffic, because unnecessary lane changing may result.

SECTION 5. USE OF TRUCK MOUNTED IMPACT ATTENUATOR VEHICLES (TMAs)

- 5.a) For lane closures on limited access roadways, a minimum of two TMAs shall be used to install and remove traffic control patterns. If two TMAs are not available, the pattern shall not be installed.
- 5.b) On non-limited access roadways, the use of TMAs to install and remove patterns closing a lane(s) is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to utilize the TMAs.
- 5.c) Generally, to establish the advance and transition signing, one TMA shall be placed on the shoulder and the second TMA shall be approximately 1,000 feet ahead blocking the lane. The flashing arrow board mounted on the TMA should be in the "flashing arrow" mode when taking the lane. The sign truck and workers should be immediately ahead of the second TMA. In no case shall the TMA be used as the sign truck or a work truck. Once the transition is in place, the TMAs shall travel in the closed lane until all Changeable Message Signs, signs, Flashing Arrows, and cones/drums are installed. The flashing arrow board mounted on the TMA should be in the "caution" mode when traveling in the closed lane.

- 5.d) A TMA shall be placed prior to the first work area in the pattern. If there are multiple work areas within the same pattern, then additional TMAs shall be positioned at each additional work area as needed. The flashing arrow board mounted on the TMA should be in the "caution" mode when in the closed lane.
- 5.e) TMAs shall be positioned a sufficient distance prior to the workers or equipment being protected to allow for appropriate vehicle roll-ahead in the event that the TMA is hit, but not so far that an errant vehicle could travel around the TMA and into the work area. For additional placement and use details, refer to the specification entitled "Type 'D' Portable Impact Attenuation System". Some operations, such as paving and concrete repairs, do not allow for placement of the TMA(s) within the specified distances. In these situations, the TMA(s) should be placed at the beginning of the work area and shall be advanced as the paving or concrete operations proceed.
- 5.f) TMAs should be paid in accordance with how the unit is utilized. When it is used as a TMA and is in the proper location as specified, and then it should be paid at the specified hourly rate for "Type 'D' Portable Impact Attenuation System". When the TMA is used as a Flashing Arrow, it should be paid at the daily rate for "High Mounted Internally Illuminated Flashing Arrow". If a TMA is used to install and remove a pattern and then is used as a Flashing Arrow, the unit should be paid as a "Type 'D' Portable Impact Attenuation System" for the hours used to install and remove the pattern, typically 2 hours (1 hour to install and 1 hour to remove), and is also paid for the day as a "High Mounted Internally Illuminated Flashing Arrow".

SECTION 6. USE OF TRAFFIC DRUMS AND TRAFFIC CONES

- 6.a) Traffic drums shall be used for taper channelization on limited-access roadways, ramps, and turning roadways and to delineate raised catch basins and other hazards.
- 6.b) Traffic drums shall be used in place of traffic cones in traffic control patterns that are in effect for more than a 36-hour duration.
- 6.c) Traffic Cones less than 42 inches in height shall not be used on limited-access roadways or on non-limited access roadways with a posted speed limit of 45 mph and above.
- 6.d) Typical spacing of traffic drums and/or cones shown on the Traffic Control Plans in the Contract are maximum spacings and may be reduced to meet actual field conditions as required.

9.71.03 Construction Methods

Signing Patterns

The Contractor shall provide such safety measures, pavement markings, traffic control devices, incidental flagmen, and signs deemed necessary to safeguard and guide the traveling public through the work zones as ordered by the Engineer, included in the approved maintenance scheme, or as shown on the plan. The Contractor shall erect, maintain, move, adjust, clean, relocate, store all signs, barricades, drums, traffic cones, and delineators when, where, and as directed by the Engineer. The use of unauthorized or unapproved signs, barricades, drums, traffic cones, or delineators will not be permitted.

All signs in any one signing pattern shall be mounted at the same height above the pavement. The Contractor shall keep all signs in proper position, clean and legible at all times. The Contractor shall maintain the site so that no weeds, shrubbery, construction materials, equipment or soil will obscure any sign, light, or barricade. Signs that no longer pertain to the project conditions shall be removed or adjusted from the view of traffic. 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. Traffic drums shall be used to delineate raised catch basins and other hazards.

Pavement Markings

During construction, the Contractor shall maintain all pavement markings on paved surfaces on all roadways throughout the limits of the project.

Interim Pavement Markings

The Contractor shall install painted pavement markings, which shall include centerlines, shoulder edge lines, lane lines (broken lines), lane-use arrows, and stop bars, on each intermediate course of bituminous concrete pavement and on any milled surface by the end of the work day/night. If the next course of bituminous concrete pavement will be placed within seven days, shoulder edge lines are not required. The painted pavement markings will be paid under the appropriate items.

If the Contractor will install another course of bituminous concrete pavement within 24 hours, the Contractor may install Temporary Plastic Pavement Marking Tape in place of the painted pavement markings by the end of the work day/night. These temporary pavement markings shall include centerlines, lane lines (broken lines) and stop bars; shoulder edge lines are not required. Centerlines shall consist of two 4 inch wide yellow markings, 2 feet in length, side by side, 4 to 6 inches apart, at 40-foot intervals. No passing zones should be posted with signs in those areas where the final centerlines have not been established on two-way roadways. Stop bars may consist of two 6 inch wide white markings or three 4 inch wide white markings placed side by side. The Contractor shall remove and dispose of the Temporary Plastic Pavement Marking Tape when another course of bituminous concrete pavement is installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

If an intermediate course of bituminous concrete pavement will be exposed throughout the winter, then Epoxy Resin Pavement Markings should be installed unless directed otherwise by the Engineer.

Final Pavement Markings

The Contractor should install painted pavement markings on the final course of bituminous concrete pavement by the end of the work day/night. If the painted pavement markings are not installed by the end of the work day/night, then Temporary Plastic Pavement Marking Tape shall be installed as described above and the painted pavement markings shall be installed by the end of the work day/night on Friday of that week.

If Temporary Plastic Pavement Marking Tape is installed, the Contractor shall remove and dispose of these markings when the painted pavement markings are installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

The Contractor shall install permanent Epoxy Resin Pavement Markings in accordance with Section 12.10 entitled "Epoxy Resin Pavement Markings, Symbols, and Legends" after such time as determined by the Engineer.

NOTE: Painted pavement markings will not be allowed as a substitution for either the permanent pavement markings or the Temporary Plastic Pavement Marking Tape on the final course of bituminous concrete pavement.

Dust Control

The Contractor shall be responsible for taking all steps necessary to minimize dust emanating from the project and for keeping the street free of accumulations of sand or similar materials. When ordered by the

Engineer, the Contractor shall remove snow and take care of ice on temporary, new and existing sidewalks within the limits of the project. No additional payment will be made for this work.

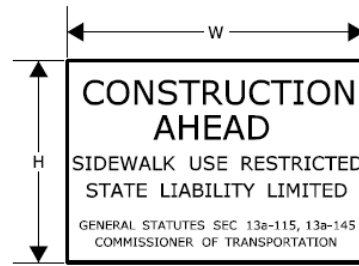
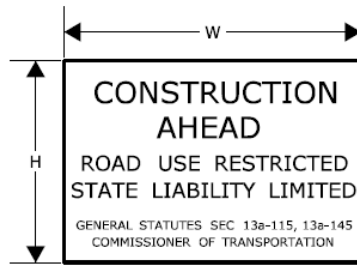
Article 9.71.05 – Basis of Payment

When the item of "Maintenance and Protection of Traffic" appears in the contract, this work will be paid for at the contract lump sum price for "Maintenance and Protection of Traffic." This price shall include all material, equipment, tools, labor, transportation, operations and all work incidental thereto. The amount of the lump sum paid in any given period shall be proportional to the percentage of the total of all other work completed. All materials including construction signs, barricades, traffic cones, traffic drums, and miscellaneous materials associated with the Work in this Item, and the costs for labor, equipment and services involved in the erection, maintenance, moving, adjusting, cleaning, relocating and storing of signs, barricades, drums, traffic cones and delineators furnished by the Contractor as well as all costs of labor and equipment involved in the maintenance of traffic lanes and detours, except for pavement markings, ordered or included in the approved scheme for maintenance of traffic.

Should the Contractor fail to perform any of the work required under this item, the Town may perform or arrange for others to perform such work. In those instances, the Town will deduct money due or money to become due to the contractor all expenses connected with the execution of this work. This money shall be deducted even if the Town expense exceeds the price bid for this work by the Contractor.

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.

SERIES 16 SIGNS



		W	H
16-E	80-1605	84"	60"
16-H	80-1608	60"	42"
16-M	80-1613	30"	24"

		W	H
16-S	80-1619	48"	30"

THE 16-S SIGN SHALL BE USED ON ALL PROJECTS THAT REQUIRE SIDEWALK RECONSTRUCTION OR RESTRICT PEDESTRIAN TRAVEL ON AN EXISTING SIDEWALK.

SERIES 16 SIGNS SHALL BE INSTALLED IN ADVANCE OF THE TRAFFIC CONTROL PATTERNS TO ALLOW MOTORISTS THE OPPORTUNITY TO AVOID A WORK ZONE, SERIES 16 SIGNS SHALL BE INSTALLED ON ANY MAJOR INTERSECTING ROADWAYS THAT APPROACH THE WORK ZONE. ON LIMITED-ACCESS HIGHWAYS, THESE SIGNS SHALL BE LOCATED IN ADVANCE OF THE NEAREST UPSTREAM EXIT RAMP AND ON ANY ENTRANCE RAMP PRIOR TO OR WITHIN THE WORK ZONE LIMITS.

THE LOCATION OF SERIES 16 SIGNS CAN BE FOUND ELSEWHERE IN THE PLANS OR INSTALLED AS DIRECTED BY THE ENGINEER.

SIGNS 16-E AND 16-H SHALL BE POST-MOUNTED.

SIGN 16-E SHALL BE USED ON ALL EXPRESSWAYS.

SIGN 16-H SHALL BE USED ON ALL RAMP, OTHER STATE ROADWAYS, AND MAJOR TOWN/CITY ROADWAYS.

SIGN 16-M SHALL BE USED ON OTHER TOWN ROADWAYS.

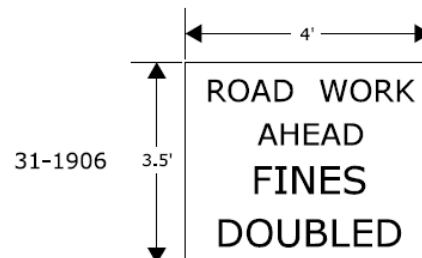
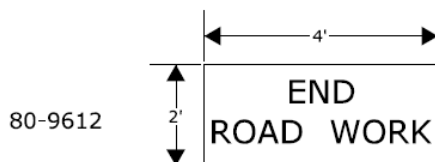
REGULATORY SIGN "ROAD WORK AHEAD, FINES DOUBLED"

THE REGULATORY SIGN "ROAD WORK AHEAD FINES DOUBLED" SHALL BE INSTALLED FOR ALL WORK ZONES THAT OCCUR ON ANY STATE HIGHWAY IN CONNECTICUT WHERE THERE ARE WORKERS ON THE HIGHWAY OR WHEN THERE IS OTHER THAN EXISTING TRAFFIC OPERATIONS.

THE "ROAD WORK AHEAD FINES DOUBLED" REGULATORY SIGN SHALL BE PLACED AFTER THE SERIES 16 SIGN AND IN ADVANCE OF THE "ROAD WORK AHEAD" SIGN.

"END ROAD WORK" SIGN

THE LAST SIGN IN THE PATTERN MUST BE THE "END ROAD WORK" SIGN.



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN
REQUIRED SIGNS

NOTES FOR TRAFFIC CONTROL PLANS

1. IF A TRAFFIC STOPPAGE OCCURS IN ADVANCE OF SIGN (A), THEN AN ADDITIONAL SIGN (A) SHALL BE INSTALLED IN ADVANCE OF THE STOPPAGE.
2. SIGNS (AA), (A), AND (D) SHOULD BE OMITTED WHEN THESE SIGNS HAVE ALREADY BEEN INSTALLED TO DESIGNATE A LARGER WORK ZONE THAN THE WORK ZONE THAT IS ENCOMPASSED ON THIS PLAN.
3. SEE TABLE 1 FOR ADJUSTMENT OF TAPERS IF NECESSARY.
4. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN TRAFFIC DRUMS SHALL BE USED IN PLACE OF TRAFFIC CONES.
5. ANY LEGAL SPEED LIMIT SIGNS WITHIN THE LIMITS OF A ROADWAY / LANE CLOSURE AREA SHALL BE COVERED WITH AN OPAQUE MATERIAL WHILE THE CLOSURE IS IN EFFECT, AND UNCOVERED WHEN THE ROADWAY / LANE CLOSURE IS RE-OPENED TO ALL LANES OF TRAFFIC.
6. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN ANY EXISTING CONFLICTING PAVEMENT MARKINGS SHALL BE ERADICATED OR COVERED, AND TEMPORARY PAVEMENT MARKINGS THAT DELINEATE THE PROPER TRAVELPATHS SHALL BE INSTALLED.
7. DISTANCES BETWEEN SIGNS IN THE ADVANCE WARNING AREA MAY BE REDUCED TO 100' ON LOW-SPEED URBAN ROADS (SPEED LIMIT < 40 MPH).
8. IF THIS PLAN IS TO REMAIN IN OPERATION DURING THE HOURS OF DARKNESS, INSTALL BARRICADE WARNING LIGHTS - HIGH INTENSITY ON ALL POST-MOUNTED DIAMOND SIGNS IN THE ADVANCE WARNING AREA.
9. A CHANGEABLE MESSAGE SIGN SHALL BE INSTALLED ONE HALF TO ONE MILE IN ADVANCE OF THE LANE CLOSURE TAPER.
10. SIGN (P) SHALL BE MOUNTED A MINIMUM OF 7 FEET FROM THE PAVEMENT SURFACE TO THE BOTTOM OF THE SIGN.

TABLE 1 - MINIMUM TAPER LENGTHS

POSTED SPEED LIMIT (MILES PER HOUR)	MINIMUM TAPER LENGTH FOR A SINGLE LANE CLOSURE
30 OR LESS	180' (55m)
35	250' (75m)
40	320' (100m)
45	540' (165m)
50	600' (180m)
55	660' (200m)
65	780' (240m)

METRIC CONVERSION CHART (1" = 25mm)

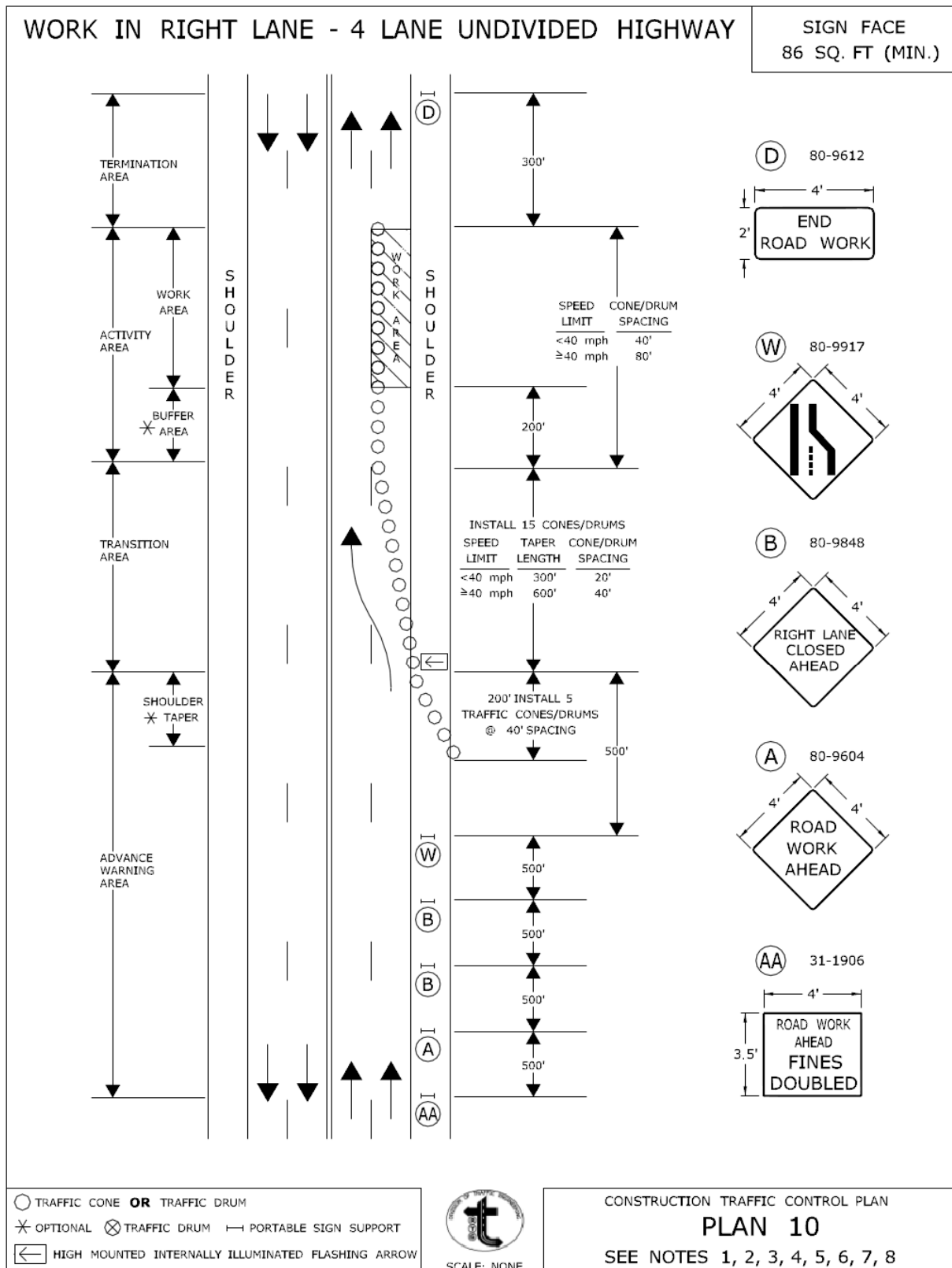
ENGLISH	METRIC	ENGLISH	METRIC	ENGLISH	METRIC
12"	300mm	42"	1050mm	72"	1800mm
18"	450mm	48"	1200mm	78"	1950mm
24"	600mm	54"	1350mm	84"	2100mm
30"	750mm	60"	1500mm	90"	2250mm
36"	900mm	66"	1650mm	96"	2400mm



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

NOTES



○ TRAFFIC CONE **OR** TRAFFIC DRUM

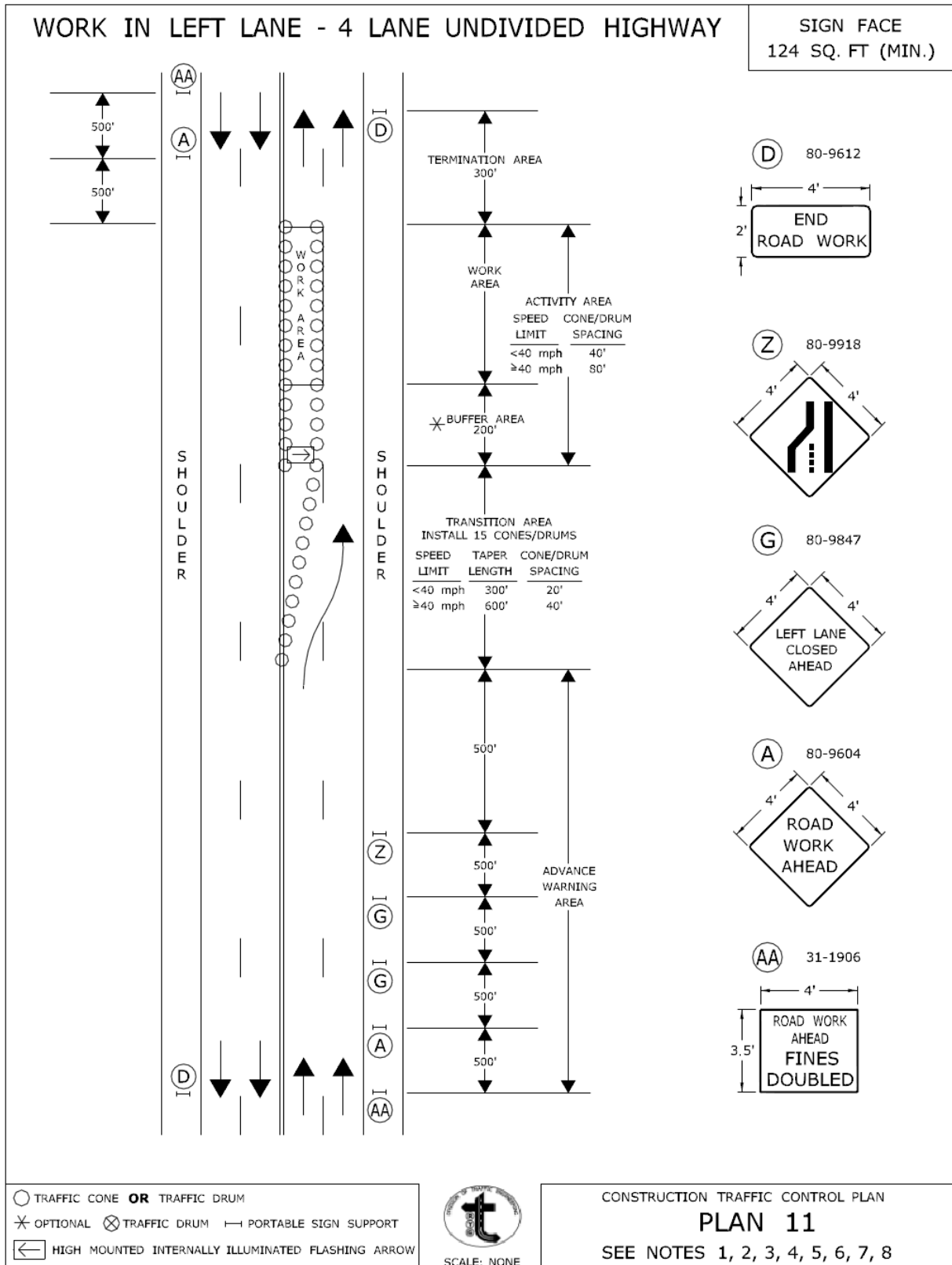
✱ OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT

← HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 10
SEE NOTES 1, 2, 3, 4, 5, 6, 7, 8

APPROVED *Charles S. Harlow* Charles S. Harlow
2012.06.05 15:54:15-0400
PRINCIPAL ENGINEER



○ TRAFFIC CONE **OR** TRAFFIC DRUM
 ✖ OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
 ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

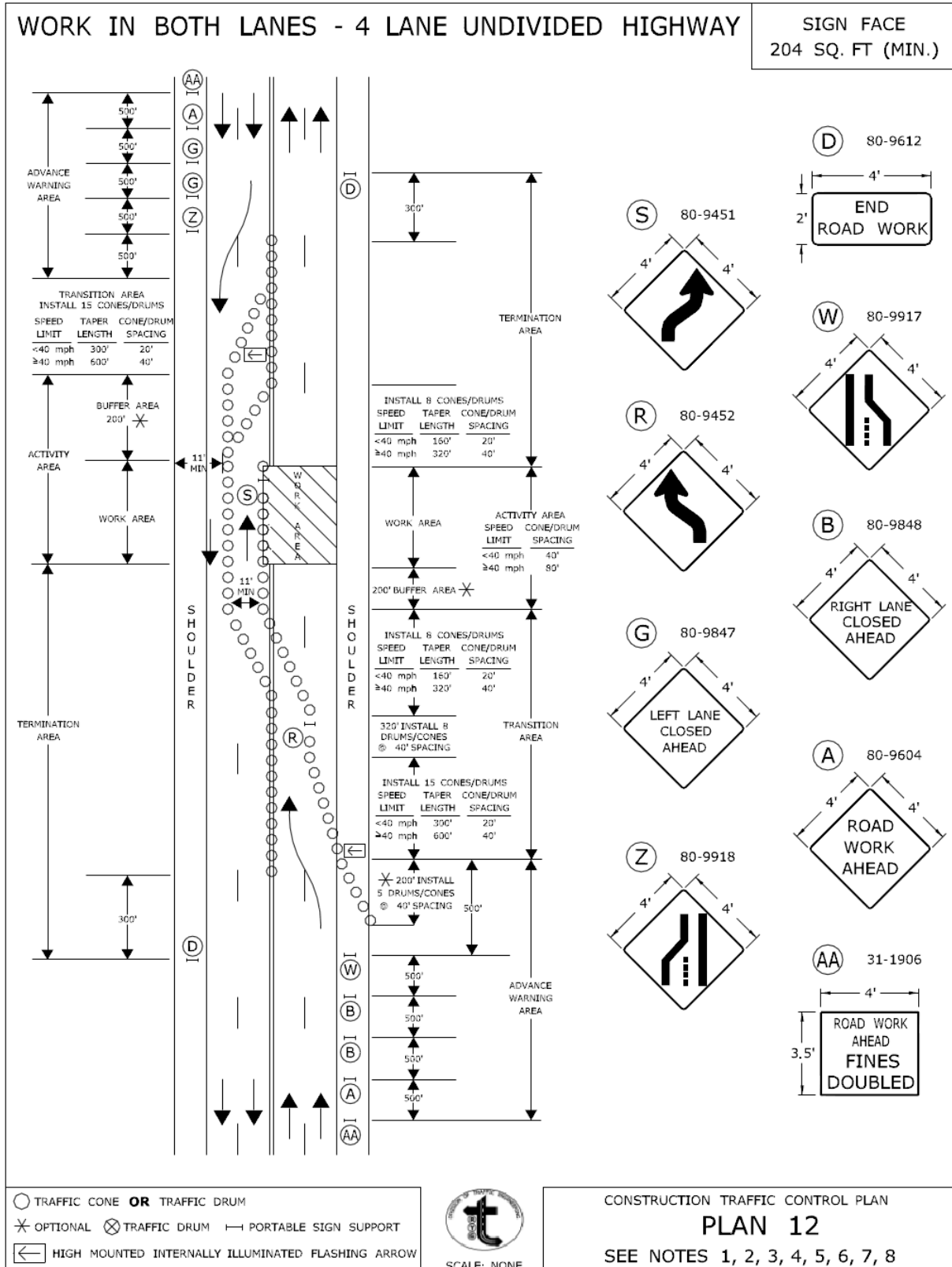
SCALE: NONE

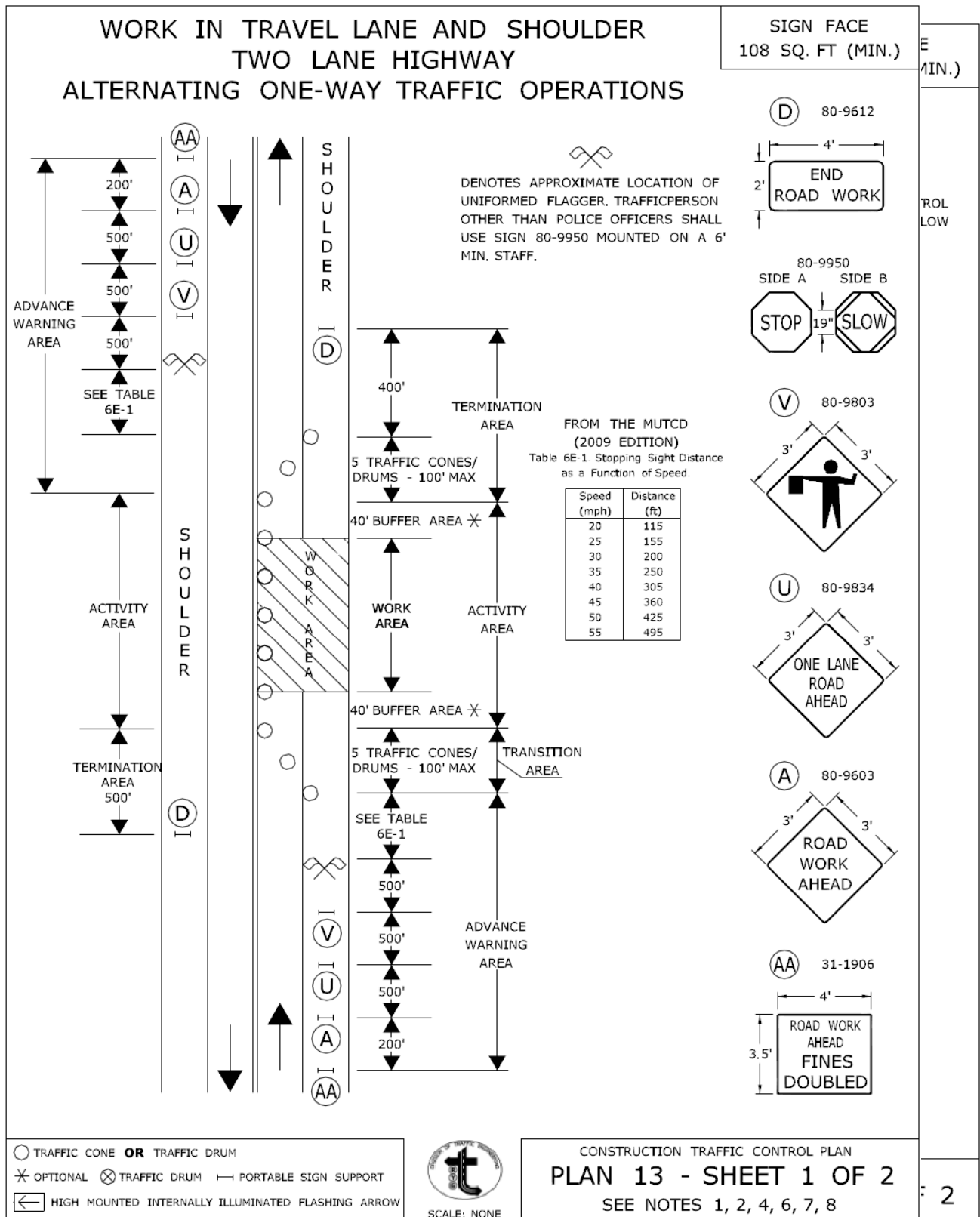
CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 11
 SEE NOTES 1, 2, 3, 4, 5, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED

Charles S. Harlow
2012.08.05 15:54:36-0400
PRINCIPAL ENGINEER





CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow* Charles S. Harlow
2012.06.05 15:55:23-04'00"
PRINCIPAL ENGINEER
PRINCIPAL ENGINEER

15-04'00"

WORK IN TRAVEL LANE AND SHOULDER TWO LANE HIGHWAY ALTERNATING ONE-WAY TRAFFIC OPERATIONS

SIGN FACE
108 SQ. FT (MIN.)

HAND SIGNAL METHODS TO BE USED BY UNIFORMED FLAGGERS

THE FOLLOWING METHODS FROM SECTION 6E.07, FLAGGER PROCEDURES, IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES," SHALL BE USED BY UNIFORMED FLAGGERS WHEN DIRECTING TRAFFIC THROUGH A WORK AREA. THE STOP/SLOW SIGN PADDLE (SIGN NO. 80-9950) SHOWN ON THE TRAFFIC STANDARD SHEET TR-1220 01 ENTITLED, "SIGNS FOR CONSTRUCTION AND PERMIT OPERATIONS" SHALL BE USED.

A. TO STOP TRAFFIC

TO STOP ROAD USERS, THE FLAGGER SHALL FACE ROAD USERS AND AIM THE STOP PADDLE FACE TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FREE ARM SHALL BE HELD WITH THE PALM OF THE HAND ABOVE SHOULDER LEVEL TOWARD APPROACHING TRAFFIC.



B. TO DIRECT TRAFFIC TO PROCEED

TO DIRECT STOPPED ROAD USERS TO PROCEED, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FLAGGER SHALL MOTION WITH THE FREE HAND FOR ROAD USERS TO PROCEED.



C. TO ALERT OR SLOW TRAFFIC

TO ALERT OR SLOW TRAFFIC, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. TO FURTHER ALERT OR SLOW TRAFFIC, THE FLAGGER HOLDING THE SLOW PADDLE FACE TOWARD ROAD USERS MAY MOTION UP AND DOWN WITH THE FREE HAND, PALM DOWN.



- TRAFFIC CONE **OR** TRAFFIC DRUM
- * OPTIONAL ⊗ TRAFFIC DRUM ⇨ PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

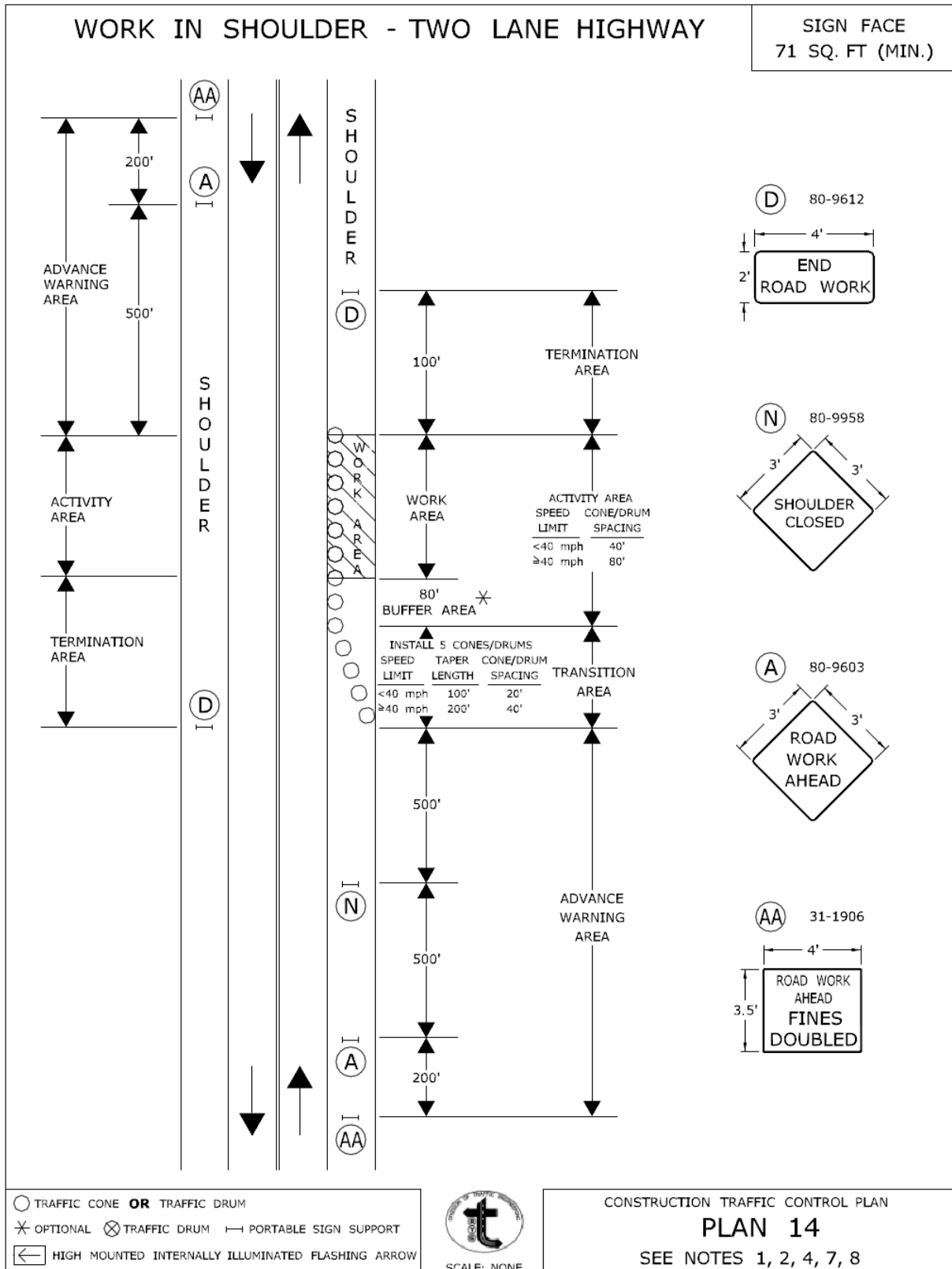
CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 13 - SHEET 2 OF 2
SEE NOTES 1, 2, 4, 6, 7, 8

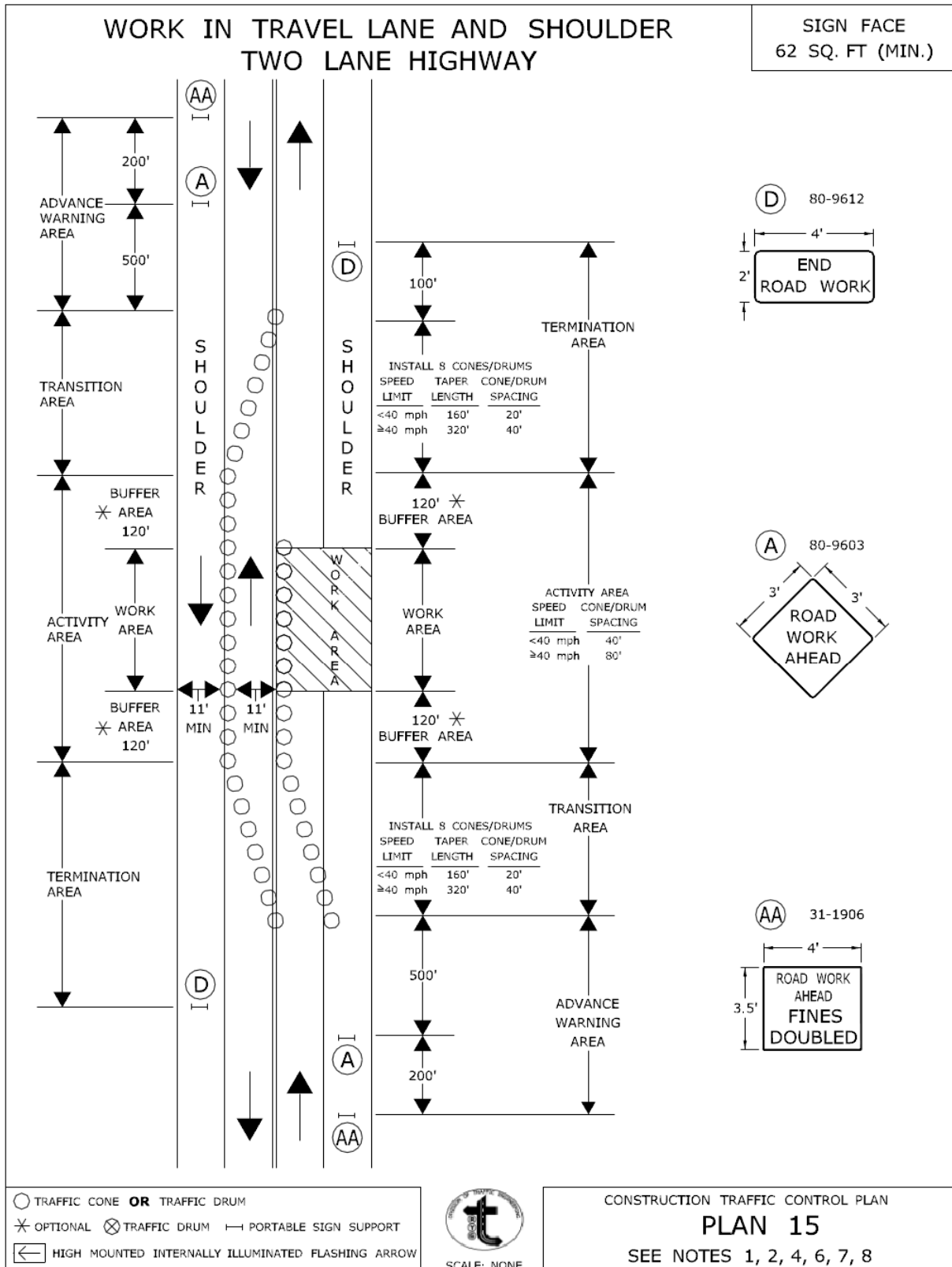
CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED

Charles S. Harlow
PRINCIPAL ENGINEER

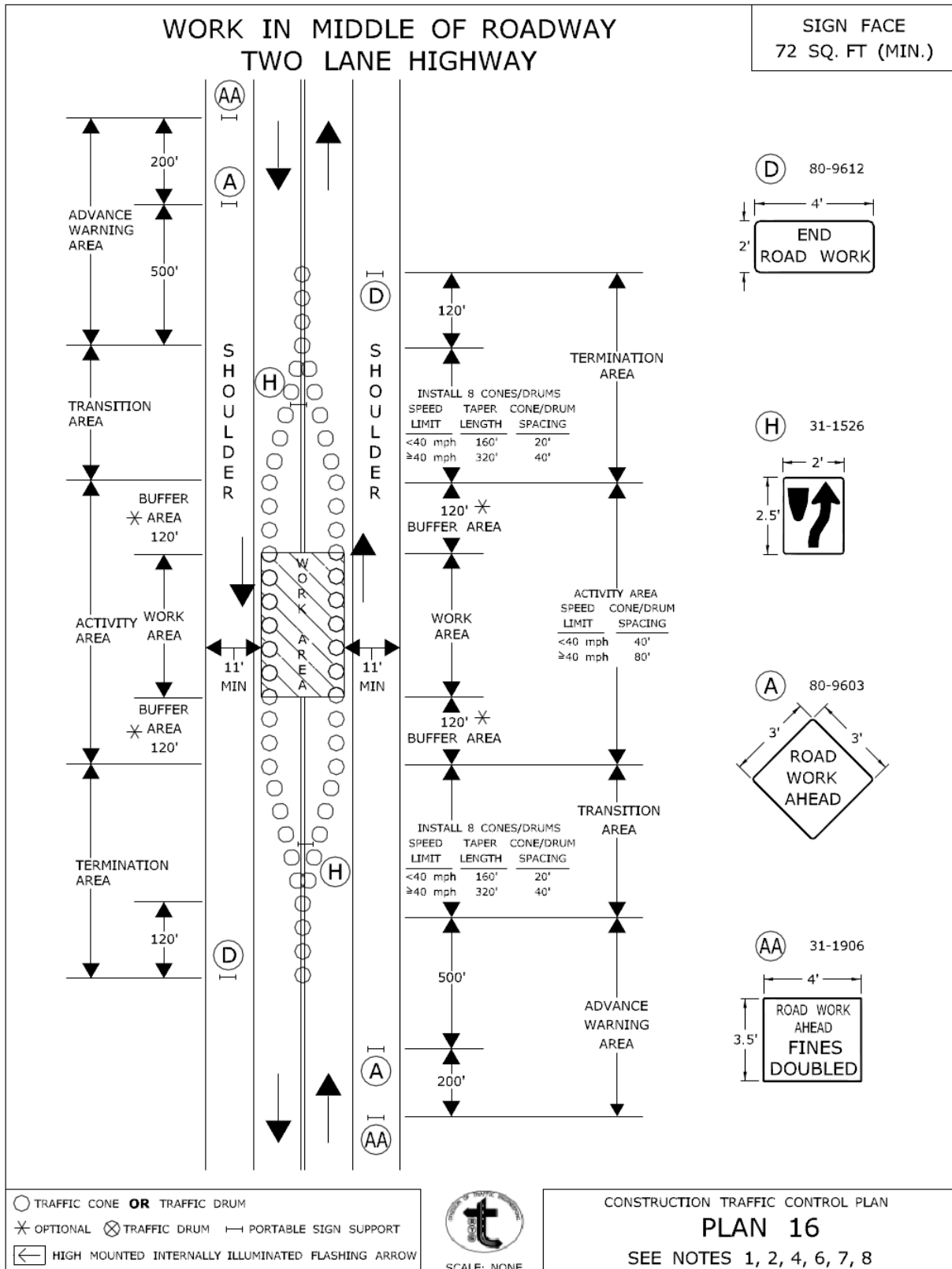
Charles S. Harlow
2012.06.05 15:55:45-04'00'





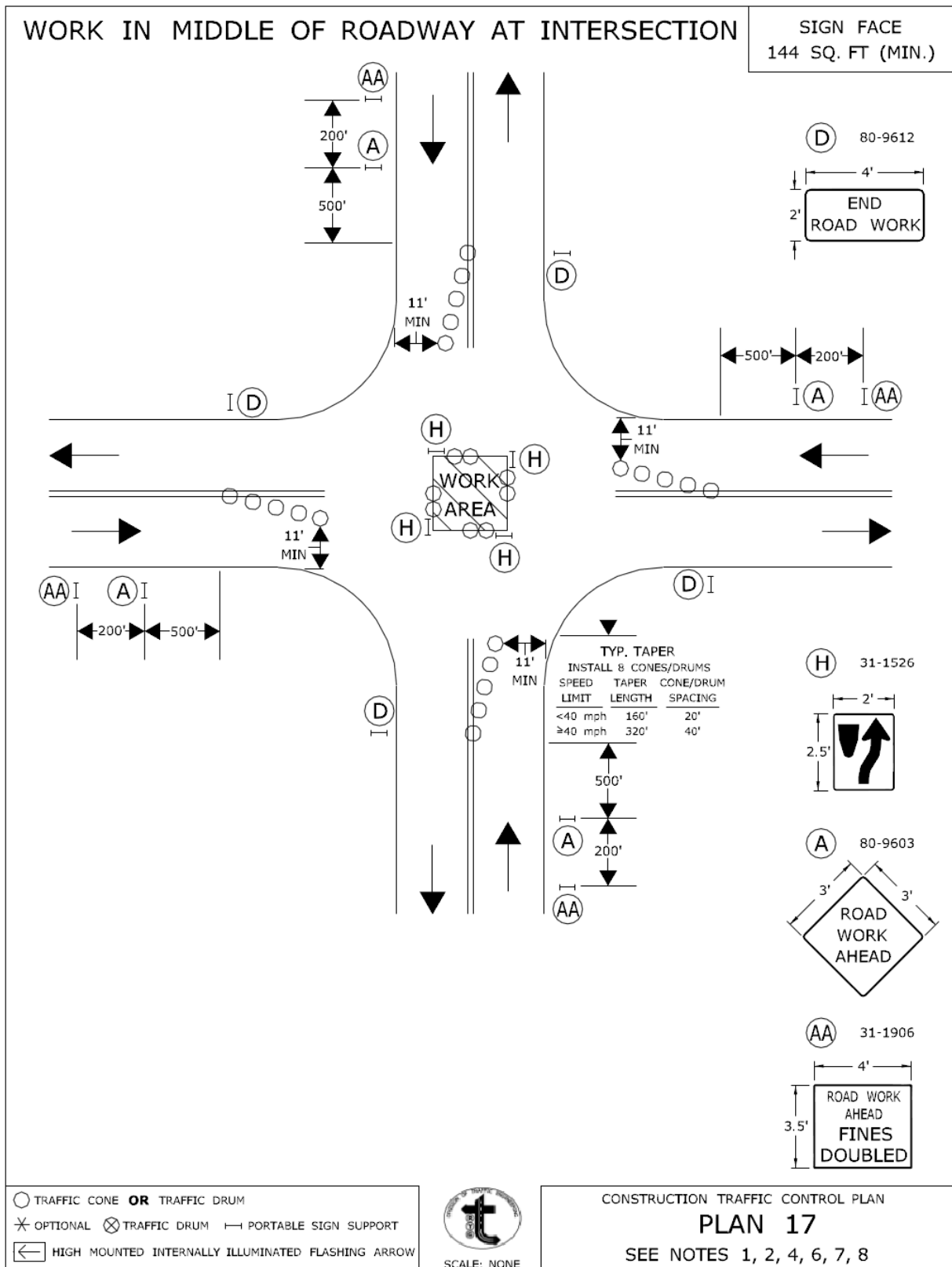
CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

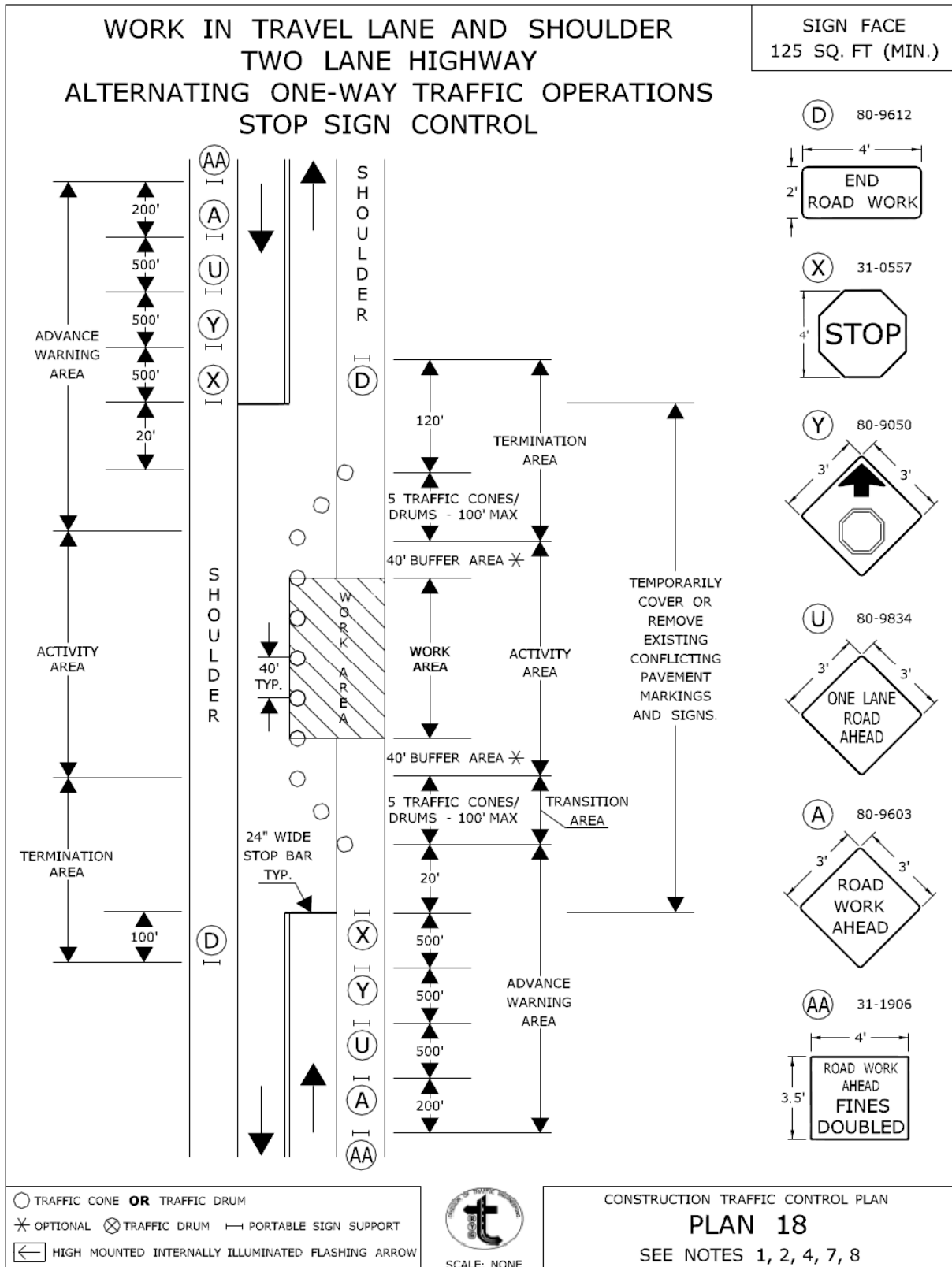
APPROVED *Charles S. Harlow* Charles S. Harlow
2012.06.05 15:56:29-04'00"
PRINCIPAL ENGINEER



CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow* Charles S. Harlow
2012.08.05 15:56:51-04'00"
PRINCIPAL ENGINEER





CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow* Charles S. Harlow
2012.06.05 15:57:37-0400'
PRINCIPAL ENGINEER

ITEM # 0979003A **CONSTRUCTION BARRICADE TYPE III**

Description: The Contractor shall furnish construction barricades to conform to the requirements in National Cooperative Highway Research Program (NCHRP) Report 350 or the AASHTO Manual for Assessing Safety Hardware (MASH) and to the requirements stated in Article 9.71 "Maintenance and Protection of Traffic," as shown on the plans and/or as directed by the Engineer.

Materials: Prior to using the construction barricades, 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 have been crash tested and have approval in writing from FHWA conforming to the requirements in National Cooperative Highway Research Program (NCHRP) Report 350 or the AASHTO Manual for Assessing Safety Hardware (MASH), as appropriate.

Alternate stripes of white and orange Type III or Type VI reflective sheeting shall be applied to the horizontal members as shown on the plans. Application of the reflective sheeting shall conform to the requirements specified by the reflective sheeting manufacturer. Only one type of sheeting shall be used on a barricade and all barricades furnished shall have the same type of reflective sheeting. Reflective sheeting shall conform to the requirements of Article M.18.09.01.

Construction barricades shall be designed and fabricated so as to prevent them from being blown over or displaced by the wind from passing vehicles. Construction barricades shall be approved by the Engineer before they are used.

Construction Methods: Ineffective barricades, 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.

Barricades that are no longer required shall be removed from the project and shall remain the property of the Contractor.

Method of Measurement: Construction Barricade Type III will be measured for payment by the number of construction barricades required and used.

Basis of Payment: "Construction Barricade Type III" required and used will be paid for at the Contract unit price per each. Each barricade will be paid for once, regardless of the number of times it is used.

(Rev. 4/22/14)

ITEM # 1010052A CAST IRON HANDHOLE COVER

Article 10.10.05 - Basis of Payment:

After the words "Cast Iron Handhole Cover, insert the phrase "of the type called for".

ITEM # 1206023A REMOVAL AND RELOCATION OF EXISTING SIGNS

Section 12.06 is supplemented as follows:

Article 12.06.01 – Description is supplemented with the following:

Work under this item shall consist of the removal and/or relocation of designated side-mounted extruded aluminum and sheet aluminum signs, sign posts, sign supports, and foundations where indicated on the plans or as directed by the Engineer. Work under this item shall also include furnishing and installing new sign posts and associated hardware for signs designated for relocation.

Article 12.06.03 – Construction Methods is supplemented with the following:

The Contractor shall take care during the removal and relocation of existing signs, sign posts, and sign supports that are to be relocated so that they are not damaged. Any material that is damaged shall be replaced by the Contractor at no cost to the State.

Foundations and other materials designated for removal shall be removed and disposed of by the Contractor as directed by the Engineer and in accordance with existing standards for Removal of Existing Signing.

Sheet aluminum signs designated for relocation are to be re-installed on new sign posts.

Article 12.06.04 – Method of Measurement is supplemented with the following:

Payment under Removal and Relocation of Existing Signs shall be at the contract lump sum price which shall include all extruded aluminum and sheet aluminum signs, sign posts, and sign supports designated for relocation, all new sign posts and associated hardware for signs designated for relocation, all extruded aluminum signs, sheet aluminum signs, sign posts and sign supports designated for scrap, and foundations and other materials designated for removal and disposal, and all work and equipment required.

Article 12.06.05 – Basis of Payment is supplemented with the following:

This work will be paid for at the contract lump sum price for “Removal and Relocation of Existing Signs” which price shall include relocating designated extruded aluminum and sheet aluminum signs, sign posts, and sign supports, providing new posts and associated hardware for relocated signs, removing and disposing of foundations and other materials, and all equipment, material, tools and labor incidental thereto. This price shall also include removing, loading, transporting, and unloading of extruded aluminum signs, sheet aluminum signs, sign posts, and sign supports designated for scrap and all equipment, material, tools and labor incidental thereto.

(Rev 1/15/12)

ITEM # 1208928A SIGN FACE SHEET ALUMINUM (TYPE III REFLECTIVE SHEETING)

Description: This item shall consist of furnishing and installing sign face-sheet aluminum signs of the type specified, metal sign posts, mast arm-mounted sign brackets at locations indicated on the plans or as ordered and in conformance with the plans and these specifications.

All traffic and parking signs shall conform to the latest revision of the "Manual on Uniform Traffic Control Devices" conventional road size, the "Standard Highway Signs" book and the "Connecticut Department of Transportation Catalog of Signs".

This item shall also include the installation of Town of Glastonbury Street Name signs on the mast arms as shown on the plans.

Materials:

Reflective sheeting shall conform to the requirements of Article M.18.09.01, Type III.

Sheet aluminum sign blanks shall be 0.08 inches thick and conform to the requirements of Article M.18.13.

Silk screening of Type III reflective sheeting shall conform to the requirements specified by the reflective sheeting manufacturer.

Metal sign posts sign supports shall meet the requirements of the Connecticut Department of Transportation galvanized Type II, 3 lbs/ft breakaway channel posts and conform to the requirements of Article M.18.14.

Sign mounting bolts shall conform to the requirements of Article M.18.15.

The Town street name signs at the locations shown on the plans are 18" tall by a length appropriate for the size of street name with 8" white reflective letters and a 1/2" white reflective border and reflective sheeting. The street name sign sheeting is 3m high intensity prismatic sheeting, white and a color to be determined by the Town.

The street name signs shall list the text of the street name in capital letters, with the street/road/boulevard abbreviated as necessary and in small capitals. The Town of Glastonbury Town Seal shall be shown on the sign face as well.

The color of the street name signs will be determined by the Town during the shop drawing review process.

Construction Methods: Placement and dimensions of copy, border and mounting holes shall conform to details of the Department of Transportation for Regulatory Warning and Guide signs which are available for inspection at the Department of Transportation office. Non-reflective copy, border and background shall be applied by the silk-screen process in a manner specified by the reflective sheeting manufacturer. The silk screening of all copy, border and background on Type III reflective sheeting shall be accomplished prior to the application of the reflective sheeting to the finished aluminum sign blank. Type III reflective sheeting shall be of the heat activated adhesive type and shall be applied in a manner specified by the reflective sheeting manufacturer.

Reflective sheeting shall be applied in such a manner that the finished sign will be wrinkle and bubble free. No splices of the reflective sheeting will be permitted on any sign face under 30 square feet (2.7 square

meters) in area with one dimension of 4 feet (1.2 meters) or less and no more than one splice will be permitted on any one sign without the approval of the Engineer.

Direct application of cutout Type III reflective sheeting copy and border shall conform to the requirements specified by the reflective sheeting manufacturer. Cutout copy and border shall be applied directly to clean, dust free reflective sheeting background panels. Borders shall be cut neatly and butt-joined at corners and panel joints. Type I or Type II reflective sheeting used for direct applied cutout copy and border shall be uniform in brightness and color.

The fabrication of aluminum sign blanks including cutting to size and shape and the punching of mounting holes shall be completed prior to metal degreasing and the application of reflective sheeting. Aluminum sign blanks shall be free of buckles, warp, dents, cockles, burrs and defects resulting from fabrication. Mast arm-mounted sign brackets shall be installed as shown on the plans.

After complete fabrication of the sign as indicated on the plans and in conformance with the requirements contained in the specifications, the sign shall be mounted on the type of support indicated on the plans after the support has been satisfactorily installed at its proper location. The reinforcing plate shall be installed as shown on the plans.

Metal sign posts shall be driven or the holes augered and the backfill thoroughly tamped after the posts have been set level and plumb. Parapet and mast arm mounted sign supports shall be installed as shown on the plans and shall be level and plumb.

The Contractor shall submit the templates for the street name signs for review and approval prior to ordering the signs.

Method of Measurement: This work will be measured for payment by the number of square feet of sign face-sheet aluminum of the type specified, installed and accepted.

Basis of Payment: This work will be paid for at the Contract unit price per square foot for "Sign Face-Sheet Aluminum" of the type specified complete in place, which price shall include the completed sign, metal sign post(s), mast arm-mounted brackets, Town seal placement on street name signs, mounting hardware, including reinforcing plates, and all materials, equipment, labor and work incidental thereto.

ITEM # 1210101A 4" WHITE EPOXY RESIN PAVEMENT MARKINGS

ITEM # 1210102A 4" YELLOW EPOXY RESIN PAVEMENT MARKINGS

ITEM # 1210105A EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS

This item shall conform to Section 12.10 EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS, CONNECTICUT SUPPLEMENTAL SPECIFICATION and Section 12.11 REMOVAL OF PAVEMENT MARKINGS, of the Form 816 amended as follows:

Delete "SYMBOLS AND LEGENDS" from the title of the section.

SECTION 12.10.03 – Construction Methods is amended as follows:

Delete the entire sections titled "3. Performance and Warranty:" and "WARRANTY:" and replace them with the following:

3. Initial Performance: The retroreflectivity of the markings applied must be measured by the Contractor three (3) to fourteen (14) days after installation. A Certified Test Report (CTR), in accordance with Section 1.06.07, must be submitted to the Engineer no later than ten (10) days after the measurements are taken using the procedures and equipment detailed below:

Test Lots - The following test lots shall be randomly selected by the Engineer to represent the line markings applied:

Table 3.1: Line Test Lots

Length of line	Number of Lots	Length of Test Lot
< 1.0 mi. (1.5 km)	1	1000 ft. (300 m)
≥1.0 mi. (1.5 km)	1 per 1.0 mi. (1.5 km)	1000 ft. (300 m)

Measurement Equipment and Procedure

Portable Retroreflectometer

1. Skip line measurements shall be obtained for every other stripe, taking no more than two readings per stripe with readings no closer than 20 in. (0.5 m) from either end of the marking.
2. Solid line test lots shall be divided into ten sub-lots of 100 ft. (30 m) length and measurements obtained at one randomly select location within each subplot.
3. For symbols and legends, 10 percent of each type shall be measured by obtaining five (5) measurements at random locations on the symbol or legend.
4. The Apparatus and Measurements shall be made in accordance with ASTM E1710 (Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer) and evaluated in accordance with ASTM D7585/D7585M (Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments).

Mobile Retroreflectometer

1. Calibration of the instruments shall be in accordance with the manufacturer's instructions.
2. Retroreflectivity shall be measured in a manner proposed by the Contractor and approved by the Engineer. The basis of approval of the test method will be conformance to a recognized standard test method or provisional standard test method.

The measurements shall be obtained when the pavement surface is clean and dry and shall be reported in millicandelas per square foot per foot candle - mcd/ft²/fc (millicandelas per square meter per lux (mcd/m²/lux)). Measurements shall be obtained sequentially in the direction of traffic flow.

Additional Contents of Certified Test Report

The CTR shall also list:

- Project and Route number
- Geographical location of the test site(s), including distance from the nearest reference point.
- Manufacturer and model of retroreflectometer used.
- Most recent calibration date for equipment used.
- Grand Average and standard deviation of the retroreflectivity readings for each line, symbol or legend.

Initial Performance:

In order to be accepted, all epoxy resin pavement markings must meet the following minimum retroreflectivity reading requirement:

White Epoxy: minimum retroreflectivity reading of 400 mcd/ft²/fc (mcd/m²/lux)

Yellow Epoxy: minimum retroreflectivity reading of 325 mcd/ft²/fc (mcd/m²/lux)

At the discretion of the Engineer, the Contractor shall replace, at its expense, such amount of lines, symbols and legends that the grand average reading falls below the minimum value for retro-reflectivity. The Engineer will determine the areas and lines to be replaced. The cost of replacement shall include all materials, equipment, labor and work incidental thereto.

(rev 02/14)

ITEM # 1220013A CONSTRUCTION SIGNS – BRIGHT FLUORESCENT SHEETING

General: The Contractor shall furnish construction signs with bright fluorescent sheeting and their required portable supports or metal sign posts that conform to the requirements of NCHRP Report 350 (TL-3). The construction signs and their required portable supports or metal sign posts shall conform 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.

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 1 foot and a maximum of 2 feet, measured from the pavement to the bottom of the sign.

All sign faces shall be rigid and reflectorized. 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. A Materials Certificate and Certified Test Report conforming to Article 1.06.07 shall be required for the reflective sheeting.

The following types of construction signs shall not be used: mesh, non-rigid, roll-up, corrugated or waffle board types substrates, foam core and composite aluminum sign substrates.

Reflective sheeting shall conform to the following:

The fluorescent orange prismatic retroreflective sheeting shall consist of prismatic lenses formed in a transparent fluorescent orange synthetic resin, sealed, and backed with an aggressive pressure sensitive adhesive protected by a removable liner. The sheeting shall have a smooth surface.

Physical Properties:

A. Photometric - Coefficient of Retroreflection R_A

When the sheeting applied on test panels is measured in accordance with ASTM E 810, it shall have minimum coefficient of retroreflection values as shown in Table I. The rotation angle shall be as designated by the manufacturer for test purposes, the observation angles shall be 0.2 degrees and 0.5 degrees, the entrance angles (component B1) shall be -4 degrees and +30 degrees.

TABLE I
Minimum Coefficient of Retroreflection R_A
Candelas per footcandle per square foot

Observation Angle (deg.)	Entrance Angle (deg.)	R_A Orange
0.2	- 4	200
0.2	+ 30	90
0.5	- 4	80
0.5	+ 30	50

The rotation shall be as designated by the manufacturer.

B. Daytime Color

Color shall conform to the requirements of Table II. Daytime color and maximum spectral radiance factor (peak reflectance) of sheeting mounted on test panels shall be determined instrumentally in accordance with ASTM E 991. The values shall be determined on a Hunter Lab Labscan 6000 0/45 Spectrocolorimeter with option CMR 559 (or approved equal 0/45 instrument with circumferential viewing illumination). Computations shall be done in accordance with ASTM E 308 for the 2 degree observer.

TABLE II
Color Specification Limits** (Daytime)

Color	1		2		3		4		Reflectance Limit Y (%)	
	X	Y	X	Y	X	Y	X	Y	MIN	MAX
Orange (new)	.583	.416	.523	.397	.560	.360	.631	.369	28	-
Orange (weathered)	.583	.416	.523	.397	.560	.360	.631	.369	20	45

Maximum Spectral Radiance Factor, new: 110%, min.
weathered: 60%, min.

** The four pairs of chromaticity coordinates determine the acceptable color in terms of the CIE 1931 standard colorimetric system measured with standard illuminant D65.

C. Nighttime Color

Nighttime color of the sheeting applied to test panels shall be determined instrumentally in accordance with ASTM E 811 and calculated in the u', v' coordinate system in accordance with ASTM E 308. Sheeting shall be measured at 0.33 degrees observation and -4 degree entrance at rotation as determined by the manufacturer for test purposes. Color shall conform to the requirements of Table III.

TABLE III
Color Specification Limits ** (Nighttime)

Color	1		2		3		4	
	u'	v'	u'	v'	u'	v'	u'	v'
Orange (new and weathered)	.400	.540	.475	.529	.448	.522	.372	.534

D. Resistance to Accelerated Weathering

The retroreflective surface of the sheeting shall be weather resistant and show no appreciable cracking, blistering, crazing, or dimensional change after one year's unprotected outdoor exposure in south Florida, south-facing and inclined 45 degrees from the vertical, or after 1500 hours exposure in a xenon arc weatherometer in accordance with ASTM G26, Type B, Method A. Following exposure, panels shall be washed in a 5% HCL solution for 45 seconds, rinsed thoroughly with clean water, blotted with a soft clean cloth and brought to equilibrium at standard conditions. After cleaning, the coefficient of retroreflection shall be not less than 100 when measured as in D.2, below, and the color is expected to conform to the requirements of Tables II and III for weathered sheeting. The sample shall:

1. Show no appreciable evidence of cracking, scaling, pitting, blistering, edge lifting or curling or more than 0.031 inch shrinkage or expansion.
2. Be measured only at angles of 0.2 degrees observation, -4 degrees entrance, and rotation as determined by the manufacturer for test purposes. Where more than one panel of color is measured, the coefficient of retroreflection shall be the average of all determinations.

E. Impact Resistance

The retroreflective sheeting applied according to the manufacturer's recommendations to a test panel of alloy 6061-T6, 0.040 inch by 3 inches by 5 inches and conditioned for 24 hours, shall show no cracking outside the impact area when the face of the panel is subjected to an impact of 100 inch-pounds, using a weight with a 0.625 inch diameter rounded tip dropped from a height necessary to generate an impact of 100 inch-pounds, at test temperatures of both 32° F and 72° F.

F. Resistance to Heat

The retroreflective sheeting, applied to a test panel as in E., above, and conditioned for 24 hours, shall be measured in accordance with Paragraph A. at 0.2 degree observation and -4 degree entrance angles at rotation as determined by the manufacturer for test purposes and exposed to 170° ± 5° F for 24 hours in an air circulating oven. After heat exposure the sheeting shall retain a minimum of 70% of the original coefficient of retroreflection.

G. Field Performance:

Retroreflective sheeting processed and applied to sign blank materials in accordance with the sheeting manufacturer's recommendations, shall perform effectively for a minimum of 3 years. The retroreflective sheeting will be considered unsatisfactory if it has deteriorated due to natural causes to the extent that: (1) the sign is ineffective for its intended purpose when viewed from a moving vehicle under normal day and night driving conditions; or (2) the coefficient of retroreflection is less than 100 when measured at 0.2 degrees observation and -4 degree entrance. All measurements shall be made after sign cleaning according to the sheeting manufacturer's recommendations.

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 sign supports or metal posts that are no longer required shall be removed from the project and shall remain the property of the Contractor.

Method of Measurement: Construction Signs - Bright Fluorescent Sheeting will be measured for payment by the number of square feet of sign face. Sign supports will not be measured for payment.

Basis of Payment: "Construction Signs - Bright Fluorescent Sheeting" required and used on the project will be paid for at the Contact unit price per square foot as listed in the bid proposal. 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.

(Rev. 1/5/12)

ITEM # 1302060A ADJUST GATE BOX (GAS)

Description: This work consists of adjusting existing gas gate boxes to new grades indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications. Adjustment of gas gate boxes shall be performed under the direct supervision of Connecticut Natural Gas (CNG) personnel. The contractor shall contact John Bonville of CNG at 860-982-3815 a minimum of 48 hours prior to his anticipated date that this work is to be performed.

Materials: Any materials required for the adjustment of boxes shall conform to the applicable section of the Form 816 or the specification of CNG.

Construction Methods: Gas gate boxes shall be carefully loosened from the surrounding material and adjusted to the designated new grades. The Contractor shall then carefully place approved granular material around the gate boxes and hand tamp this material until it is well compacted.

The Contractor must maintain access to the gate boxes at all times. If a gas gate box is damaged due to improper construction methods, the Contractor shall replace the damaged unit with the corresponding new unit at no additional cost to the Town.

Method of Measurement: "Adjust Gas Gate Boxes" will be measured by the number of such units actually adjusted in accordance with the Plans and/or as directed by the Engineer.

Basis of Payment: The accepted quantities of "Adjust Gate Box (Gas)" will be paid for at the contract unit price per each as listed in the Proposal. Each and every adjustment authorized by the Engineer will be paid for. The price shall constitute full and complete compensation for all labor, materials, and equipment including excavation, backfill, compaction, adapter collar and for all other incidentals required to finish the work, complete and accepted by both the Engineer and the representative of the particular utility company involved.

ITEM # 1302061A ADJUST GATE BOX (WATER)

Description: Reference to the "District" in this item refers to "The Metropolitan District".

The Contractor shall adjust to final grade, the gate boxes and covers appurtenant to the water mains as required and furnish and install extension rings, extension stems, air valve extensions, covers, and additional top or bottom sections if necessary, as shown on the Contract Drawings or as directed by the Engineer in accordance with these specifications.

The District shall be contacted a minimum of 48 hours prior to initiating the adjustment of any water gate boxes so that an inspector can be provided for this work. The Contractor shall contact Mr. Rich Norris at (860) 278-7850 extension 3450 to arrange an inspector for this work.

Materials: The Contractor shall furnish standard District cast iron Dwyer type gate box sections as required and extension stems if necessary.

All additional materials, including any resurfacing materials and any additional fill required, shall be furnished and placed by the Contractor. Gravel shall conform to Article M.02.01.

Construction Methods: The Contractor shall carefully excavate around the gate boxes, remove the boxes, install extension stems and air valve extensions, if necessary, reinstall the present gate box if reusable, adjust the box to final grade using extension rings if applicable, and refill the excavation. Care shall be taken to prevent material from filling the inside of the gate box.

Extension stems will be required if the gate box is raised 24-inches or more. Extension stems shall be fabricated according to the detail shown on sheet WS-25 of the District's "Developers Manual."

Any damage done to District facilities by the Contractor shall be repaired or replaced by the Contractor at his expense.

Method of Measurement: The number of adjust gate boxes, complete with extension stems, air valve extensions, gate box extension rings, covers, and additional top or bottom sections, if necessary, measured for payment shall be the actual number of each box reset.

Basis of Payment: This work will be paid for at the contract unit price per each completed unit as listed in the bid proposal for "Adjust Gate Box (Water)" complete in place, which price shall include the cost of furnishing material, including labor and equipment to incorporate them into the work. It shall also include the clearing, trenching and disposal of excavated materials, refilling trenches, furnishing the additional material for refilling, grading, sheeting, bracing, and pumping.

**SPECIAL PROVISIONS
(TRAFFIC ITEMS)**

INDEX OF TRAFFIC SPECIAL PROVISIONS

ITEM #1008908A - CLEAN EXISTING CONDUIT 136

ITEM #1010060A – CLEAN EXISTING CONCRETE HANDHOLE..... 137

ITEM# 1017032A - SERVICE (METERED)..... 138

ITEM # 1102002A – 8’ ALUMINUM PEDESTAL 140

ITEM # 1102008A – 4’4” ALUMINUM PEDESTAL 140

ITEM #1104023A – 20’ STEEL MAST ARM ASSEMBLY 141

ITEM #1104028A – 30’ STEEL MAST ARM ASSEMBLY 141

ITEM #1104031A – 35’ STEEL MAST ARM ASSEMBLY 141

ITEM #1105101A - 1 WAY, 1 SECTION MAST ARM TRAFFIC SIGNAL..... 153

ITEM #1105103A - 1 WAY, 3 SECTION MAST ARM TRAFFIC SIGNAL..... 153

ITEM#1106001A- 1 WAY PEDESTRIAN SIGNAL POLE MOUNTED 157

ITEM#1106003A- 1 WAY PEDESTRIAN SIGNAL PEDESTAL MOUNTED 157

ITEM #1107011A - ACCESSIBLE PEDESTRIAN SIGNAL AND DETECTOR (TYPE A)..... 159

ITEM # 1108163A - MODIFY EXISTING CONTROLLER 162

ITEM #1108187A - SYSTEM INTEGRATION 166

ITEM #1108578A - FULL ACTUATED CONTROLLER 8 PHASE (MODIFIED) 168

ITEM #1108660A – ETHERNET SWITCH – FIELD (4 PORT, HARDENED) 188

ITEM #1108661A – ETHERNET SWITCH – TCC (24 PORT) 188

ITEM #1108725A - PHASE SELECTOR (MODIFIED)..... 192

ITEM #1112413A - DETECTOR (TYPE A) (MODIFIED)..... 192

ITEM #1112471A - PRE-EMPTION SYSTEM CHASSIS (MODIFIED)..... 192

ITEM #1113552A - DETECTOR CABLE (OPTICAL) (MODIFIED) 192

ITEM # 1108826A – FIBER OPTIC PATCH CORD 197

ITEM # 1108843A – 12-POSITION FIBER OPTIC PATCH PANEL 199

ITEM# 1111201A – TEMPORARY DETECTION (SITE NO. 1) 203

ITEM #1111407A – VIDEO VEHICLE DETECTION SYSTEM..... 206

ITEM #1112242A FIBER OPTIC SPLICE ENCLOSURE (SIGNAL) 208

ITEM #1113028A 48 STRAND FIBER OPTIC INTERCONNECT CABLE 208

ITEM #1113030A 12 STRAND FIBER OPTIC DROP CABLE 208

ITEM #1113812A – UNINTERRUPTIBLE POWER SUPPLY 220

ITEM #1118012A REMOVAL AND/OR RELOCATION OF TRAFFIC SIGNAL EQUIPMENT..... 224

ITEM #1118051A – TEMPORARY SIGNALIZATION (SITE NO. 1)..... 227

ITEM #1008908A - CLEAN EXISTING CONDUIT

Description:

Clean existing conduit as required, as shown on the plans or as directed by the Engineer to remove dirt and debris to facilitate the installation of new cable.

Construction Methods:

Where cable is to be installed in existing conduit the conduit may have to be cleared prior to the installation. Cleaning will only be necessary if the new cable cannot be easily installed in the existing conduit. By field inspection, and with the concurrence of the Engineer, determine the sections of conduit that require cleaning.

Remove all existing cable from conduit. Install temporary cable elsewhere, as necessary, to maintain normal signalization complete with vehicle & pedestrian detection, EVPS, and coordination. Clean the conduit by one of the following methods:

- 1) Rodding.
- 2) A high pressure jet spray, or air pressure.
- 3) By pulling a mandrel or ball through the conduit.

Submit in writing the anticipated method of cleaning the conduit to the Engineer for approval prior to cleaning any conduit.

If the conduit is found damaged to any extent that the cleaning process will not clear the obstruction, it will be the judgment of the Engineer whether to replace the entire conduit run or excavate and replace only the damaged section.

If the existing conduit is found to be missing hardware such as bonding bushings and bond wire, the missing material shall be provided and installed under this item prior to installation of the cable.

Method of Measurement:

This work shall be measured from termination point to termination point. This work shall be measured for payment on actual number of linear feet (meters)..

Basis of Payment:

The work under the Item "Clean Existing Conduit" shall be paid for at the contract unit price per linear foot, which price shall include all material, tools, equipment, labor, and work incidental thereto. Work pertaining to temporary operation shall be paid for under Item 1118051A - Temporary Signalization (Site No. 1). Replacement of any damaged conduit shall be paid for under the applicable conduit item.

Pay Item	Pay Unit
Clean Existing Conduit	l.f. (m)

ITEM #1010060A – CLEAN EXISTING CONCRETE HANDHOLE

DESCRIPTION:

Clean all debris from an existing concrete handhole where shown on the plans or as directed.

MATERIAL:

Insulated Bonding Bushings:
 Specification Grade
 Threaded
 Malleable Iron or Steel
 Galvanized
 UL listed
Bonding Wire:
 M.15.13
Grout:
 M.03.05

CONSTRUCTION METHODS:

Remove to a level even with the bottom of the handhole all sand, silt and other debris. Remove any material that is accessible from the ends of conduit. Additional conduit cleaning will be paid for under Item 1008908A-Clean Existing Conduit. Place approximately 4" (100) of ¾" (19) crushed stone in bottom of handhole using care not to allow crushed stone to enter conduits. Grout around conduits to prevent future entrance of dirt and silt. Properly dispose all removed debris. Inspect bonding bushings. Tighten loose bushings. Secure loose bond connections. Install new bonding bushings on spare conduits and bond to other conduits.

METHOD OF MEASUREMENT:

This work will be measured for payment by the number of concrete handholes cleaned, complete and accepted.

BASES OF PAYMENT:

This work will be paid for at the contract unit price each for "Clean Existing Concrete Handhole", which price shall include the removal and disposal of debris from handhole and associated conduit, crushed stone, grout, bonding bushings, bonding wire, and all equipment and work incidental thereto.

<u>Pay Item</u>	<u>Pay Unit</u>
Clean Existing Concrete Handhole	Each (Ea)

ITEM# 1017032A - SERVICE (METERED)

Description:

Furnish and install a metered electric service at the location shown on the plans or as directed by the Engineer. The meter housing, supporting equipment, brackets and clamps shall be painted black by the manufacturer.

Materials:

- Meter Socket
 - UL listed
 - Manual lever bypass
 - Locking metal cover for the glass enclosure
 - Contact the serving utility company for a list of approved meter sockets
- Conduit Bond Clamp
 - UL listed
 - Rated for direct burial

Locations served by United Illuminating (UI) or Wallingford Electric Division (WED)

Meter socket rated at 100 amps

Locations served by Connecticut Light and Power Co. (CL&P)

Meter socket rated at 200 amps

Enclosure capable of accepting a 3 inch (75 mm) rigid metal conduit (RMC)

Construction Methods:

Comply with the National Electric Code (NEC), the Department of **Public Utility Regulatory Authority (PURA)**, and the serving power company requirements. Install a meter socket with associated equipment on the outside of the controller cabinet, as shown on the plans. Mount the enclosure approximately 54 inches (1.37 meters) above the ground. Install an expansion fitting in the RMC between the ground and the enclosure. Attach a direct-buried bond clamp to the service RMC below ground level, adjacent to the foundation. Bond the service conduit to the controller cabinet ground rod. Install a continuous nylon pull rope of at least 200 lbs (90 Kg) breaking strength in the conduit between the meter socket and the service source. Ensure all circuit breakers are off when service is connected by the utility company. The work must be inspected and approved by the Engineer or his designated representative prior to scheduling a service connection. Record the meter number and the date service is connected for billing purposes.

Service Request

- Traffic Signal on State Road: Contact the CT DOT Traffic Electrical office to complete the necessary service request forms.
- Traffic Signal on Town Road: Complete all necessary request forms and forward to the appropriate power company office.
- Incident Management Site: Complete all necessary request forms and forward to the appropriate power company office.

Locations served by United Illuminating

Contact the UI office to have a Job Number assigned. When the work is complete notify the Engineer to inspect and confirm that the work is according to the National Electric Code. Request that the Engineer contact the United Illuminating, Work in Progress office, to report the job number and to schedule a service connection.

Locations served by Wallingford Electric Division

Contact the Electric Division, Engineering Office to arrange for service and/or to schedule work by the Electric Division on utility poles above 10 feet (3 meters). When the work is complete notify the Engineer to inspect and confirm that the work is according to the National Electric Code. Request that the Engineer contact the Electric Division 24 hours prior to the desired connection date.

Locations served by Connecticut Light and Power Co. and all other electric power providers

Contact the power company engineering representative for exact requirements of the service. All riser fees and any other installation charges required of an underground metered service are the responsibility of the Contractor. When the work is complete notify the Engineer to inspect and confirm that the work is according to the National Electric Code. Request that the Engineer contact the power company to schedule the connection.

Method of Measurement:

The installation of the Service (Metered) will be measured for payment by the number of metered electric services of the type specified, completed, with service connected, and accepted in place.

Basis of Payment:

This work will be paid for at the contract unit price each for "Service (Metered)" complete and accepted in place. The price shall include all material above ground such as the meter socket enclosure, surface conduit, expansion fitting, coupling, and load side service conductors. The price shall also include the direct-buried ground clamp, bonding wire, pull rope, all material, equipment, tools, labor and incidentals necessary.

The power company will provide the line-side conductors and the meter.

ITEM # 1102002A – 8’ ALUMINUM PEDESTAL

ITEM # 1102008A – 4’4” ALUMINUM PEDESTAL

Add the following:

All pedestal assemblies shall be powder coated black.

The color of the finish coat for the complete aluminum pedestal assembly and all hardware shall be BLACK, No. 17038, Federal Standard No. 595. The Contractor shall submit color samples to the Engineer for approval prior to fabrication.

ITEM #1104023A – 20’ STEEL MAST ARM ASSEMBLY

ITEM #1104028A – 30’ STEEL MAST ARM ASSEMBLY

ITEM #1104031A – 35’ STEEL MAST ARM ASSEMBLY

Description: Work under this item shall consist of designing, fabricating and installing a mast arm assembly to carry traffic appurtenances (such as traffic signals, signs, antenna, etc.) of the type specified, on a prepared foundation, in accordance with the details shown on the plans, in accordance with these specifications and as ordered by the Engineer.

All mast arms and hardware shall be painted black. The color of the finish coat for Mast Arms and anchor bolt covers, handhole covers, post caps, and end caps shall be included under this item.

Materials: The structural plate components, such as the baseplate and the plates in the arm to pole ring stiffened, built-up box connection, shall be made of steel that conforms to the requirements, including the supplementary notch toughness requirements, of ASTM A709, Grade 50T2 (ASTM A709M, Grade 345T2) and meet the following Charpy-V Notch toughness requirements:

Minimum test value energy 20 ft.-lbs.
Minimum average energy 25 ft.-lbs. at 40° F

The Charpy V-notch sampling and testing shall be in accordance with ASTM A673, "P" piece frequency.

The tubular components, such as the pole, arm and luminaire arm, and the steel for the handhole reinforcement, shall be made of steel with a minimum yield stress of 35,000 psi (241 MPa). The steel shall meet the following notch toughness requirements:

Yield Strength	Thickness in. (mm)	Minimum Test Value Energy ft.-lbs. (J)	Minimum Average Energy, ft.-lbf (J)
$F_y \leq 36 \text{ ksi (250 MPa)}$	$\leq 4 \text{ (100)}$	20	25 (34) at 40°F (4°C)
$36 \text{ ksi (250 MPa)} < F_y \leq 50 \text{ ksi (345 MPa)}$	$\leq 2 \text{ (50)}$	20	25 (34) at 40°F (4°C)
$36 \text{ ksi (250 MPa)} < F_y \leq 50 \text{ ksi (345 MPa)}$	$2 < t \leq 4$ $(50 < t \leq 100)$	24	30 (41) at 40°F (4°C)
$50 \text{ ksi (345 MPa)} < F_y \leq 70 \text{ ksi (485 MPa)}$	$\leq 4 \text{ (100)}$	28	35 (48) at -10°F (-23°C)

Charpy V-notch sampling and testing shall be in accordance with AASHTO T243 (ASTM A673/A673M), "P" piece frequency.

Charpy V-notch sampling and testing shall be in accordance with AASHTO T243 (ASTM A673/A673M), "P" piece frequency.

The non-structural components, such as hand hole covers, caps and anchor bolt covers, shall be made of steel with minimum yield strength of 36,000 psi (250 MPa).

All high strength bolts shall conform to ASTM A325, Type 1 (ASTM A325M, Type 1). Nuts shall conform to ASTM A563, Grade DH (ASTM A563M, Property Class 10S). Circular, flat, hardened steel washers

shall conform to ASTM F436 (ASTM F436M). The bolts, nuts and washers shall be galvanized in accordance with ASTM A153 (ASTM A153M) or ASTM B695, Grade 50. The nuts shall be overtapped to the minimum amount required for the bolt assembly and all surfaces of the nuts shall be lubricated with a lubricant containing a visible dye of any color that contrasts with the color of the galvanizing. The high strength bolts shall conform to the requirements of Subarticle M.06.02-3.

The anchor bolts shall conform to ASTM F1554, Grade 105. The nuts shall conform to ASTM A563, Grade DH (ASTM A563M, Class 10S). The washers shall conform to ASTM F436 (ASTM F436M). The bolts, nuts and washers shall be galvanized in accordance with ASTM A153 (ASTM A153M). The nuts shall be overtapped to the minimum amount required for the bolt assembly and all surfaces of the nuts shall be lubricated with a lubricant containing a visible dye of any color that contrasts with the color of the galvanizing.

All steel components, including anchor bolts, shall be completely hot-dip galvanized, after fabrication, in accordance with ASTM A123 (ASTM A123M) or ASTM A153 (ASTM A153M), as applicable. Repairs to damaged areas of the hot-dip galvanized coatings shall conform to the requirements of ASTM A780 amended as follows:

Paints containing zinc dust, if used for repairs, shall contain either between 65% to 69% metallic zinc by weight or greater than 92% metallic zinc by weight in dry film.

The silicone sealant shall be a 1-component, 100% silicone sealant recommended for use with galvanized steel.

Neoprene gasket material for the access openings shall conform to ASTM D1056, Grade 2A2 or 2A3. Other grades of neoprene approved by the Engineer may be used.

Closed cell elastomer for sealing the space between the foundation and base plate shall conform to ASTM D1056, Grade 2A2 or 2A3 and shall have a pressure-sensitive adhesive backing on one side for adhesion to steel. Closed cell elastomer contained within the anchor bolt pattern shall not interfere with the anchor bolt leveling nuts and shall not block the opening in the base plate.

Bare copper grounding conductor shall be #8 AWG stranded bare copper wire conforming to M.15.13. The grounding bolt shall be stainless steel with a hex head.

The Contractor shall submit Certified Test Reports and Materials Certificates in conformance with Article 1.06.07 for the steel used in the mast arm members and components, high-strength bolts (including nuts and washers) and anchor bolts (including nuts and washers). The Certified Test Reports shall include the following:

- a. Mill test reports that indicate the place where the material was melted and manufactured.
- b. High-strength bolt test results for proof load tests, wedge tests, and rotational-capacity tests that indicate where the tests were performed, date of tests, location of where the components were manufactured and lot numbers.
- c. Galvanized material test results that indicate the thickness of the galvanizing.

Prior to incorporation into the work, the Contractor shall submit samples in conformance with Article 1.06.02 for the steel used in the mast arm members and components, high-strength bolts (including nuts and washers) and anchor bolts (including nuts and washers).

Construction Methods: The design and fabrication of the mast arm assembly, including its anchorage (into the foundation), shall conform to the requirements of the latest edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, including the latest interim specifications, amended as follows:

- The design wind speed shall be 120 mph (193 km/hr). The computation of wind pressures in accordance with Appendix C is not permitted.
- The mast arms shall be designed to support fixed mounted traffic signals and signs. The wind drag coefficient for traffic signals and luminaires shall be 1.2.
- The mast arms shall be designed for fatigue category I. The mast arms shall be designed for the wind load effects due to galloping, natural wind gusts and truck-induced gusts. The luminaire arms shall be designed for the wind load effects due to natural wind gusts. The design pressure for the truck-induced gust shall be based on a truck speed of 65 mph (105 km/hr). The design of the mast arms assuming that vibration mitigation devices will not be installed.
- The vertical deflection of the free end of the arm due to the wind load effects of galloping and truck-induced gusts shall not exceed 8" (200 mm).
- The minimum design life for mast arms shall be 50 years.
- The maximum stress ratio (the ratio of the computed stress to the allowable stress) or combined stress ratio in any mast arm component due to each group load shall not exceed 0.90.
- The maximum arm length shall be 40'-0" (12 000 mm), measured from the centerline of the pole to the tip of the arm.
- The maximum luminaire arm length shall be 15'-0" (4500 mm).
- The maximum diameter of the pole at its base shall be 18" (457 mm).
- The maximum diameter of the arm at the arm-pole connection shall be 15" (381 mm).
- The minimum wall thickness of the arm at the pole connection and the pole shall be 5/16" (8 mm).
- The arm, luminaire arm and pole shall be fabricated from either round or multisided tubular members. Multisided tubular members with other than 8, 12 or 16 sides are not permitted. Multisided tubular members with fluted sides are not permitted. The arm and luminaire arm shall be fabricated with a taper (change in diameter).
- A maximum of one slip-type field splice is permitted in the arm. Slip-type field splices are not permitted in the pole. The wall thickness of the pole and arm component members shall be uniform throughout their lengths. The use of multiple plies (laminations) to obtain the required arm and pole thickness is not permitted. The use of shop-fabricated stepped members is not permitted.
- The arm, luminaire arm and pole members may be fabricated with no more than 2 longitudinal seam welds.

- The longitudinal seam welds within 6" (152 mm) of the member ends shall be complete joint penetration groove welds. The longitudinal seam welds on the female section of telescopic (slip-type) field splices shall be complete joint penetration groove welds for a length equal to the minimum splice plus 6" (150 mm).
- Partial joint penetration longitudinal seam welds shall be non-destructively tested in accordance with the magnetic particle method. Complete joint penetration longitudinal seam welds in members less than 5/16" (8 mm) thick shall be non-destructively tested in accordance with the magnetic particle method on both the inside and outside surfaces. Complete joint penetration seam welds in members greater than or equal to 5/16" (8 mm) thick shall be non-destructively tested in accordance with the ultrasonic method.
- The arm to transverse plate connection shall be made with a complete joint penetration groove weld with a backing ring attached to the plate with a continuous fillet weld. The pole to transverse base plate connection (at the foundation) shall be made with a complete joint penetration groove weld with a backing ring attached to the plate with a continuous fillet weld. 100% of the complete joint penetration groove welds shall be non-destructively tested by the ultrasonic method. After galvanizing, the joint between the backing ring and tubular member shall be sealed with silicone sealant.
- The strength of a connection made with a complete joint penetration groove weld shall be no greater than the strength of the base metal. In connections joining base metal with different yield strengths, the base metal with the lower yield strength shall govern the design.
- The minimum base plate and flange plate thickness shall be 2" (51 mm). The determination of the plate thickness in the tubular member to transverse plate connections shall consider the potential for the plate to warp due to the heat from welding. Consideration should be given to the use of thicker plates to allow for subsequent machining of warped plates to a flat surface so that removal of material will not compromise the required strength of the plate.
- The flange plate connection in the arm to pole in the ring stiffened, built-up box connection shall be designed as slip critical connections with standard holes. The minimum number of high-strength bolts in a flange splice shall be 8. Consideration should be given to the use of smaller diameter bolts since they require lower specified minimum bolt tensions.
- The minimum thickness of the ring plates and gusset plates in the ring stiffened, built-up box connection shall be 1/2" (12 mm).
- The size of fillet welds specified in designed connections shall be no less than 5/16". The use of seal and tack welds is not permitted. No welding shall be performed after galvanizing.
- The use of stiffeners at tubular member to transverse plate connections and at the arm to pole connection is not permitted.
- The pole base plate anchor bolt circle diameter shall be 24" (610 mm).

- The anchor bolt to base plate connection shall be designed as a double-nut connection with shear holes. The anchor bolts shall use embedded anchorage plates to transmit loads from the pole base to the concrete foundation. The use of hooked anchor bolts is not permitted. The minimum number of anchor bolts shall be 8. The minimum anchor bolt diameter shall be 2" (51 mm). The minimum anchor bolt embedment, the distance from the top of the foundation to the top of the embedded anchorage plate, shall be 3'-6" (1067 mm). Each anchor bolt shall be supplied with 4 nuts and 4 washers. Washers shall be placed on the top and bottom surfaces of the pole base plate and anchorage plate. Welding to the anchor bolts is not permitted.

The mast arm shall be designed for the load effects due to the actual traffic appurtenances (signals, signs, luminaires, cameras, etc.). The mast arms shall also be designed for the effects of traffic appurtenances during all stages of construction that may exist during the project under which the mast arms are installed. The mast arms shall be designed to support traffic appurtenances with properties no less than those tabulated on the plans.

The dimensions of the mast arm assemblies are shown on the traffic plans, elevations, cross-sections or in the special provisions. The arm, luminaire arm and pole lengths and the attachment heights shall be verified by the Contractor based on the finished grade at the site, top of foundation elevation, the locations of overhead utility cables and the traffic appurtenance mounting heights. If either the arm or pole length is inadequate, the Contractor shall notify the Engineer.

The minimum vertical clearance from the top of the finished road to the bottom of the traffic signals shall be 16'-0" (4877 mm). The maximum vertical clearance from the top of the finished road to the bottom of the traffic signals shall be 18'-0" (5486 mm). The traffic signals shall be installed so that the bottom of all the signals for each approach is at the same elevation.

The arm to pole connection shall be made with a ring stiffened, built-up box. The luminaire arm to pole connection shall be made with either a built-up box or a ring stiffened built-up box. A minimum of 8 high-strength bolts shall be used to connect the arm flange plate to the built-up box connection plate. A minimum of 4 high-strength bolts shall be used to connect the luminaire arm flange plate to the built-up box connection plate. All fasteners and their components used in the connection shall be visible. The use of tapped holes in the plates of the connection is not permitted. A hole(s) shall be provided in the connection to allow wires to pass from the pole to the arm and luminaire arm. The sides of all other holes in the connection shall be ground smooth and the edges rounded by grinding to prevent the wires from chafing. Holes placed in the connection for galvanizing shall be filled with neoprene plugs.

A J-hook shall be welded to the inside of the pole at the top for wire handling and support.

The mast arm pole shall have a handhole centered 1'-3" (380 mm) from the top of the base plate. The handhole shall be located away from traffic. The handhole shall be reinforced with a frame having a minimum 4" (102 mm) wide by minimum 6" (152 mm) high clear opening. The minimum thickness of the handhole frame shall be no less than the thickness of the pole. The handhole frame shall be connected to the pole with a partial joint penetration groove weld reinforced with a fillet weld. The handhole shall be provided with a cover connected to the frame with stainless steel screws. The cover shall be installed with a neoprene gasket matching the dimensions of the cover. The cover shall also be attached to the frame with a stainless steel chain. The inside bottom of the frame shall have a hole tapped for the stainless steel grounding bolt.

The mast arm shall be supplied with a pole cap plate, arm cap plate, and anchor bolt covers. The cap plates shall be attached with fasteners. The joint between the tubular member and plate shall be sealed with a neoprene gasket matching the dimensions of the plate.

Prior to fabrication, the Contractor shall submit working drawings and design computations for each mast arm assembly to the Engineer for review in accordance with Article 1.05.02. An individual, independently packaged set of working drawings and computations, with all details and documents necessary for fabrication and erection of the structure and its components, including a copy of the certificate of insurance, shall be prepared and submitted for **each** mast arm. **A single set of drawings with tabulated data for multiple mast arm locations is not permitted.** The alpha-numeric mast arm identifier shall be included on these documents. The working drawings and computations shall be prepared in Customary U.S. units.

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

- title sheet
- table of contents
- contact information for designer, fabricator and galvanizer – contact information should include name and address of each firm and the name of contact person with phone number and email address
- copy of the certificate of insurance
- copy of fabricator's AISC certification
- copy of the traffic signal control plan detailing mast arm assembly
- mast arm assembly working drawings
- mast arm assembly design computations
- welding procedures
- mast arm installation procedure, including the method to plumb the pole

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

Working drawings submitted in paper form shall be printed on ANSI B (11" x 17"; 279 mm x 432 mm; Ledger/Tabloid) sheets. Each drawing shall have a border and title block. Located in the lower right hand corner of the drawing adjacent to the title block, each drawing shall have a rectangular box, 2 ¼" wide x 1 ¾" high (57 mm wide x 44 mm high), for the reviewers stamp. On the ANSI B sheets, the minimum text height and width shall be 1/16". All letter characters shall be uppercase. Design computations, procedures and other supporting data shall be submitted on 8 ½" x 11" (216 mm x 279 mm) (Letter) sheets.

Working drawings submitted in an electronic portable document format (.pdf) shall be created on ANSI D (22" x 34"; 559 mm x 864 mm) full scale (1" electronic file = 1" paper) sheets. (The purpose of creating the drawings on ANSI D sheets is so that the sheets may be printed/plotted at that size or smaller without loss of legibility.) Each drawing shall have a border and title block. Located in the lower right hand corner of the drawing adjacent to the title block, each drawing shall have a rectangular box, 2 ¼" wide x 1 ¾" high (57 mm wide x 44 mm high), for the reviewers stamp. On the ANSI D full scale sheets, the minimum text height and width shall be 1/8". All letter characters shall be uppercase. The electronic files for the design computations, procedures and other supporting data shall be created on ANSI A (8 ½" x 11", 216 mm x 279 mm) letter sheets.

The working drawings shall include complete details of all mast arm components. The drawings shall include, but not be limited to the following:

- the project number, town and mast arm identification number
- reference to the design specifications, including interim specifications
- reference to the design specifications design criteria, such as design wind speed, minimum design life, fatigue category, vehicle speed, etc.
- material specifications for all components
- material designations for the arm and pole, with an explanation of the alpha numeric characters (equivalent thickness, in inches (in millimeters), shall be provided for gage numbers)
- non-destructive weld testing requirements
- details of the location of the longitudinal seam welds in the arm, luminaire arm and pole
- a plan view of the anchor bolt layout relative to the orientation of the arm(s)
- anchor bolt dimensions, including embedment and projection
- permanent camber
- mast arm installation procedure, including the method to plumb the pole

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

- the project number, town and alpha-numeric mast arm identifier
- computations for projects in Customary U.S. units shall be provided in Customary U.S. units. Computations for projects in metric units shall be provided in both Customary U.S. units and metric units.
- references to design specifications, including interim specifications, and the applicable code section and articles
- description/documentation for all computer programs used in the design
- drawings/models of the structure, components and connections, with dimensions, loads and references to the local and global coordinate systems used (as applicable), to facilitate review of the results
- a tabulation of the section properties of the tubular members at each analyzed section. The tabulated values should include the diameter, D (if round member); effective width, b (if multisided member, AASHTO 5.5.2); equivalent diameter (if multisided member, AASHTO 5.6), wall thickness, t ; inside bend radius, r_b (if multisided member, AASHTO 5.5.2), cross-sectional area, A ; moment of inertia, I ; section modulus, S ; radius of gyration, r . AASHTO Table B-1 may be used to

determine the section properties. If Table B-1 is used, the radius measured to the mid-thickness of the wall shall also be provided.

- results of all group loads and load combinations
- stress ratios and combined stress ratios for all group loads and load combinations
- maximum vertical deflection due to dead loads
- vertical deflection of the free end of the arm due to the wind load effects of galloping and truck-induced gusts

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

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

Bridge Safety and Evaluation - Robert P. Zaffetti – Sandra A. Dumas
Research and Materials – James P. Connery - Robert G. Lauzon
Traffic Engineering - Tracy L. Fogarty
Traffic Signal Lab – Harold J. Decker
Engineer of Record

The mast arm assemblies shall be fabricated in accordance with the latest edition of the AASHTO LRFD Bridge Construction Specifications, including the latest interim specifications, amended herein.

The steel fabricator shall be AISC certified for the fabrication of Simple Steel Bridges (SBR).

Fabrication of the mast arm may begin only after the working drawings and design computations have been reviewed and the Engineer has authorized fabrication to begin. The Contractor shall submit to the Engineer, no less than 2 weeks prior to the start of fabrication, the name and location of the fabrication shop where the work will be done so that arrangements can be made for an audit of the facility and the assignment of the Department Quality Assurance (QA) inspector. No fabrication will be accepted unless the QA inspector is present during fabrication. No changes may be made during fabrication without prior written approval by the Department.

The Contractor shall furnish facilities for the inspection of material and workmanship in the shop by the Engineer. The Engineer and his representative shall be allowed free access to the necessary parts of the premises.

The Engineer will provide QA inspection at the fabrication shop to assure that all applicable Quality Control plans and inspections are adequately adhered to and maintained by the Contractor during all phases of the fabrication. A thorough inspection of a random selection of elements at the fabrication shop may serve as the basis of this assurance.

Prior to shipment to the project, each individual piece of structural steel shall be marked in a clear and permanent fashion by a representative of the fabricators' Quality Control (QC) Department to indicate

complete final inspection by the fabricator and conformance to the project specifications for that piece. The mark must be dated. A Materials Certificate in accordance with Article 1.06.07 may be used in lieu of individual stamps or markings, for all material in a single shipment. The Materials Certificate must list each piece within the shipment and accompany the shipment to the project site.

Following the final inspection by the fabricator's QC personnel, the Engineer may select pieces of 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 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.

Fabrication of the mast arm assemblies shall conform to the requirements of Articles 6.03.04, 6.03.05, 6.03.06 and 6.03.10, 6.03.11, 6.03.12 and 6.03.13.

All welding details, procedures and nondestructive testing shall conform to the requirements of AWS D1.1 Structural Welding Code - Steel.

Personnel performing the nondestructive testing shall be certified as a NDT Level II technician in accordance with the American Society for Non Destructive Testing (ASNT), Recommended Practice SNT-TC-1A and approved by the Engineer.

All nondestructive testing shall be witnessed by Engineer. Certified reports of all tests shall be submitted to the Engineer for examination. Each certified report shall identify the structure, member, and location of weld or welds tested. Each report shall also list the length and location of any defective welds and include information on the corrective action taken and results of all retests of repaired welds.

The Department reserves the right to perform additional testing as determined by the Engineer. Should the Engineer require nondestructive testing on welds not designated in the contract, the cost of such inspection shall be borne by the Contractor if the testing indicates that any weld(s) are defective. If the testing indicates the weld(s) to be satisfactory, the actual cost of such inspection will be paid by the Department.

All members and components shall be hot-dip galvanized in a single dip. Double-dipping shall not be used.

All damaged areas of the hot-dip galvanized surfaces shall be repaired in accordance with the requirements of ASTM A780. If paint containing zinc dust is used for repairs, the dry coating thickness shall be at least 50% greater than the thickness of the adjacent hot-dip galvanized coating, but no greater than 4.0 mils. The paint shall be brush applied. The use of aerosol spray cans shall not be permitted. The color of the finished repair area shall match the color of the adjacent hot-dip galvanized surface at the time of the repair to the satisfaction of the Engineer.

After fabrication, the arm to pole bolted connection shall be assembled in the fabricator's shop, in the presence of the Engineer, to determine the acceptability of the connection. The faying surfaces shall be free of dirt, loose scale, burrs, other foreign material and other defects that would prevent solid seating of the parts. Prior to assembly, the galvanized faying surfaces shall be scored by wire brushing. The faying surfaces of the connection plates shall be checked with a straight edge to ensure that the surfaces are not distorted and the entire faying surface of each plate will be in contact when assembled. The high-strength bolts, including nuts and washes, shall be installed and tensioned in accordance with Subarticle 6.03.03-4(f). A connection may be found acceptable by the Engineer if the faying surfaces of the flange

(connection) plates are in firm, continuous contact after properly tensioning the bolts. Only mast arm assemblies with acceptable arm to pole bolted connections shall be shipped. If a bolted connection is found not acceptable, the Contractor shall submit a procedure to repair the connection to the Engineer for review. Galvanized surfaces damaged by the repair procedure shall be hot dip galvanized. Repair of the damaged galvanized surfaces in accordance with the requirements of ASTM A780 or with a galvanizing repair stick is not permitted. Bolts, nuts and washers used for the trial shop fit-up shall not be reused in the final field assembly.

After fabrication and prior to shipping, aluminum identification tags shall be attached to the arm and pole members with self-tapping tamper resistant screws.

The finished members and components shall be protected with sufficient dunnage and padding to protect them from damage and distortion during transportation. Damage to any material during transportation, improper storage, faulty erection, or undocumented fabrication errors may be cause for rejection of said material at the project site. All costs associated with any corrective action will be borne by the Contractor.

Following delivery to the project site, the Engineer will perform a visual inspection of all material to verify shipping documents, fabricator markings, and that there was no damage to the material or coatings during transportation and handling.

The Engineer is not responsible for approving or accepting any fabricated materials prior to final erection and assembly at the project site.

High-strength bolts, nuts and washers shall be stored in accordance with Subarticle 6.03.03-4(f).

The mast arm shall be erected, assembled and installed in accordance with these specifications and the procedures and methods submitted with the working drawings. The Contractor and the mast arm designer are responsible to ensure that the erection and assembly procedures and methods in this specification are acceptable for use with the mast arm assembly. Changes to these method and procedures shall be submitted with the working drawings and computations.

Prior to installation of the mast arm pole, the threads of the embedded anchor bolts shall be cleaned of accumulated dirt and concrete. The anchor bolt nuts shall be re-lubricated with a lubricant containing a visible dye of any color that contrasts with the color of the galvanizing. On each anchor bolt, all the nuts shall be run down by hand on the anchor bolt threads.

The pole shall be erected so that the centerline of the pole will be plumb after the application of all the dead loads. The pole may be initially installed raked in the opposite direction of the overhead member to obtain the plumb condition.

During the erection of the pole, the leveling nuts and washers shall be inspected, and if necessary adjusted, so that they are in full contact with the bottom surface of the baseplate. Subsequently, the top nuts and washers shall be inspected, and if necessary adjusted, so that they are snug tight (in full contact with the baseplate). Snug tight is defined as the condition where the nuts and washers are in full contact with the baseplate and the snug tight condition was the result of the full effort of a person using a 12" wrench.

With the top nuts snug tight, the top nuts shall be tightened one-sixth of a turn beyond snug tight. After the top nuts are tightened, the leveling nuts should be retightened to assure the full contact has been maintained. The top nuts shall have full thread engagement. The distance from the bottom of the leveling nuts to the top of the foundation shall not exceed 1" (25 mm).

High-strength bolts, including nuts and washes, shall be installed and tensioned in accordance with Subarticle 6.03.03-4(f). The arm shall be temporarily and fully supported while all the high-strength bolts are

installed and tensioned. The temporary arm support shall not be removed until the Engineer has confirmed that the faying surfaces of the flange (connection) plates are in firm, continuous contact and the high-strength bolts were properly installed and tensioned. All high-strength bolts in the arm to pole bolted connection shall be inspected (in accordance with Subarticle 6.03.03-4(f)) to confirm the high-strength bolts were properly tensioned.

After erecting the mast arm, the mast arm shall be electrically grounded by attaching the bare copper grounding conductor to the inside of the handhole frame with a stainless steel bolt and to the ground rod with a ground clamp. The rigid metal conduit shall be electrically grounded by attaching the bare copper grounding conductor to the insulated bonding bushing and to the ground rod with a ground clamp.

The traffic appurtenances shall be located and mounted on the arm as shown on the cross-sections. Holes, if required for wires, shall be located adjacent to the appurtenances and shall be drilled in the bottom of the arm. A rubber grommet shall be installed in each hole to protect the wires from chafing.

After installation of the traffic appurtenances, the anchor bolt nuts (leveling and top anchor nut) and washers shall be in full contact with the top and bottom surfaces of the pole base plate and the centerline of the pole shall be plumb.

After installation of the traffic appurtenances, if the structure exhibits excessive vibration, oscillations or deflections as determined by the Engineer, the Contractor shall design and construct devices to mitigate the movements. The Contractor is responsible for immediately stabilizing the structure to the satisfaction of the Engineer. Stabilizing the structure may require the removal of the sign panels or the entire structure. Prior to installation of any mitigation device, the Contractor shall submit drawings, design computations other documentation to the Engineer for review in accordance with Article 1.05.02.

The last character of the mast arm identification number shall be stenciled with black paint, unless otherwise specified, on the pole of each mast arm. The character shall be 3" (76 mm) high and placed approximately 1' (305 mm) above the top of the base plate facing the centerline of the roadway.

All mast arm assemblies, including all brackets and hardware, shall be factory painted after galvanization.

The steel mast arm (shaft, arm, and base and camera bracket) shall be hot-dip galvanized, conforming to the requirements of ASTM-A123. Pole Cap, bolt covers, handhole covers, bolts, washers, nuts and screws shall be galvanized, conforming to the requirements of ASTM A153.

Second Coat: After galvanizing, the exterior steel surface shall be blast cleaned to Steel Structures Painting Council Surface Preparation Specification No. 6 (SSPC-SP6) requirements utilizing cast steel abrasives conforming to the Society of Automotive Engineers (SAE) Recommended Practice J827. The blast method used is a recirculating, closed cycle centrifugal wheel system with abrasive conforming to SAE Shot Number S280.

Interior surfaces (pole shafts only) at the base end for a length of approximately 610mm shall be mechanically cleaned and coated with a zinc rich epoxy powder. The coating shall be electrostatically applied and cured in a gas fired convection oven by heating the steel substrate to a minimum of 177 degrees Celsius (350 degrees Fahrenheit) and a maximum of 204 degrees Celsius (400 degrees Fahrenheit).

All exterior surfaces shall be coated with a Urethane or Triglycidyl Isocyanurate (TGIC) Polyester Powder to a minimum film thickness of 2.0 mils (0.0508mm). The coating shall be electrostatically applied and cured in a gas fired convection oven by heating the steel substrate to a minimum of 177 degrees Celsius (350 degrees Fahrenheit) and a maximum of 204 degrees Celsius (400 degrees Fahrenheit). The thermosetting powder resin shall provide both intercoat as well as substrate fusion adhesion that meets 5A or 5B classifications of ASTM D3359.

The color of the finish coat for steel mast arms (shaft, arm, and base and camera arm), anchor bolt covers, handhole covers, post caps, end caps, bolts, washers and nuts shall be Black. The color of the finished coat shall be BLACK, No. 17038, Federal Standard No. 595. The Contractor shall submit color samples to the Engineer for approval prior to fabrication.

The powder coating facilities shall be owned and operated by the pole manufacturer to ensure a quality coating system. Prior to shipment, small poles shall be wrapped in 4.8mm (0.19 inches) thick Ultraviolet inhibiting plastic backed foam. Larger poles shall be cradled in a 303mm (12 inches) rubberized foam base.

Any coating damaged prior to or during the installation of shall be repaired. Areas to be repaired shall be clean, dry, free from grease, oil, corrosion products and other contamination. If contaminated, power wash or scrub with stiff brush and clean water. Repair areas may be brushed or sprayed as appropriate. If the Contractor elects to spray they must provide overspray containment. The minimum overspray containment shall conform to the requirements of SSPC Guide 6 for the Class 3A level.

All defective work shall be corrected by the Contractor at no cost to the Town or Department.

Compliance with Regulations: The Contractor is required to meet all OSHA and EPA as well as state and local government regulations regarding worker safety and protection, hazardous waste handling and disposal through the use of appropriate containment, engineering controls, respirators, monitors, etc.

Method of Measurement: This work will be measured for payment by the number of steel mast arm assemblies of the type specified, completed and accepted in place.

Basis of Payment: This work will be paid for at the contract unit price each for "XX Steel Mast Arm Assembly" or "XX Steel Combination Mast Arm Assembly", of the type specified, complete in place, which price shall include all equipment, materials, tools and labor incidental to the design, fabrication and installation, including mitigation devices if required, of the mast arms at the locations specified on the plans.

ITEM #1105101A - 1 WAY, 1 SECTION MAST ARM TRAFFIC SIGNAL

ITEM #1105103A - 1 WAY, 3 SECTION MAST ARM TRAFFIC SIGNAL

Description:

Traffic signals and all supporting equipment, brackets and clamps shall be painted black by the manufacturer.

Article 11.05.03 – Construction Methods:

Add the following paragraph:

Circular indications that have an identification mark (such as an arrow) on the top of the lens shall be installed with that mark at the 12 o'clock position.

Article M.16.06 - Traffic Signals

Sub Article 3 - Housing:

In the last sentence, between the words "housing" and "shall" add "and all internal hardware".

Add the following after the last paragraph.

Each section of the housing shall be provided with a removable visor. The visor shall be the cap type, unless otherwise noted on the plan. The visor shall be a minimum .05 inch (.13 mm) thick. The visor shall be the twist on type and secured to the signal by four equidistant flat tabs screwed to the signal head.

Sub Article 4 - Brackets:

Add the following at the end of the last paragraph:

Install a 2" wide yellow retroreflective strip (Type IV sheeting) along the perimeter of the face of the backplate.

Delete Sub Article 5 - Optical Unit and Sub Article 6 – Lamp Socket and replace with the following:

Optical Unit, Light Emitting Diode:

(a) General:

Only Optical Units that meet the requirements contained herein supplied by the below manufacturers that have been tested by the Department's Signal Lab will be accepted. Final approval for model numbers will be done at the time of the catalog cut submittals.

Duralight
Trastar, Inc.
860 N. Dorothy Dr., Suite 600
Richardson, TX 75081

GE Lighting Solutions
Corporate Headquarters
1975 Noble Road Building 338E
East Cleveland, OH 44112-6300

Dialight
1501 Foute 34 South
Farmingdale, NJ 07727

Leotek
726 South Hillview Drive
Milpitas, CA 95035

The materials for Light Emitting Diode (LED), Optical Unit, circular and arrow, shall conform to the following:

- The ITE Performance Specification for Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement for circular indications dated June 27, 2005.
- The ITE Performance Specification for Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement for arrow indications dated July 1, 2007.

Section 4, Adjustable Traffic Signals and General Housing sections of the **Department of Transportation Functional Specifications for Traffic Control Equipment, current edition governs.** Where the Department of Transportation Functional Specifications conflict with this Special Provision or the 2005/2007 ITE Performance Specifications, this Special Provision and the 2005/2007 ITE Performance Specifications shall govern.

The Optical Unit shall have an Incandescent look and be made up of a smooth surfaced outer shell, multiple LED light sources, a filtered power supply and a back cover, assembled into a sealed unit. The Optical Unit shall be certified as meeting the 2005/2007 ITE Specifications by Intertek Testing Services, Inc. (ITSNA, formerly ETL) or another organization currently recognized by the Occupational Safety and Health Administration (OSHA) as a Nationally Recognized Testing Laboratory (NRTL.) The Optical Unit shall perform to the requirements of the ITE Specification for a minimum of 60 months.

A "Swing Test" will be performed by the Department to ensure no significant dimming or blanking occurs, until the lamp is obscured by the visor. All L.E.D Lamps will be subjected to further field testing for reliable operation.

The Arrow Optical Unit shall be "Omni-Directional" so that it may be oriented in a right, left or straight configuration without degradation of performance.

(b) Electrical Requirement:

Operating voltage:

80 to 135 Volts AC with cutoff voltage (no visible indication) below 35Volts AC.

Power requirements:

Circular Indications: 12", (300 mm) – no more than 16 Watts

Circular Indications: 8", (200mm) - no more than 16 Watts

Arrows Indications: 12", (300mm) - no more than 16 Watts

Power Supply:

Fused and filtered to provide excess current protection and over voltage protection from electrical surges and transient voltages.

(c) Photometric Requirement:

Beam Color:

Meet 2005/2007 ITE Specifications

(d) Mechanical Requirements:

Diameter:

The Circular Optical Unit shall fit into standard 12" (300mm) or 8" (200mm) housing.

The Arrow Optical Unit shall fit 12" (300mm) housings only.

Enclosure:

UV (Ultraviolet) stabilized polycarbonate back cover.

Clear lens cover for all Red, Yellow and Green Circular Optical Units.

For Arrow Optical Units the arrow indication segment of the lens shall be clear.

Enclosure sealed and waterproofed to eliminate dirt contamination and be suitable for installation in all weather conditions.

Clearly mark on the housing the following information:

- Manufacturer & model number
- Date of manufacture (must be within one year of installation)

The model number shall end with the number of LEDs used to comprise the unit as the last digits of the model number. Example, if the unit comprised of 3 LEDs and the model is x12y, then the new model number shall read x12y3.

Operating temperature:

Meet 2005/2007 ITE Specification

Wiring: L.E.D. lamps shall have **color coded 16 AWG wires** for identification of heads as follows:

RED L.E.D. Lamps	RED with WHITE neutral
YELLOW L.E.D. Lamps	YELLOW with WHITE neutral
GREEN L.E.D. Lamps	GREEN or Brown with WHITE neutral
RED L.E.D. ARROWS	RED/WHITE with WHITE neutral
YELLOW L.E.D. ARROWS	YELLOW/WHITE with WHITE neutral
GREEN L.E.D. ARROWS	GREEN/WHITE or BROWN/WHITE with WHITE neutral

GREEN/YELLOW L.E.D ARROWS	GREEN/WHITE or BROWN/WHITE, YELLOW/WHITE, with WHITE neutral
---------------------------	--

Wires shall be terminated with a **Block Spade**, 6-8 stud/ 16-14 wire size.

All Circular Optical Units shall be supplied with a minimum 40" pigtail and all Arrow Optical Units Supplied with a minimum 60" pigtail.

Sub Article 9 - **Painting:**

Third coat: Replace the first two sentences with the following:

- The color shall be Black, No. 37038, Federal Standard No. 595. The Contractor shall submit color samples to the Engineer for approval prior to fabrication.

ITEM#1106001A- 1 WAY PEDESTRIAN SIGNAL POLE MOUNTED

ITEM#1106003A- 1 WAY PEDESTRIAN SIGNAL PEDESTAL MOUNTED

Description:

Pedestrian signals and all supporting equipment, brackets and clamps shall be painted black by the manufacturer.

Section 11.06.02 Pedestrian Signal, Materials

Section M.16.07 C. Optical Unit

Delete 2. LED: and replace with the following:

General

- Meet requirements of current MUTCD Section 4E.
- Meet current ITE specifications for Pedestrian Traffic Control Signal Indications - (PTCSI) Part 2: Light Emitting Diode (LED).
- Meet CT DOT, 2008 - 2010 Functional Specifications for Traffic Control Equipment; Section 5D, LED Pedestrian Signal with Countdown Timer.
- Meet EPA Energy Star® requirements for LED Pedestrian Signal Modules.

Operational

- Countdown display only during the flashing Pedestrian Clearance (Ped Clr) Interval. Timer goes blank at end of flashing ped clr even if countdown has not reached zero.

Physical

- Sealed optical module to prevent entrance of moisture and dust.
- Self-contained optical module, including necessary power supplies.
- Designed to securely fit into standard housing without the use of special tools or modifications to the housing.
- Identification information on module: manufacturer's name, model number, serial number, and date code.

Optical

- Multiple LED sources; capable of partial loss of LED's without loss of symbol or countdown message.
- Two complete self contained optical systems. One to display the walking person symbol (walk) and the hand symbol (don't walk). One to display the countdown timer digits.
- Visual Image similar to incandescent display; smooth, non-pixelated.
- Symbol and countdown digit size as shown on the plan.
- Solid hand/person symbol; outline display not allowed.
- Overlaid hand/person symbols and countdown digits arranged side by side.
- Countdown digit display color: Portland Orange in accordance with ITE requirements.
- Countdown digits comprised of two seven segments, each in a figure 8 pattern.
- Photometric Requirements: Luminance, Uniformity, and Distribution in accordance with ITE requirements.
- Color Uniformity in accordance with ITE requirements.

- Blank-Out design; symbols and digits illegible even in direct sunlight when not illuminated.

Electrical

- Operating voltage: 89 VAC to 135 VAC.
- Low Voltage Turn-Off: 35 VAC.
- Turn-On and Turn-Off times in accordance with ITE specifications.
- Combined Hand – Countdown Digits wattage: \geq 20 Watts.
- Input impedance at 60 Hertz sufficient to satisfy Malfunction Management Unit (MMU) requirements.
- Two separate power supplies. One to power the walking person symbol. One to power the hand symbol and the countdown digits.
- Meet Federal Communication Commission (FCC) regulations concerning electronic noise.
- Filtered and protected against electrical transients and surges.

Warranty

- Five years from date ownership is accepted.

Section M.16.07 F. Painting:

Third coat: Replace the first two sentences with the following:

The color shall be Black, No. 37038, Federal Standard No. 595. The Contractor shall submit color samples to the Engineer for approval prior to fabrication.

ITEM #1107011A - ACCESSIBLE PEDESTRIAN SIGNAL AND DETECTOR (TYPE A)

Description:

Furnish and install an Accessible Pedestrian Signal and Detector (APS&D). The APS&D provides audio and tactile information to augment the visual pedestrian signal.

Type A provides a low frequency percussive tone during the walk interval and is used where there is an exclusive pedestrian phase or ≥ 10 foot separation between APS&Ds.

They pedestrian pushbuttons and sign frame shall be painted black by the manufacturer.

Material:

A. General:

- Conform to applicable sections of the current MUTCD Chapter 4E, Pedestrian Control Features as specified herein.
- All features fully operational when the traffic signal is in colors mode.
- All features non-operational when the traffic signal is in flash mode.
- Interchangeable with a non-accessible type pedestrian pushbutton with no modifications to the Controller Assembly (CA) or Controller Unit.
- Audible transducer integral with the APS&D housing, adjacent to the pushbutton.
- Operation programming method: Either or combination of:
 - Mechanically by dip switches or circuit board jumpers
 - Infrared remote-control hand-held device

B. Electrical:

- Metallic components either grounded or insulated to preclude an electrical hazard to pedestrians under all weather conditions.
- All features powered by the 110VAC Walk signal and the 110VAC Don't Walk signal so that additional conductors from the CA are not needed.

C. Audible Pushbutton Locator Tone

- Frequency: repeating tone at one (1) second intervals
- Tone duration: ≤ 0.15 seconds
- Volume:
 - Minimum setting of zero
 - Manually adjustable initial setting
 - Automatically adjusted after initial setting. Volume increased in response to a temporary increase in ambient noise and subsequently decreased with a decrease in ambient noise.
 - Maximum volume: 100 dBA which is the approximate sound pressure of a gasoline powered lawn mower nearby.
 - Automatic volume adjustment independent of other APS&Ds at the intersection.
 - May be disabled without affecting operation of other features.
- Silent only during walk interval. Active all other times.

D. Vibrotactile Arrow Pushbutton

- Pushbutton contained in a circular assembly which fits inside the housing and is attached to the housing with 4 screws.
- ADA compliant: Size: ≥ 2.0 " (50) diameter, Actuation force: ≤ 5 ft-lb (22.2 N)
- Shape: Circular, raised slightly above housing so that it may be actuated with the back of a hand
- Tamper-proof, vandal-proof, weatherproof, freeze-proof, impact-resistant design and construction.
- Operation: Vibrates only during the walk interval (when the walk indication is displayed).
- Tactile Arrow:

- Attached to surface of the button assembly by a tamperproof method.
- Raised slightly above surface of pushbutton, minimum 0.125" (0.3)
- Size: Length ≥ 1.5" (38), Height ≥ 1.0" (25)
- Color: Sharp contrast to background color of pushbutton and housing

E. Audible Walk Interval

1. General:

- Operation independent of other APS&Ds at intersection.
- Active only during the walk interval (when the walk indication is displayed).
- Volume:
 - Minimum setting of zero
 - Manually adjustable initial setting
 - Automatically adjusted after initial setting. Volume increased in response to a temporary increase in ambient noise and subsequently decreased with a decrease in ambient noise.
 - Automatic volume adjustment independent of other APS&Ds at the intersection.
 - Maximum volume: 100 dBA which is the approximate sound pressure of a gasoline powered lawn mower nearby.
- Duration:
 - Default method: Automatically set by the duration of the visual walk signal display.
 - When selected: Manually set when rest-in-walk is used for a concurrent pedestrian movement.
- Audible sounds that mimic any bird call are not allowed.

2. Type A, Percussive Tone:

- Repeating tone at eight (8) to ten (10) ticks per second.
- Tone frequency: Multiple frequencies with a dominant component at 880 Hz which creates a "tick - tick - tick..." sound.

H. Pushbutton Housing/Sign Frame/Sign

- One piece die cast aluminum meeting requirements of ASTM B85.
- Sign frame designed to accept 9" x 12" (230 x 300) four-hole advisory sign.
- Flat back to facilitate surface mount.
- Available brackets to either pedestal top-mount or pole side-mount on pole diameter range of 3½" (89) to 15" (380).
- Available brackets to allow mounting two (2) APS&Ds to the same 3½" (89) pole, facing ≥ 60 degrees apart, at the same height.
- Wire entrance through the rear.
- Stainless steel mounting hardware.
- Color: BLACK, No. 17038, Federal Standard No. 595. The Contractor shall submit color samples to the Engineer for approval prior to fabrication.
- Finish: Housing/Frame and all mounting brackets either:
 1. Painted with 3 coats of infrared oven-baked paint before assembly.
 - Primer: Baked iron oxide which meets or exceeds FS TT-P-636.
 - Second coat: Exterior-baking enamel, light gray, which meets or exceeds FS TT-E-527.
 - Third coat: BLACK, No. 17038, Federal Standard No. 595. The Contractor shall submit color samples to the Engineer for approval prior to fabrication.
 2. Electrostatic powder coated after chemically cleaned.
- Sign: CT DOT Sign No. 31-0845

Construction Methods:

Install the APS&D according to the manufacturer's instructions. Position the ASP&D so the plane of the sign face is parallel to the crossing (sign is facing perpendicular) and the arrow is pointing in the same direction as the crossing, not necessarily at the ramp. Notify the Engineer if there is any discrepancy or ambiguity between the plans and field conditions that prevent placement of the ASP&D as shown on the plan. Set the minimum sound levels of the locator tone and the audible walk indication when there is little or no ambient noise as in night time operation. Set the volume of audible walk indications and pushbutton locator tones to a maximum of 5dBA louder than ambient sound. The locator tone should be audible 6' to 12' (1.8 m to 3.6 m) from the pushbutton or to the building line, whichever is less. Confirm the volume of both audible walk indication and the locator tone increases with an increase in ambient sound and subsequently decreases when the ambient noise decreases.

If programming method is remote, by an infrared hand-held device, provide one device and operation manual for each intersection where APS&D is installed.

Method of Measurement:

This work is measured by the number of APS&Ds of the type specified, installed, tested, fully operational, and accepted.

Basis of Payment:

Payment for this work is based on the installation, inspection, successful completion of the 30 day test period, and final acceptance of the Accessible Pedestrian Signal and Detector of the type specified. Payment includes the sign, mounting brackets for adjacent buttons on the same structure, all incidental materials, labor, tools, and equipment necessary to complete the installation. Payment also includes the warrantee, installation manual, and operation manual.

If programming method is remote by an infrared hand-held device, the total bid price of all APS&Ds includes one remote programming device and accompanying operation manual for each intersection where APS&D is installed.

Pay Item	Pay Unit
Accessible Pedestrian Signal and Detector (Type A)	Each

ITEM # 1108163A - MODIFY EXISTING CONTROLLER

This item shall consist of modifying the existing traffic controller to provide the revised operation as shown on the plans or as directed by the Engineer. The modification shall include, but not be limited to, installation of a new controller unit, fiber optic interconnect cable and termination, revisions to the timing and sequence, cabinet wiring, coordination, pre-emption, field wiring and cabinet wiring diagrams. This location is to be included into the Town of Glastonbury's closed loop signal system.

MATERIAL

The material for this work shall conform to the requirements of the current edition of the Connecticut Department of Transportation Functional Specifications for Traffic Control Equipment. The material shall be compatible with the existing equipment. Any material in question shall be approved prior to installation by the Engineer.

Controller Unit

This Specification is for establishing the minimum requirements for a TS2 Actuated Traffic Signal Controller. The TS2 Actuated Traffic Signal Controller shall meet all of the applicable portions of the NEMA TS2 Type 1, 2003 Section 3 for Actuated Control, using the Naztec 980 controller or approved equal. "Approved equal" equipment shall be permitted only when written approval is obtained from the Town. If there is a discrepancy between this specification and NEMA requirements, the conditions of this specification shall prevail.

All controller types shall be sixteen (16) phase. A comprehensive technical document including functional description and drawings, both hardcopy and electronic, shall be attached to the Contractor's Bid. Failure to comply may result in the Bid being rejected.

Controller Unit - General Functional Requirements

The controller unit shall be:

- Fully actuated;
- Solid state microprocessor based;
- Menu driven;
- With capacity to control 16 traffic phases plus pedestrian phases; and
- Capable of Time Base Coordination with a minimum of 200 programmable steps.

All phases shall have the capability to be recalled to minimum green, maximum green, or pedestrian walk.

All timer units, where pedestrian timing is specified, shall rest in WALK display for main street unless otherwise specified.

Phase detection shall be capable of being declared as either locking or non-locking.

Software programming shall permit the controller unit to time concurrent phases, which shall have active detector calls.

The controller shall be programmable to start up in phases 2 and 6 amber and in phases 4 and 8 red intervals.

The controller unit shall have the capability of time based permissive force-offs. The controller unit shall support the ability to provide automatic calculations for computing the permissive period during coordination. This calculation shall not allow phase to be skipped during coordination. It shall not require the user to enter any data other than the split and cycle information. Calculations shall use the controller entries for phase timings to determine the permissive periods. The controller unit shall support the ability to open separate permissive periods for each phase. This shall support the ability to add unused non-coordinated phase time to the end of the coordinated phase.

The controller unit shall have the ability to store and to execute a minimum of:

- 24 timing plans;
- 16 splits;
- 16 phase omits; and
- 16 phase recalls.

The controller unit shall have the ability to create and store in memory:

- An event (including two levels of transit signal priority (TSP) requests (high and low)) and error log; and
- Log containing volume and occupancy values recorded by traffic detectors; it shall be possible to store data integrated over 5 minute periods (programmable) for at least 24 hours.

The controller unit's clock and memory shall be rechargeable and battery backed-up to retain time, date and signal timing data for a period of at least 30 days.

The communication protocol supplied with the controller shall allow the new TSCS to exchange data with the controller to provide the following functions:

- Status:
 - Current failures;
 - Vehicle and pedestrian display (red, amber, green) for all 16 phases;
 - State of actuating detectors;
 - State of pedestrian detectors;
 - Local pre-empts/priority including two levels of TSP (high and low); and
 - Progress of cycle time.
- Error and Event Log:
 - Upload and Clear.

- System Detector data:
 - Upload volume, occupancy and speed; and
 - Set integration period.
- Timing Plans:
 - Download and upload; and
 - Remote manual select.
- Time Base schedule:
 - Download and upload.
- Set date and time
- Phase minimum values (main page timings):
 - Upload.

The controller unit shall have its own address for communication purposes. There shall be a minimum of 40 programmable addresses available.

The controller shall have input/output remapping features and/or logic programming.

The controller unit shall have the ability to detect the occurrence of all-flash conditions and report through the controller timer to the Traffic Signal Control System using the communications protocol provided.

Phasing

The controller shall be capable of 16 phase operation with a minimum of four rings.

Phases 1, 3, 5 and 7 shall be configurable as left turn arrows for 8 phase units and phases 1 and 3 must be configurable as either a left turn arrow and green ball or a flashing green aspect for 4 phase units. Phases 2, 4, 6 and 8 shall be solid displays with actuated parallel pedestrian indications.

For 16 phase units the vehicle phases will be assigned to phases 1 through 8 as described above, and the remaining phases will be used for transit (generally phases 10/12 and 14 and 16 in a dual ring configuration).

Yellow Trap

The controller shall be wired so that it cannot back up to service a left turn demand.

Pedestrian Phases

Pedestrian isolation circuits shall be provided for all pedestrian phases and shall be external logic units.

CONSTRUCTION METHODS

All revisions to the cabinet wiring shall be neat and orderly. All additional wiring shall be from terminal to terminal. Splices will not be allowed. All changes, additions and deletions shall be documented, dated and drawn on the reproducible original or a reproducible copy of the original cabinet wiring diagram. Four paper copies shall be furnished to the Engineer upon completion of the revision.

METHOD OF MEASUREMENT

This item will be measured for payment as an "Each" item.

BASIS OF PAYMENT

This item will be paid for at the contract price each, for "Modify Existing Controller" which price shall include all necessary load switches, relays, components, hardware, tools, equipment, engineering and labor required to modify the existing controller as shown on the plan. This price shall also include four updated cabinet wiring diagrams.

ITEM #1108187A - SYSTEM INTEGRATION

DESCRIPTION:

Work under this item shall consist of the successful integration of all system devices furnished under this contract with the Town of Glastonbury's Traffic Signal Control System (TSCS). New traffic signal controllers shall be added as a separate coordinated system. This item shall include all required creations, additions and modifications to the graphics subsystem, communications subsystem, data base, system software, showing the status of the intersection operation in the controller "list page" alongside of the communication status, and all other hardware and software necessary to the complete the integration of all traffic signals into the Town of Glastonbury TSCS.

The Town's existing TSCS uses the ATMS.now software by Trafficware / Naztec. System integration work shall be performed by a certified Trafficware partner. The contractor shall include the PDF of the new intersection signal equipment layouts in the documentation of the TSCS.

MATERIALS: As required.

CONSTRUCTION METHODS:

The Contractor shall accomplish all described work with the least amount of interruption to the operation of the existing Town of Glastonbury network. Prior to the start of any fiber optic cabling work on the project, the Contractor and his authorized vendor shall meet with the Town IT Director (Bobby Ashton), Town Engineer / Manager of Physical Services (Daniel Pennington), and the Engineer of Record to discuss the planned integration of the TSCS equipment in the Town facilities. The meeting shall serve to plan the installation of the equipment, system integration, schedule, and determine points of access for the Town network. The Contractor shall keep the Town of Glastonbury's Director of Information Technology apprised of all work scheduled and in progress. The Town Engineer / Manager of Physical Services and the Engineer of Record are to be included and instructed in the system integration process.

The work under this item shall also include modifications to the existing communication and electrical wiring at Naubuc School as necessary to complete the system integration work. The Contractor shall work with the Town IT Director to implement the IP addresses for all field system components and any other equipment included under this contract.

The Contractor shall produce computer representations of all intersections and upgrade the existing system map to include intersections under this contract for the purposes of monitoring system status. Displays of the intersection operation status (when hover over the intersection in the GIS map) shall include, but not limited to, the following:

- Intersection operating plan
- System parameter status
- Pre-empt status
- Time and date
- Cabinet door open
- Police door open
- Master Cycle Timer
- Local Cycle Timer
- Active Splits
- Overlap Indications
- Offset selection
- Plan offset value
- Plan cycle length value
- Time of day outputs

The Contractor shall install all cabling at Naubuc School in a neat and workmanlike manner utilizing cable bundling devices and cable trays as approved by and satisfactory to the Town IT Director.

METHOD OF MEASUREMENT:

This item shall be measured at the contract "Lump Sum" price for the successful integration of all local intersections into the existing Town TSCS, as described in these specifications and as required for a complete and functional system, to the satisfaction of the Town of Glastonbury Director of Information Technology and the Town Engineer/ Manager of Physical Services.

BASIS OF PAYMENT:

This item shall be paid for at the contract Lump Sum price for "System Integration". This price shall include all additions and modifications to the various TSCS software system, hardware, software, subsystems, graphics creations, materials, equipment, tools, labor, and incidentals thereto.

ITEM #1108578A - FULL ACTUATED CONTROLLER 8 PHASE (MODIFIED)

Description:

Outside of the controller cabinet shall be painted black, inside of controller shall be painted white.

Article 11.08.01 - Description: Delete the second paragraph and replace with the following:

This item shall consist of furnishing and installing an actuated controller, which shall be a completely digital solid state unit, for controlling the operation of the traffic signals.

The controller shall be completely furnished with the number of phases called for in the item. The cabinet to house the controller shall be completely wired and all sub-bases shall be complete with load switches and flash relays as specified in the **Functional Specifications For Traffic Control Equipment**. The cabinet shall also have all necessary auxiliary equipment required to provide the sequence and timing indicated on the plans. A time switch shall be installed in each cabinet. The controller cabinet shall be sufficiently sized to house the specified equipment including UPS and fiber optic splice enclosure) as well as emergency vehicle preemption equipment.

This item shall also include provisions for supporting an uninterruptible power supply, transfer switch and external power supply connection for portable generator hookup in extended periods of area-wide loss of power. The UPS is specified under ITEM #1113812 herein.

Article M.16.09 - Controllers: Add the following sub-articles:

2. Actuated Controllers: The purpose of this sub-article is to set forth minimum design and operating requirements for the materials and components for a digitally timed actuated controller.

Controller Unit

This Specification is for establishing the minimum requirements for a TS2 Actuated Traffic Signal Controller. The TS2 Actuated Traffic Signal Controller shall meet all of the applicable portions of the NEMA TS2 Type 1, 2003 Section 3 for Actuated Control, using the Naztec 980 controller or approved equal. "Approved equal" equipment shall be permitted only when written approval is obtained from the Town. If there is a discrepancy between this specification and NEMA requirements, the conditions of this specification shall prevail.

All controller types shall be sixteen (16) phase. A comprehensive technical document including functional description and drawings, both hardcopy and electronic, shall be attached to the Contractor's Bid. Failure to comply may result in the Bid being rejected.

Controller Unit - General Functional Requirements

The controller unit shall be:

Fully actuated;

Solid state microprocessor based;

Menu driven;

With capacity to control 16 traffic phases plus pedestrian phases; and

Capable of Time Base Coordination with a minimum of 200 programmable steps.

All phases shall have the capability to be recalled to minimum green, maximum green, or pedestrian walk.

All timer units, where pedestrian timing is specified, shall rest in WALK display for main street unless otherwise specified.

Phase detection shall be capable of being declared as either locking or non-locking.

Software programming shall permit the controller unit to time concurrent phases, which shall have active detector calls.

The controller shall be programmable to start up in phases 2 and 6 amber and in phases 4 and 8 red intervals.

The controller unit shall have the capability of time based permissive force-offs. The controller unit shall support the ability to provide automatic calculations for computing the permissive period during coordination. This calculation shall not allow phase to be skipped during coordination. It shall not require the user to enter any data other than the split and cycle information. Calculations shall use the controller entries for phase timings to determine the permissive periods. The controller unit shall support the ability to open separate permissive periods for each phase. This shall support the ability to add unused non-coordinated phase time to the end of the coordinated phase.

The controller unit shall have the ability to store and to execute a minimum of:

24 timing plans;

16 splits;

16 phase omits; and

16 phase recalls.

The controller unit shall have the ability to create and store in memory:

An event (including two levels of transit signal priority (TSP) requests (high and low))
and error log; and

Log containing volume and occupancy values recorded by traffic detectors; it shall be possible to store data integrated over 5 minute periods (programmable) for at least 24 hours.

The controller unit's clock and memory shall be rechargeable and battery backed-up to retain time, date and signal timing data for a period of at least 30 days.

The communication protocol supplied with the controller shall allow the new TSCS to exchange data with the controller to provide the following functions:

Status:

- Current failures;
- Vehicle and pedestrian display (red, amber, green) for all 16 phases;
- State of actuating detectors;
- State of pedestrian detectors;
- Local pre-empts/priority including two levels of TSP (high and low); and
- Progress of cycle time.

Error and Event Log:

- Upload and Clear.

System Detector data:

- Upload volume, occupancy and speed; and
- Set integration period.

Timing Plans:

- Download and upload; and
- Remote manual select.

Time Base schedule:

- Download and upload.

Set date and time

Phase minimum values (main page timings):

- Upload.

The controller unit shall have its own address for communication purposes. There shall be a minimum of 40 programmable addresses available.

The controller shall have input/output remapping features and/or logic programming.

The controller unit shall have the ability to detect the occurrence of all-flash conditions and report through the controller timer to the Traffic Signal Control System using the communications protocol provided.

Phasing

The controller shall be capable of 16 phase operation with a minimum of four rings.

Phases 1, 3, 5 and 7 shall be configurable as left turn arrows for 8 phase units and phases 1 and 3 must be configurable as either a left turn arrow and green ball or a flashing green aspect for 4 phase units. Phases 2, 4, 6 and 8 shall be solid displays with actuated parallel pedestrian indications.

For 16 phase units the vehicle phases will be assigned to phases 1 through 8 as described above, and the remaining phases will be used for transit (generally phases 10/12 and 14 and 16 in a dual ring configuration).

Yellow Trap

The controller shall be wired so that it cannot back up to service a left turn demand.

Pedestrian Phases

Pedestrian isolation circuits shall be provided for all pedestrian phases and shall be external logic units.

Malfunction Management Unit

The Malfunction Management Unit (MMU) shall meet all of the applicable portions of the NEMA TS2 2003 Section 4. The MMU shall detect and respond to improper and conflicting signals and improper operating voltages in a controller assembly. The MMU shall detect the presence of voltage on conflicting field connection terminals, the absence of proper voltages on all of the signal field connection terminals of a channel, and shall be capable of monitoring the presence of satisfactory operating voltages within the controller unit and MMU itself.

The MMU, upon sensing any of these conditions, shall cause the transfer of the traffic signals to Flashing Operation, and the controller assembly shall be wired in such a manner as to provide Flash Transfer if the MMU is removed from service.

The MMU shall operate with the Type Select input at Logic Ground potential such that it is a Type 15 with sixteen channels. Each of the sixteen channels consists of three 120 volt AC inputs: Green/Walk, Amber, and Red/Don't Walk.

The Signal Monitor portion of the MMU shall be capable of monitoring for the presence of voltage on conflicting field connection terminals in the controller assembly. For the purpose of conflict determination, a signal on any of the Green, Amber, or Walk inputs associated with a channel shall be considered as that channel being active.

The Signal Monitor portion of the MMU shall also detect the absence of any required signal voltage on each channel at the field connection terminals in the controller assembly. For this purpose a signal on the Green/Walk, Amber, or Red/Don't Walk inputs associated with a channel shall be considered as that channel being active.

The Voltage Monitor portion of the MMU shall be capable of monitoring the Controller Unit Voltage Monitor output which indicates satisfactory operating voltage in the controller unit.

Communication Protocol

It is expected that signalized intersections to be initially connected to the selected TSCS are interconnected over a newly installed fiber communication network. Field communications processing shall be distributed between the central processors, and local field equipment.

The Contractor shall use open, industry standard protocols. At a minimum the TSCS shall have National Transportation Communication for ITS Protocol (NTCIP) 1202 Level 2 as defined by Section 3.3.6 of NEMA TS2-2003. NTCIP v02.06 capabilities shall include for all NTCIP mandatory and optional objects. The Proponent must demonstrate/document how they will guarantee compliance with NTCIP center-to-field communication protocol.

The Contractor shall support multiple traffic signal controller cabinet assemblies using this protocol. The Contractor shall describe what controllers they support in their proposal submission. The proposals will be evaluated as a total cost of ownership.

Communication Ports

The controller unit shall be supplied with one port conforming to EIA-232 specification, and an Ethernet port. All ports and terminals shall be supplied with Keystone "Jack Screws" catalogue number 7230 or approved equal.

Detector Racks

Each controller shall be equipped with specific racks fully wired for operation and complete with power supplies to accommodate detectors. For this application, the following shall be installed using a maximum of two racks:

- 8 position, 16 channel rack with US Traffic (UST) Model 222 rack mounted solid state detectors and RTC Model 380 Card Rack wired dual priority for fire pre-emption, but not including the card(s).

The detector rack(s) shall be compatible with TS2 Type 1 technology.

Bus Interface Unit NEMA TS2 Type 1

The Bus Interface Unit (BIU) shall meet all of the applicable portions of the NEMA TS2-2003 Section 8 for Bus Interface Units for NEMA TS2 Type 1 controller cabinet assemblies. Bus Interface Units are required in the traffic signal controller cabinet assembly, TS2 Type 1, for connection between the controller and the terminal facilities and detector racks.

Traffic Signal Control Cabinet

The Town intends to procure a controller cabinet assembly that can support up to 16 phase operation.

Cabinet Dimensions

The outline dimensions of the cabinets shall be equivalent to a ConnDOT "D" cabinet, base mounted. The controller cabinet shall comply with NEMA standards and shall be made of aluminum, with a minimum thickness of the aluminum of 3.175 mm. All internal and external cut edges shall be ground smooth to prevent injury or damage. The cabinet shall be manufactured so as to prevent the accumulation of water on its top surface.

Door

The cabinet shall have a hinged main door that permits access to all equipment within the cabinet and visual inspection of all indications and controls. The main door shall be not less than 1320 mm high by 845 mm wide. The size of the main door of the cabinet shall be substantially the full area of the front of the cabinet and shall include a 'door-in-door' for access to a police panel.

The main door shall be provided with a door stop which holds the door open at a minimum of two positions (90 degree and 120 degree) open stop, which can be locked in place. The stop and catch mechanism shall be capable of holding the door open at 90 degrees with a load of 15 pounds per square foot applied uniformly over the face of the door. The doorstop shall be durable stainless steel, approximately 10 mm in diameter.

A three-point latch is required for the main door. The latching mechanism shall be constructed of heavy cadmium plated steel bar and nylon rollers on the locking bar, and a handle which will serve to secure the door.

The door handle shall be durable stainless steel, with a durable 12.7 mm shank, and shall be subject to approval by the Town. Provisions for padlocking shall be provided. The handle shall not impede the operation of the lock during opening. The controller cabinet shall come with a Pelco SM1026 door lock and key or approved equal.

Shelves

The cabinet shall have provisions for positioning shelves to within 31 cm of the bottom of the cabinet and to within 20 cm of the top of the cabinet in increments of not more than 5 cm.

The cabinet will be supplied with 3 shelves, with the spacing to be determined by the Town. One of the three shelves shall have a sliding pullout shelf capable of safely supporting a laptop computer. The pullout shelf shall not interfere with the backboard or cabinet accessories and shall be a minimum of 40 cm x 26 cm (length times width).

Finish

The outside of the control cabinet shall be powder coated Black, No. 17038, Federal Standard No. 595 finish and the inside of the control cabinet shall be powder coated white. The Contractor shall submit paint chips and sample finishes on aluminum of the intended color to the Engineer for approval.

The coating shall be a polyester-TGIC (triglycidyl isocyanurat) resin system.

A Certificate of Compliance of the powder coating system is required for approval.

Cabinet Ventilation

The cabinet shall have a replaceable filter with the following dimensions: width 41 cm, height 31 cm, thickness 3 cm. The cabinet will have an air vent filter and removable aluminum cover.

Police Panel

The police panel shall come complete with: signal switch, auto/flash switch, auto/manual switch, hand push button and retractable cord, Pelco SM1013 lock with key (or equivalent).

Thermostat

The cabinet shall be equipped with an adjustable thermostatically controlled heater (bar type, minimum 250 W, CSA approved). The cabinet shall be equipped with an adjustable thermostatically controlled fan with manual control, which shall be vented to the outside. Thermostats shall be located so as to be easily accessible. Thermostat terminals shall be insulated to prevent accidental shock or shorting.

Cabinet Mounting

The cabinet shall be base mounted. A Neoprene gasket shall be supplied for the base of the cabinet.

Ancillary Requirements

The cabinet shall come equipped with a clear plastic cover that covers the power supply.

The controller shall be equipped with back panel able to accommodate 12 three-phase output modules.

The controller shall be equipped with all load switches for the indicated 4, 8, or 16 phase operation, indicating lights for vehicles/pedestrian display shall be provided integral with the load switch.

The cabinet shall come equipped with two internal circuit breakers with labels, one for power feed and one for auxiliary equipment.

The cabinet shall come equipped with a radio interference filter.

The cabinet shall include lightning/high voltage surge protector, model HESCO HE1700RS, wired to provide "user defined input" capability.

The cabinet shall be equipped with two (2) - 110 V AC duplex power outlets (UL/CSA approved) equipped with a ground fault protection unit. One unit shall be located near bottom half of the cabinet and, the other located above the top shelf. The exact location is to be determined by the Town after the contract has been awarded and prior to installation.

The cabinet shall be equipped with 3-way switches inside the cabinet to simulate vehicle and pedestrian pulse and locking detector inputs directly to the controller. These switches shall, as a minimum, access the following features: stop timing, manual timing, manual interval advance and flash mode. These switches shall be designated such that up is on, down is momentary on and center is off. The switches shall be located so they cannot be activated by accident.

The cabinet shall be equipped with solid state flasher (minimum 15A, 2 poles).

The cabinet will include two Malfunction Management Unit (MMU) conflict sheets showing all conflicting displays with numbered circuits.

The cabinet shall be equipped with a lamp outlet complete with 60 W lamp and switch.

The cabinet will be supplied with two sets of equipment and electrical drawings, and one set of operations manuals.

The cabinet shall be supplied with a heavy duty Fellcoat Re-env EPPZ-C waterproof plastic pouch (44 cm x 35 cm) or approved equal capable of mounting to the cabinet door for the purposes of storing electrical and equipment drawings and manuals.

The Contractor shall provide a workable solution for all main panel wiring (wire size and colour coding).

The wiring within the controller cabinets shall be neatly arranged and laced, or enclosed in plastic tubing or raceway.

The controller and cabinet shall be configured to ensure that pre-emption related devices are powered from the rack and video processors are powered from the power supply through the provision of one (1) terminal for every two (2) video cameras used at an intersection.

The cabinet shall be set up to accommodate UPS, transfer switches and an external receptacle for portable generator power.

The Connecticut Department of Transportation Functional Specifications for Traffic Control Equipment, current edition governs the material for the Controller Assembly. The Functional Specifications are advertised biennial for vendors to provide equipment to the State on a low bid basis. All underlined text indicates an addition or revision to these specifications from the previous version. The Functional Specifications are available on the Departments website.

The following sections of the **Notice to Bidders**, pages 1 - 10, shall apply to contract supplied traffic controllers: 12, 15, 16, 17, 18, & 19.

Item 1108115A – FULL ACTUATED CONTROLLER 8 PHASE shall conform to the requirements of Section 1, pages 11 – 94. The Controller Unit (CU) shall conform to the requirements of Item 1D1, CONTROLLER (PRE-EMPTION TYPE), pages 29 – 31. All cabinets shall conform to the specifications of the "D" CABINET REQUIREMENTS, pages 78 – 84.

Controllers in a closed loop system shall conform to the requirements of Section 27, INTERNAL CLOSED LOOP SYSTEM FOR EXISTING NAZTEC SYSTEM, pages 160 – 183, in addition to the above requirements.

The solid state time switch shall conform to Section 13. FOUR CIRCUIT SOLID STATE TIME CLOCK WITH TIME BASE COORDINATION OPTION TC/TBC, pages 138 - 141.

Traffic signal equipment which has not been previously approved to meet the requirements of the Functional Specifications for the above items, will not be approved for use on this contract.

Several parts of Item 1 of the Functional Specifications do not apply to contract supplied and developer supplied traffic controllers. The specifications which are to be disregarded are listed below.

- Item 1A-1 - Controller, Two Phase Microprocessor Keyboard Entry
 - Type 6 Conflict Monitor
- Item 1A-2 - Two Phase Type "A" Cabinet

Supplemental specifications listed below, have been added for material and controller operations which the Department of Transportation does not include in the Functional Specifications for Traffic Control Equipment.

- U.C.F. Time Switch Flash Command Procedure
- Time Clock/Time Base Installation Requirements
- 24 Volt Relay Type A
- 110 Volt Relay Type F
- Type G
- Time Delay Relay
- Non-Actuated Advance Green Phase
- Actuated Advance Green Phase
- Non-Actuated Clearance / Lag Green Phase
- Actuated Clearance / Lag Green Phase
- Flashing Stop Ahead Sign
- Max II Actuation By Pedestrian Call

UNIFORM CODE FLASH COMMAND PROCEDURE

1. Activate the **MINIMUM RECALL** input to the controller to ensure cycling prior to transferring to flashing operation.
2. Omit all non-actuated and actuated artery advance phases.
3. Omit phases 1 & 5 of all quad sequences.
4. Activate the **STOP TIME** input to the controller, upon entering flash, to prevent cycling.
5. Transfer to flash at the end of the last side street all red condition (at the point the artery **ON** output becomes active).
6. Special technical notes on the intersection plan supercede the above requirements.

TC/TBC INSTALLATION REQUIREMENTS

The following requirements are to be observed when engineering the installation of TC/TBC:

1.
 - a. Circuit 1 shall be designated FLASH and be reserved for night flash command.
 - b. Circuit 2 shall be designated MAX 2 and be reserved for Max 2 command.
 - c. Circuit 3 shall be designated COORD and shall select coordinated operation of the intersection.
 - d. Circuit 4 shall be the yield, and force off command to the controller.
2. All clock outputs shall be active to select the function specified. For example; If the TC/TBC were removed for repair, no inputs would be applied to the controller. The intersection will then operate non-coordinated, in Max 1. Programming the TC/TBC without cycle and offset is not an acceptable method to create a non-coordinated operation. Refer to the typical hookup diagram.
3. All TC/TBC clock installations shall be wired as detailed in figure 1. This method is used for both full and semi actuated operation.
4. Midnight resync shall occur at 12:00 AM.
5. A program card shall be completed indicating all input steps and settings. Four copies shall be provided. One copy left in the cabinet. Three delivered to the engineer along with the cabinet wiring diagrams.

TIME CLOCK / TIME BASE COORDINATION

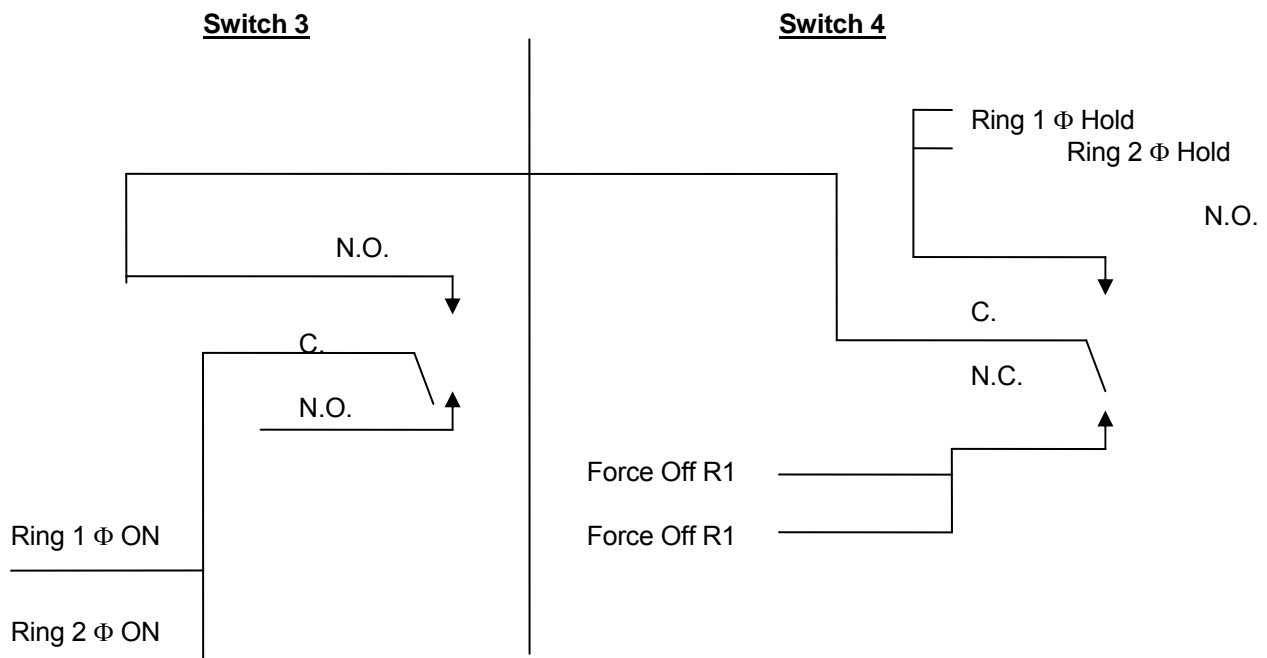


FIG. 1

24 VOLT RELAY

All 24 Volt relays shall meet the requirements of one of the following two types. Diodes shall be installed across the coils of all direct current relays to shunt the reverse voltage generated when the coil de-energizes. All diodes shall be general purpose ECG 125 1000prv @ 25A or equivalent, rated at least .5 amp forward biased. Diodes shall be external to the relay, not enclosed in the dust cover.

TYPE A: Midland Ross, Midtex 155-92 or equivalent.

DESCRIPTION:

This relay shall be enclosed in a clear polycarbonate removable dust cover. It shall have a mechanical life of more than 100,000 operations at rated load.

CONTACTS:

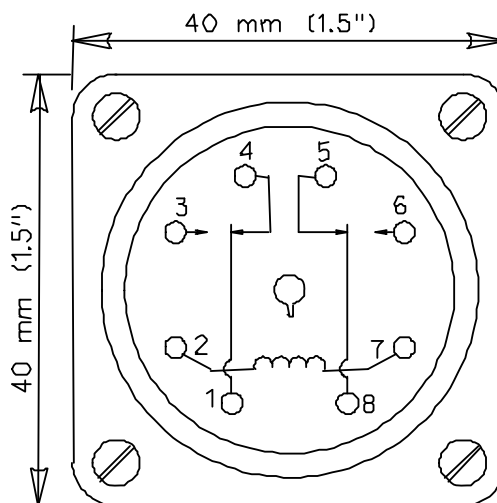
The contacts shall be 2 form C (D.P.D.T), U.L. rated at 5 amps 120 volts A.C. The contacts shall be pure fine silver (gold flash). There shall be no tungsten (lamp) load on the contacts of this relay.

COIL: The coil shall operate on 24 V.D.C. and have no less than 450 OHMS impedance.

SIZE: The relay shall be no larger than 65mm(2.5") H x 40mm(1.5") L x 40mm(1.5") W.

BASE: This relay shall have an eight pin octal plug-in base with the pin designation shown below:

- 1. Common (1)
- 2. Coil
- 3. Normally open (1)
- 4. Normally closed (1)
- 5. N.C. (2)
- 6. N.O. (2)
- 7. Coil (2)
- 8. Comm.



Bottom View And Wiring Diagram

SOCKET: The socket shall be a closed back, screw terminal type. The front mounted screws shall be 6-32 capable of accepting #14 AWG wire.

110 VOLT RELAY

All 110 volt relays shall meet the requirements of one of the following two types. Across the coil of each relay there shall be a molded suppressor rated at .1uf - 47 ohm @ 600V to suppress electrical noise created by the energization / de-energization of the relay.

TYPE F: Midland Ross, Midtex 136-62T3A1 or equivalent

DESCRIPTION:

Relays of this type shall function as flash transfer, power switching and signal drive. Other uses are acceptable, however, type G relays cannot be used for the above applications.

CONTACTS:

The contacts shall be in the D.P.D.T. form and consist of 10mm(3/8") diameter silver cadmium oxide, rated at 20 Amps @ 117 VAC resistive.

COIL:

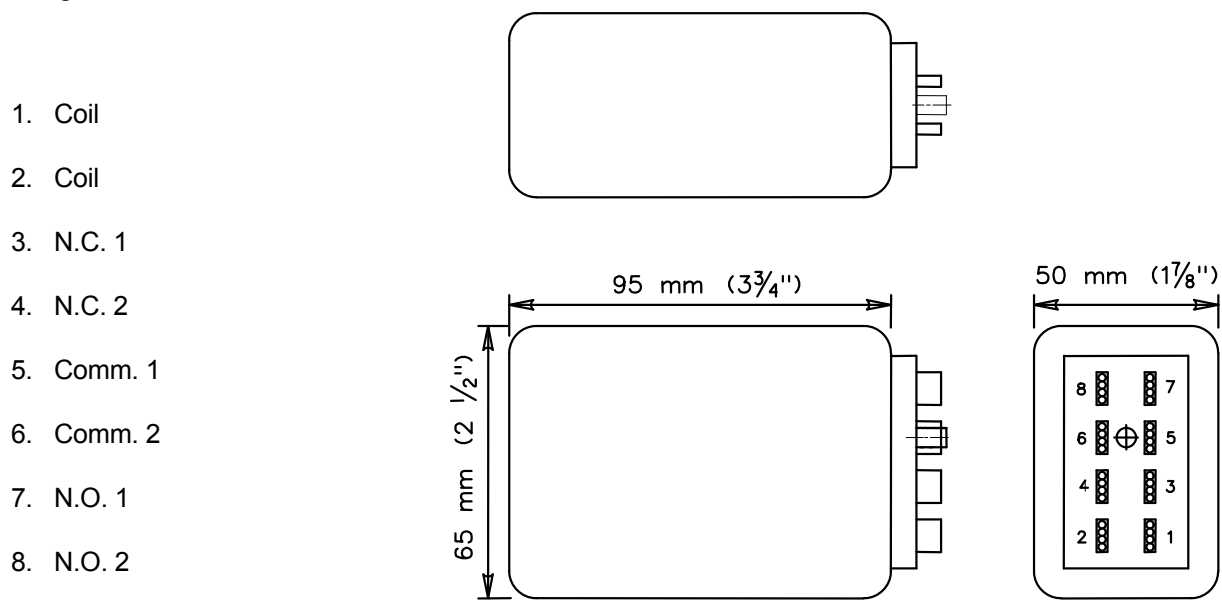
The coil shall operate on 110 VAC. No semi-conductors will be allowed in the coil circuit of this relay.

SIZE:

The relay shall be enclosed in a clear plastic dust cover. The overall dimensions shall be no larger than 63mm(2 1/2") x 94mm(3 3/4") x 47mm(1 7/8") as illustrated below.

BASE:

This relay shall have an eight blade plug-in base, Ventron Beau Plug P-5408 or equivalent with the pin designations as shown below:



SOCKET:

The socket shall be Ventron Beau Plug S-5408 or equivalent, contacts rated at 15 Amps @ 1750 VRMS.

TYPE G: Magnecraft, W 88 ACXP-8 or equivalent

DESCRIPTION:

Relays of this type shall function in low current switching applications such as interconnect interface or pre-emption circuits. A clear polycarbonate plastic enclosure shall cover the relay mechanism.

CONTACTS:

The contacts shall be in the D.P.D.T. form and consist of 5mm (3/16") diameter gold flashed, silver alloy, rated at 10 Amps @ 120 VAC resistive.

COIL:

The coil shall operate on 120 Volts AC and require a nominal 3 VA.

SIZE:

Height, length and width dimensions shall be the same as the 24 volt relay Type A: 35mm(1 3/8") x 60mm(2 3/8") x 35mm(1 3/8").

BASE:

The base shall be an octal plug with the pin designations the same as the 24 volt relay Type A.

SOCKET:

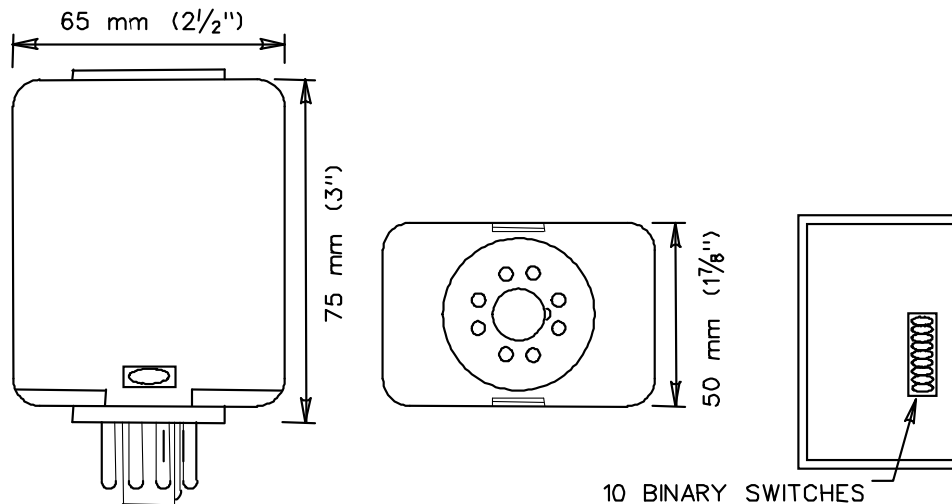
The socket shall be the same as that for the 24 volt relay Type A.

TIME DELAY RELAY

120 VAC SSAC TDM120A or equivalent
24 VDC SSAC TDM24DL or equivalent

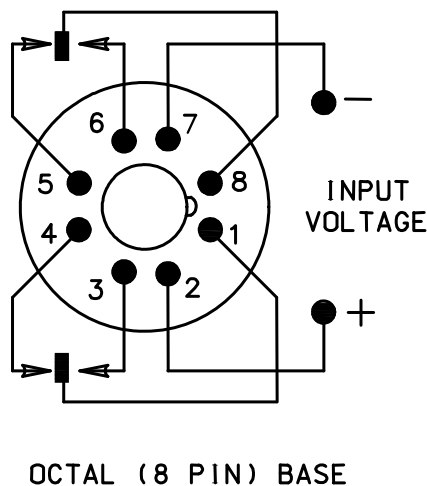
DESCRIPTION:

The time delay relays shall be self enclosed, plug-in, delay on operate type. They shall be digitally timed and adjustable by the use of dip switches located on the top of the case. The timing range shall be 1 to 1023 seconds in 1 second intervals. The time delay relays shall have an internal double pole double throw relay with form "C" contacts rated at 10 amps 120 volts AC. They shall operate accurately in a temperature range of -20 to +65 degrees C. A 120 volt AC input shall initiate timing of the 120 VAC TDR and a 24 VDC input shall initiate timing of the 24 VDC TDR. Removal of the input voltage shall reset the timer. Maximum dimensions of the case shall be as shown below.



SOCKET:

The socket shall be a standard octal base (8 pin) with screw terminal connectors. The pin designation shall be as shown below.



NON-ACTUATED ADVANCE GREEN PHASE

Where the timing and sequence indicates an advance green phase that always precedes the phase in recall (usually phase 2), and that either is fixed timed or is to be extended only, the following guidelines shall be in effect:

1. The parent phase ON output shall be diode connected to the advance phase OMIT input.
2. If the advance phase is to be extendable, it shall be in minimum recall. If the advance phase is fixed timed, it shall be in maximum recall. A different advance time may be selected by switching to maximum 2.

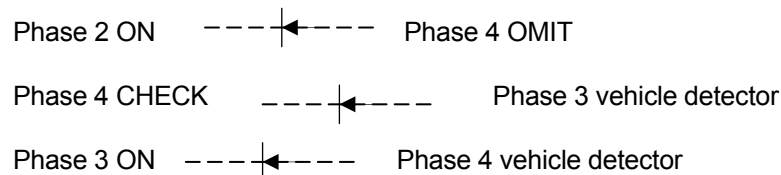
Example: Phase 1 is the advance phase (extendable), in minimum recall.
Phase 2 is the artery, in recall.
Phase 4 is the minor street, in non-lock.



Where the timing and sequence indicates an advance phase that is fixed timed (not extendable), and that always precedes either a phase other than phase 2 or a phase not in recall, the following guidelines shall be in effect:

1. The recall phase (usually Phase 2) ON output shall be diode connected to the advance phase's, parent phase OMIT input.
2. The parent phase CHECK output shall be diode connected to the advance phase vehicle detector input.
3. The advance phase ON output shall be diode connected to the following parent phase vehicle detector input. This is to insure a green indication on the parent phase.
4. The advance phase shall be in the non-lock mode. The advance time shall be selected from the maximum interval.

Example: Phase 2 is the artery, in recall.
Phase 3 is the advance for phase 4, in non-lock mode.
Phase 4 (parent phase) is the minor street, in non-lock mode.

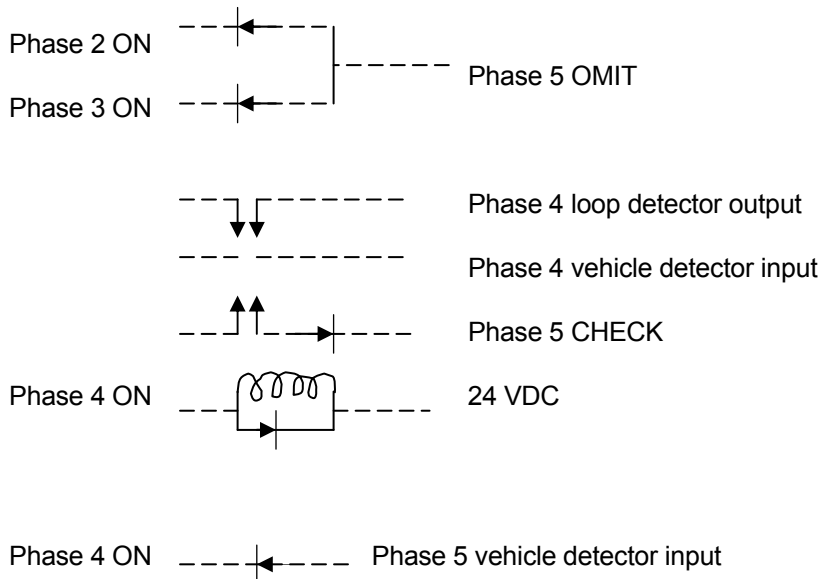


ACTUATED ADVANCE GREEN

Where the timing and sequence indicates an advance green phase that is to be extended only, and is to always precede either a phase other than phase 2 or a phase not in recall, the following guidelines shall be in effect:

1. The phase ON outputs of all phases that could precede the advance phase, shall be diode connected to the parent phase OMIT input.
2. The parent phase CHECK output shall be diode connected, through the normally closed contacts of a relay, to the advance phase vehicle detector input. The advance phase loop detector output shall be connected to the normally open contacts.
3. The relay coil shall be energized by the advance phase ON output, which in turn will switch the vehicle detector input from the parent phase CHECK circuit to the loop detector.
4. The advance phase ON output shall be diode connected to the following parent phase vehicle detector input. This is to insure a green indication from the parent phase.
5. The advance phase shall be in the non-lock mode.

Example: Phase 2 is the artery, in recall.
Phase 3 is the pedestrian phase.
Phase 4 is the advance for phase 5, in non-lock.
Phase 5 (parent phase) is the minor street, in non-lock.



The 24 volt relay shall be Type C as previously described in these specifications.

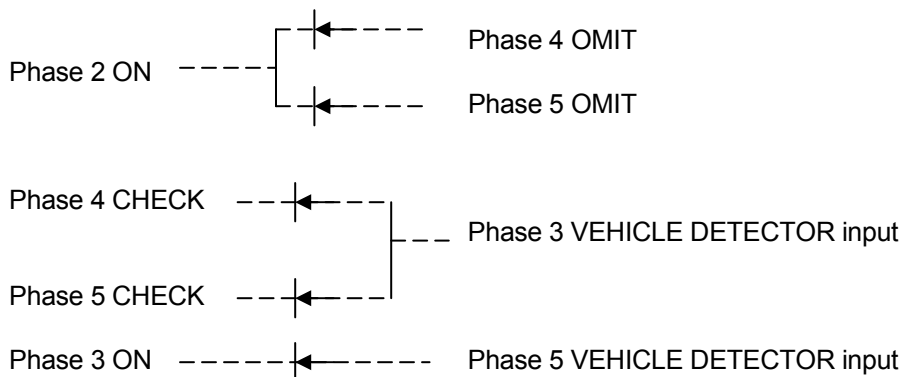
NON-ACTUATED CLEARANCE PHASE

NON-ACTUATED LAG GREEN PHASE

Where the timing and sequence indicates a non-actuated clearance phase or a lagging green phase that always follows the phase in recall, the following guidelines shall be in effect:

1. The parent phase ON output shall be diode connected to all appropriate phase OMIT inputs except the clearance phase.
2. The remaining actuated phases shall have their CHECK outputs diode connected to the clearance phase vehicle detector input.
3. The clearance phase ON output shall be diode connected to the following phases vehicle detector input (if the phase is in non-lock mode). This will prevent the controller from returning to the parent phase from the clearance phase without servicing the minor street.
4. The clearance phase shall be in the non-lock mode.
5. The clearance, or lag green time shall be selected from the maximum interval.

Example: Phase 2 is the artery, in recall.
Phase 3 is the clearance phase, in non-lock.
Phase 4 is the pedestrian phase.
Phase 5 is the minor street, in non-lock.



Where the timing and sequence shows a non-actuated clearance phase or lagging green phase following either a phase other than phase 2 or a phase not in recall, the following guidelines shall be in effect:

1. The parent phase ON output shall be diode connected to the following clearance phase vehicle detector input. This insures the clearance phase will always follow the parent phase.
2. The clearance phase shall be in the non-lock mode.
3. The clearance, or lag green time shall be selected from the minimum green interval.



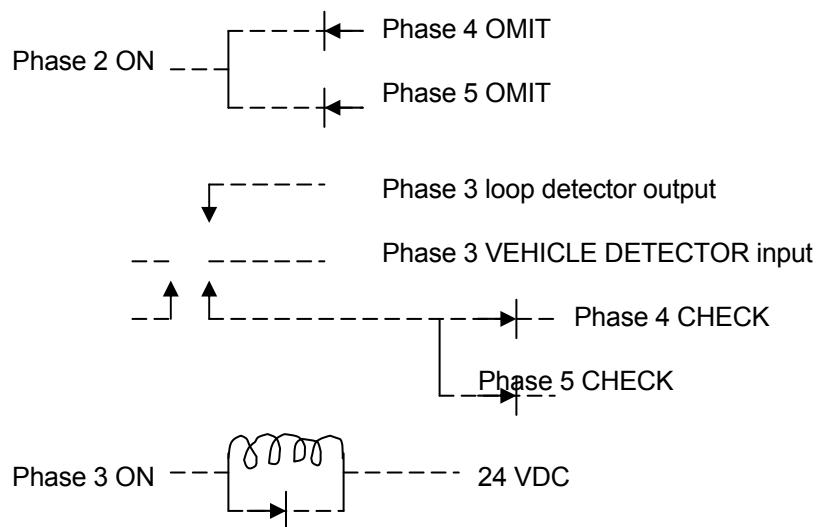
ACTUATED CLEARANCE PHASE

ACTUATED LAG GREEN PHASE

Where the timing and sequence indicates an actuated lagging green phase that is to be extended only, and always follows another phase, the following guidelines shall be in effect:

1. The parent phase (usually phase 2) ON output shall be diode connected to the phase OMIT inputs of all phases that could follow the lag phase.
2. The CHECK outputs of all phases that could follow the lag phase shall be diode connected, through the normally closed contacts of a relay, to the lag phase vehicle detector input. The lag phase loop detector output shall be connected to the normally open contacts.
3. The relay coil shall be energized by the lag phase ON output which in turn will switch the phase detector input from the CHECK circuits to the loop detector.
4. The lag phase shall be in the non-lock mode.

Example: Phase 2 (parent phase) is the artery, in recall.
Phase 3 is the lag phase, in non-lock.
Phase 4 is the pedestrian phase.
Phase 5 is the minor street, in non-lock.



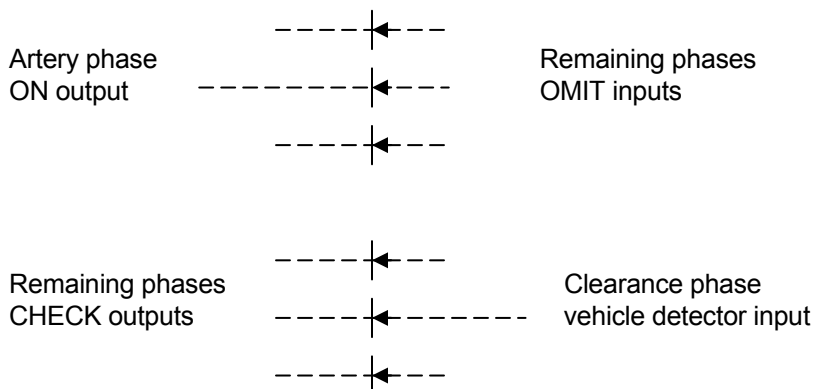
The 24 VDC relay shall be Type C as previously described in these specifications.

FLASHING STOP AHEAD SIGN

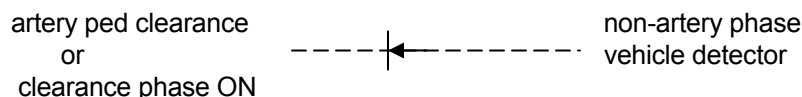
Where the timing and sequence indicates a flashing stop ahead sign, the clearance interval following the phase that the sign is off shall be timed by the following method.

The following phase shall be used for the clearance time. These phases shall be overlapped. The green indication will be maintained by the overlap feature and the following phase green time will be the stop ahead sign clearance.

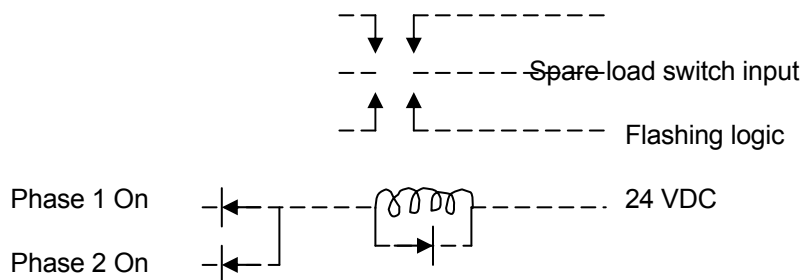
The artery phase ON output shall be diode connected to all other phase OMIT inputs except the clearance phase and the artery phase. The CHECK outputs from the remaining phases (as needed) shall be diode connected to the sign clearance phase vehicle detector input. The clearance phase shall be in the non-lock mode.



If the non-artery phases are in the non-lock mode, a call must be forced to the non-artery phase once the controller leaves the artery Hold interval (either artery walk or artery green). This prevents a false "Stop Ahead" indication if a vehicle turns right on red during the flashing sign clearance interval.



Unless otherwise shown on the plans, the 110 VAC flash power shall be from a spare load switch in the controller cabinet. The load switch input shall be driven with the flashing logic output from the controller. The flashing logic output shall be disconnected from the load switch during the intervals the sign is inactive.



Typical drive circuit for "WHEN FLASHING STOP AHEAD" sign

TIME BASE COORDINATION
MAX II ACTUATION BY PEDESTRIAN CALL

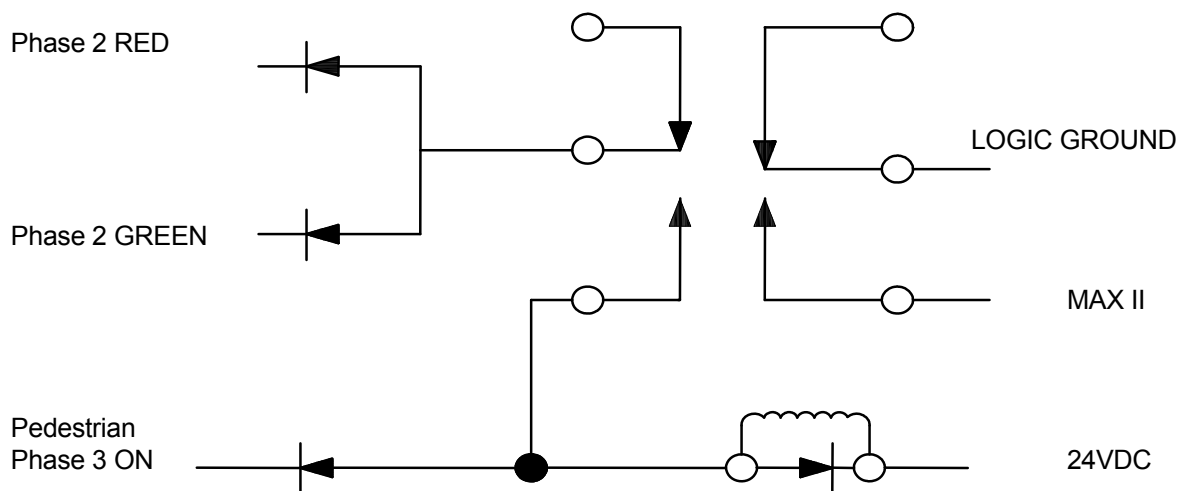
When the sum of the split times, including the walk and don't walk, exceed the background cycle length, the designer may choose to either allow a double cycle of the background timer or reduce the phase timings when the ped phase is called. Reduction of the phase timing by switching to MAX 2 avoids double cycling.

Where indicated on the plans the exclusive pedestrian phase will call MAX II. The minor movement max 2 times are set low so that the total phase times do not exceed the coordination cycle length.

Install a 24 volt relay connected to the inputs and outputs as shown on the following schematic.

Operation: When the controller advances to the exclusive pedestrian phase, the relay is actuated and latched. MAX II timing is selected for one complete cycle, until the relay is unlatched by the artery yellow (absence of red or green).

Example: Phase 2 is the artery. Phase 3 is the exclusive pedestrian phase.



ITEM #1108660A – ETHERNET SWITCH – FIELD (4 PORT, HARDENED)

ITEM #1108661A – ETHERNET SWITCH – TCC (24 PORT)

Description:

The Ethernet network shall be comprised of environmentally hardened Ethernet switching equipment (i.e. Ethernet switches), compliant with IEEE 802.3 (10Mbps), IEEE 802.3u (100Mbps), IEEE 802.3z (1000Mbps) and IEEE 802.3ab (1000Mbps). Field-hardened Ethernet switches with eight ports shall be installed in the field. A 24-port Ethernet switch shall be installed at Naubuc School as shown on the plans.

Materials:

Environmental Requirements

Each switch shall be capable of operating properly over an ambient temperature range of -25°C to +70°C without the use of internal or external cooling fans. Each switch shall be capable of operating properly in relative humidity conditions of 95% non-condensing at 55°C.

Port Requirements

The field-hardened Ethernet switches shall support the following port requirements and options:

- 8 - 10/100/1000BaseTX ports:
 - o RJ45 connectors
 - o Cable type: Category 6, unshielded twisted pair (CAT 6 UTP)
 - o Segment Length: 100m
 - o Auto-negotiation support (10/100/1000Mbps)
 - o Auto MDIX crossover capability
 - o Full Duplex operation (IEEE 802.3x)

- 2 - 100BaseFX fiber optical ports:
 - o Each of the two (2) optical port shall have two (2) fiber optic strands
 - o Connectors, two (2) total, each supporting two fiber optic strands. Connector types shall be confirmed with City Engineer.
 - o Optical Characteristics: 1310nm single mode
 - o Supports Fiber Type: 9/125um single mode fiber.
 - o Segment Length: 15km with single mode fiber
 - o Full Duplex operation (IEEE 802.3x)

The Ethernet switch at the Central Site shall support the following port requirements and options:

- 24 - 10/100/1000BaseTX ports:
 - o RJ45 connectors
 - o Cable type: Category 6, unshielded twisted pair (CAT 6 UTP)
 - o Segment Length: 100m
 - o Auto-negotiation support (10/100/1000Mbps)
 - o Auto MDIX crossover capability
 - o Full Duplex operation (IEEE 802.3x)

- 2 - 100BaseFX fiber optical ports:
 - o Each of the two (2) optical port shall have two (2) fiber optic strands

- o Connectors, two (2) total, each supporting two fiber optic strands. Connector types shall be confirmed with City Engineer.
- o Optical Characteristics: 1310nm single mode
- o Supports Fiber Type: 9/125um single mode fiber.
- o Segment Length: 15km with single mode fiber
- o Full Duplex operation (IEEE 802.3x)

Networking Requirements

Each switch shall support automatic address learning of up to 4096 MAC addresses. Each switch shall support the following advanced layer 2 functions:

- o IEEE 802.1Q VLAN, with support for up to 4096 VLANs
- o IEEE 802.1p priority queuing
- o IEEE 802.1w rapid spanning tree.
- o IEEE 802.3x flow control
- o IEEE 802.17 resilient packet ring (RPR)

Network Management Functionality Requirements

Each switch shall provide the following network management functions:

- o SNMPv2
- o RMON
- o Port Mirroring
- o Spanning Tree
- o Rapid Spanning Tree (IEEE 802.1w)

Programmable Critical Failure Relay

Each switch shall provide a programmable critical failure out relay that may be configured to activate upon critical error detection such as loss of link or detection of critical system errors. This function shall be user enabled and programmable. The output contacts shall be available in a Form-C configuration and be capable of switching at least 30Vdc @ 2A.

Power Supply Requirements

Each switch shall provide options for operation at the following power supply inputs:

- o 85 to 264 Vac (50/60Hz)
- o 10 to 30 Vdc

Each switch shall require no more than 15W of power. The Ethernet switches' power supply shall have no exposed power connectors.

Mounting Requirements

Each switch shall provide options for DIN Rail mounting and panel mounting via brackets. Field-hardened Ethernet switches shall be installed in cabinets in the field. The Naubuc School Ethernet switch shall be installed in a rack in the location specified by the Engineer.

Construction Methods:

The Contractor shall furnish and install all hardware, tools, equipment, materials, supplies, and manufactured articles. The Contractor shall also perform all operations and equipment integration necessary to install fully operational Ethernet switches that meet the required features, functions, and parameters.

Installation

The Contractor shall install Ethernet switches as designated in the plans and specifications. The Contractor shall install new Ethernet switches into the Ethernet network without disabling existing Ethernet services. The Contractor shall confirm compatible interoperability with the existing Ethernet switches. The Contractor shall install and mount the Ethernet switches as per the manufacturer's recommended installation procedure. The Contractor shall be responsible for the proper configuration for the Ethernet switches including assignment of IP addresses, as necessary. The Contractor shall install all interface cable connections between the Ethernet switches and associated equipment. All cables shall be labeled identifying the associated equipment connection. The Contractor shall neatly train and organize all cables. No cables shall be installed with a radius less than the manufacturer's minimum recommended bending radius.

Submittals

In addition to the submittal requirements specified elsewhere, the Contractor shall submit an operating manual, a service manual, and maintenance instructions for each type and model of Ethernet switch.

Testing

In addition to the testing requirements specified elsewhere, the Contractor shall test the Ethernet switches to demonstrate:

- **Resilient Packet Ring Test:** The Contractor shall ensure that network is configured to support the resilient packet ring network. The Contractor shall demonstrate this by disconnecting the field switches at each of the sites from the network and verifying that the data transmission on network is fully operational.

Warranty

Two (2) years, all parts and labor, from date of acceptance.

Delivery, Storage, and Handling

The Contractor shall deliver, store, handle and install all materials and equipment in such a manner as not to degrade quality, serviceability or appearance. The Contractor shall be responsible for storage of the materials and equipment prior to delivery and testing in a clean, dry location free from construction dust, precipitation and excess moisture. The Contractor shall be required to replace any damaged materials and equipment at no additional cost.

Method of Measurement:

This item shall be measured for payment for each installed Ethernet switch complete, as specified and shown on the drawings and these specifications.

Basis of Payment:

The unit price bid for each Ethernet Switch shall include the cost of furnishing all labor, materials, tools and equipment necessary to complete the work. Payment for all miscellaneous hardware, cabling, necessary documentation, and testing shall be included under this item.

Pay Item:

Ethernet Switch - Field

Ethernet Switch – Central Site

Unit:

EA

EA

ITEM #1108725A - PHASE SELECTOR (MODIFIED)

ITEM #1112413A - DETECTOR (TYPE A) (MODIFIED)

ITEM #1112471A - PRE-EMPTION SYSTEM CHASSIS (MODIFIED)

ITEM #1113552A - DETECTOR CABLE (OPTICAL) (MODIFIED)

SYSTEM DESCRIPTION:

The emergency vehicle traffic signal priority control system shall enable designated vehicles to remotely cause the traffic signal controller to advance to and/or hold a desired traffic signal display by using existing controller functions. The control shall be effective for a distance of up to 2500 feet (762 m) along an unobstructed "line of sight" path. The control shall not terminate until the vehicle is within 40 feet (12.2m) of the detector or at the intersection.

The system shall consist of the following components:

A. Phase Selector {GTT (typ.) model 762 (2 channel) or model 764 (4 channel)} which shall cause the signal controller to advance to and/or hold the desired traffic signal display for the emergency vehicle. A pre-emption system chassis (GTT (typ.) model 770) shall house one phase selector and pre-emption system chassis model 760 shall house one multimode phase selector model 764.

B. Optical Detector which shall be mounted on or near a traffic signal and shall receive the optical energy signals generated by the Vehicle Emitter.

Detector (Type A) 1 Direction, 1 Channel (GTT (typ.) model 711)

C. Detector Cable (Optical) (GTT (typ.) model 138)

System Operation:

A. The operating sequence shall be initiated when the Optical Detector receives the required optical energy signal from the Vehicle Emitter.

B. The Phase Selector shall cause the traffic signal controller to advance to and/or hold the desired traffic signal display for the emergency vehicle.

C. The Phase Selector shall cause the controller to advance to and/or hold the desired traffic signal display even if the optical energy signals cease before the desired display is obtained.

D. The Phase Selector shall allow the traffic signal controller to resume normal operation within ten seconds after optical energy signals cease if the optical energy signals cease after the desired traffic signal display is obtained.

- E. The Phase Selector shall not respond to optical energy signals from an emergency vehicle if it is already processing optical energy signals from another emergency vehicle.

System Components:

A. Optical Detector:

The optical detector receives the high intensity optical pulses produced by the emitter. These optical energy pulses are transformed by the detector into appropriate electrical signals which are transmitted to the phase selector. The optical detector is mounted at or near the intersection in a location which permits an unobstructed line of sight to vehicular approaches. The units may be mounted on signal span wires, mast arms or other appropriate structures.

1. Shall be of solid state construction.
2. Shall operate over an ambient temperature range of minus 30^o F. to plus 165^o F. (minus 34^o C to plus 74^o C.)
3. Shall have internal circuitry potted in a semi-flexible compound to ensure moisture resistance.
4. Shall operate in 5% to 95 % relative humidity.
5. Shall have a cone of detection of not more than 13 degrees. The detector and/or phase selector shall not sense a pre-emption signal from an emitter outside this cone.

B. Phase Selector

The Phase Selector utilizes solid state and relay circuitry to interface between the Optical Detector and the traffic signal controller. The Phase Selector supplies power to and receives electrical signals from the Optical Detector. When Detector signals are recognized as a valid call, the Phase Selector causes the signal controller to advance to and/or hold the desired traffic signal display. This is accomplished by utilizing Phase Selector circuitry in conjunction with normal internal controller functions, such as;

The phase selector is capable of assigning priority traffic movement to one of two channels on a first-come, first-serve basis. Each channel is connected to select a particular traffic movement from those normally available within the controller. Once a call is recognized, "commit to green" circuitry in the phase selector functions so that the desired green indication will be obtained even if optical communication is lost. After serving a priority traffic demand, the phase selector will release the controller to follow normal sequence operation.

1. Shall include an internal power supply to supply power to the optical detectors.
2. Shall have two channel operation with the capability of interfacing with an additional phase selector for expansion of channels of operation.
3. Shall have adjustable detector range controls for each channel of operation, from 40 feet (12m) to 2500 feet (762m).

4. Shall have solid state indicator lights for power on and channel called.
5. Shall operate over an ambient temperature range of minus30^o F. to plus 165^o F. (minus 34^o C to plus74C)
6. Shall operate in 5% to 95 % relative humidity.

C. Pre-emption System Chassis.

1. Opticom Model 760 and 770 card racks shall consist of a metal enclosure.
2. Dedicated card slot for one Opticom phase selector.
3. Front panel shall include a terminal strip for connecting the Opticom detectors and outputs to a gate operator as well as a 9-pin circular connector and harness to connect to 120 VAC.
4. Stable "on-shelf" mounting.
5. Easy-to-read terminal designations.
6. Relay Specifications:
 - a. Shall be designed to actuate gate opener circuit.
 - b. Shall be designed to switch AC or DC.
 - c. Shall include normally open and closed contacts.

D. Detector Cable (Optical).

1. 3 Conductor cable with shield and ground wire.
2. AWG #20 (7x28) stranded.
3. Individually tinned copper strands.
4. Conductor insulation: 600 volt, 167^o F. (75 deg. C).
5. 1 Conductor-yellow; 1 Conductor-blue; 1 Conductor-orange.
6. Aluminized mylar shield tape or equivalent.
7. AWG #20 (7x28) stranded uninsulated drain wire
8. DC resistance not to exceed 11.0 ohms per 1000 feet (305m).
9. Capacitance from one conductor to other two conductors and shield not to exceed 48 pf/ft. (157pf/m).
10. Jacket: 600 volts, 176^o F. (80 deg. C), minimum average wall thickness – 0.045" (1.14mm).
11. Finished O.D.: 0.3" (7.62mm) max.

System Interface:

System shall be capable of operating in a computerized traffic management system when appropriate interfacing is provided by the computer supplier.

General:

The Contractor shall furnish the manufacturer the phasing diagrams indicating controller sequence and timing.

The optical equipment manufacturer shall replace or repair without charge, any component parts that prove to be defective within five years from the date of shipment from manufacturer. Manufacturer shall certify upon request that all materials furnished will conform to this specification. The manufacturer or his designated representative shall be responsible for determining and setting all required range and emitter intensity for the emergency vehicle operation.

Construction Methods:

All equipment except the vehicle emitter assembly shall be installed and wired in a neat and orderly manner in conformance with the manufacturers' instructions. The vehicle emitter assembly shall be delivered to a designated town representative. Installation of the vehicle emitter assembly shall be the responsibility of the town.

Traffic signals owned and maintained by the State that have optical pre-emption equipment owned and maintained by the town shall have an Auxiliary Equipment Cabinet (AEC) attached to the controller cabinet. The optical preemption equipment shall be housed in the AEC. Traffic signals owned and maintained by the town do not require an AEC to house the pre-emption equipment.

Detector cables shall be installed continuous with no splices between the optical detector and the AEC.

Detector locations shown on the plan are for illustration purposes only. Exact location shall be determined by the manufacturer or the designated representative for the best possible line of sight.

If not present in an existing traffic controller cabinet, the following items shall be installed and connected, in conformance with the current Functional Specifications for Traffic Control Equipment, "D" Cabinet Requirements (Pre-emption Type):

- Controller "D" harness and adapter.
- Pre-emption termination panel with terminal block and relay bases.
- Pre-emption disconnect switch, mounted on the emergency switch panel (on inside of cabinet door).
- Pre-emption test buttons, mounted on the pre-emption termination panel.

All connections from the phase selector to the "D" harness and to the cabinet wiring shall be made at the termination panel. The termination panel shall have AC+ Lights, AC-, and a switched logic ground. The switched logic ground feeds all the pre-empt inputs to the phase selector. When switched off by the pre-emption disconnect switch, the traffic controller shall not be affected by pre-empt calls from the optical pre-emption system. A minimum of two test buttons shall be provided. If there are more than two pre-empt runs, a button for each shall be installed. A chart or print out, indicating the program steps and settings shall be provided along with the revised cabinet wiring diagrams.

Test the pre-emption system at the semi-final inspection according to the following guidelines:

1. Notify the system owner/user, such as the municipal fire chief or public works director, of the scheduled inspection
2. Request a fire department representative and an emergency vehicle, which has an emitter, to conduct the test. If not available, the contractor shall provide an emitter.
3. In the presence of the Engineer, and the municipal representative, test each pre-empted approach with the emergency vehicle. Test the following items of the system:
 - *Confirm the emitter activates the phase selector and the phase selector activates the correct pre-emption input to the controller.
 - *Confirm adequate range. The traffic signal must be pre-empted to green sufficiently in advance of the emergency vehicle arrival. The vehicle emitter shall initiate pre-emption at a minimum distance of 2500 FT. (760m).
 - *Confirm there are no false calls. Keep the emitter active as the emergency vehicle passes through the intersection. No other optical detectors shall sense the strobe.
4. Document the test. Provide the Engineer and, upon request, the municipality copies of the test results.

If a malfunction is found or the system needs adjustment (such as range, emitter intensity, or detector location), schedule a follow-up test. Repeat the above steps for all approaches that did not pass.

All adjustments such as emitter intensity, phase selector range, sensitivity, detector placement, shall be made at the intersection, by the contractor so that the optical pre-emption operates correctly with other major manufacturers' equipment currently owned by the town.

Method of Measurement:

Optical Detectors (modified), Phase Selectors (modified), System Chassis (modified) will be measured for payment by the number of each supplied, installed and accepted. Detector Cable (Optical) (modified) will be measured by the number of linear feet (meters) supplied, installed and accepted. Vehicle Emitters (modified) will be measured by the number of each supplied to the Town and accepted.

Basis of Payment:

Payment for Optical Detectors (modified), Phase Selector (modified), System Chassis (modified) and Detector Cable (Optical) (modified) will include the item unit cost, including all manufacturer's required mounting hardware and the cost of installation and supervision by the manufacturer or his designated representative, including travel and subsistence, and all materials, equipment and labor incidental thereto. Payment for termination panel, "D" harness, test buttons, program chart (or print out) and revised cabinet wiring diagrams shall be included in the item PRE-EMPTION SYSTEM CHASSIS (MODIFIED). Payment for Vehicle Emitters (modified) will include the item unit cost only.

Pay Items =====	Pay Units =====
Detector (TYPE A) (MODIFIED)	Ea.
Phase Selector (MODIFIED)	Ea.
Detector Cable (Optical) (MODIFIED)	L.F. (m)
Pre-Emption System Chassis (MODIFIED)	Ea.

ITEM # 1108826A – FIBER OPTIC PATCH CORD

Description:

This work shall include furnishing and installing pre-assembled fiber optic patch cords (hereinafter referred to as patch cords). Patch cords are used for final connection between equipment and the fiber optic cable patch panels.

Materials:

Patch cords shall meet the same material performance specifications as those specified for 12 Strand Fiber Optic Drop Cable.

Pre-assembled patch cords shall be purchased from the manufacturer completely assembled in standard lengths. The fiber patch cords shall be single mode as required to match the trunk cable.

Patch cords shall be a minimum of 6.5 feet in length unless specified otherwise on the plans.

The outside jacket shall be color-coded yellow for single mode fiber.

Pre-assembled fiber optic patch cords shall be labeled at each end, within six (6) inches of the termination. The label shall be identical at each end of the cord. Each cord shall have a unique label. Labels may be field applied.

Unless a different connector is required for compatibility with existing or proposed active components, all fiber optic patch cord connectors shall be ST/ST compatible. Connector types shall be confirmed with the City Engineer. The ST connectors shall be ceramic ferrule, with the fiber permanently secured within the ferrule by epoxy (heat set), chemically cured or a hot-melt adhesive in accordance with the connector and/or the epoxy manufacturer. When patch cords are installed outside of a controlled-environment location, the connector minimum operating temperature range shall be -40° F to +158° F. For those applications within a controlled- environment location, the minimum operating temperature shall be -4° F to +140° F.

For any patch cables that require field termination, the procedure for the termination of the patch cables (installation of connectors) used in this project shall comply with the connector manufacturer's standard field installation recommendations. This procedure shall be submitted to the Engineer for approval. Unless recommended otherwise by the connector manufacturer, each fiber shall be cleaved and cleaned, and shall receive multiple polishing with increasingly fine grit polishing pads.

The average loss for mated pairs of connectors shall not exceed 0.4 dB for single mode fibers.

Construction Methods:

Installation

The Contractor shall connect patch cords to system equipment as indicated in contract documents and as directed by Engineer.

At no time shall the bending radius of a cord be less than the manufacturer's recommendation. For all cords the minimum bending radius shall be 20 times the cable diameter during installation. After installation, the minimum bending radius shall be 10 times the cable diameter.

At no time shall the pulling (tensile) strength of the patch cord be exceeded during installation. The Contractor must take appropriate precautions to assure that the installation does not damage the cables.

Testing:

All testing and test equipment shall be in conformance with the following standards:

- o TIA/EIA-455-B Standard Test Procedure for Fiber Optic Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices, and other Fiber Optic Components.
- o TIA/EIA-526 Standard Test Procedures for Fiber Optic Systems.

All patch cords longer than 100 feet shall be tested using an Optical Time Domain Reflectometer (OTDR). OTDR testing shall occur after completion of the installation, splice, or termination.

OTDR measurements shall be made once in each direction on each fiber after final assembly. OTDR graphs shall be submitted to the Engineer.

Fiber optic patch cords shorter than 100 feet shall be tested using an optical power meter and calibrated optical source. The optical attenuation shall be measured from end-connector to end-connector and the results recorded and submitted to the Engineer.

Acceptable loss per each fiber, per direction, shall be the sum of the cable length times the specified loss as indicated above. An allowance of 0.5 dB per connector (1.0 dB per connector pair) and 0.1 dB per fusion splice shall be permitted. Any cable, termination, or splice, installed under this contract, with losses in excess of the acceptable limit shall be repaired, or replaced by the Contractor at the Contractor's sole expense.

Where test results indicate excessive loss, or other problems, in the existing fibers, terminations, or splices, the Contractor shall submit those findings to the Engineer as soon as possible.

Method of Measurement:

This item shall be measured for payment for each Fiber Optic Patch Cord installed by length and number of fibers, tested, and complete, as specified in contract documents.

Basis of Payment:

The unit price bid for each Fiber Optic Patch Cord shall include the cost of furnishing all labor, materials, tools and equipment necessary to complete the work. Typical items would be "EACH OF 6.5 FEET FIBER OPTIC PATCH CORD."

Pay Item:
Fiber Optic Patch Cord

Unit:
EA

ITEM # 1108843A – 12-POSITION FIBER OPTIC PATCH PANEL

Description:

The 12-Position Fiber Optic Patch Panel shall be used for the termination of fiber optic cables within field cabinets. The Patch Panels shall consist of the following main components:

- o Patch Panel Housing
- o Connector Modules

Materials:

Patch Panel Housing

The patch panel housings shall be rack or shelf mountable and shall provide for the cross-connecting or inter-connecting of fibers. The patch panel housing shall allow for the mounting of multiple connector modules. The units shall provide for direct connectorization and pigtail splicing.

Rack-mountable housings shall be mountable in an EIA-310 compatible 465 or 592 mm (19" or 24") rack. The unit shall be modular with separate splicing, connector, jumper management and combination connector /splicing housings available. The unit shall be mounted with a 120 mm (4.75") frontal projection, with the option to flush mount. The unit shall not exceed a depth requirement of 305 mm (12").

The unit shall meet the design requirements of ANSI/TIA/EIA-568 and the plastics flammability requirements of UL 94 V-0.

Housings shall be manufactured using 16 gauge aluminum or equivalent for structural integrity and shall be finished with a wrinkled black powder coat for durability. Installation fasteners shall be included and shall be black in color.

The unit shall have patch cord routing guides that allow a transition and segregation point for jumpers exiting the sides of the housing.

The unit shall accommodate a 12-Position port count.

The unit shall include a clamshell-type cable clamping mechanism to provide cable strain relief. The cable clamp shall accept one cable from 0.735 TO 1.125 inches (9.5 to 28.6 mm) in diameter. The cable clamp mechanism shall also handle multiple smaller fiber count cables when used with the multiple cable insert. The total cable capacity per clamp shall be five cables (≤ 0.4 in/10.2mm OD) when used with the multiple cable insert. Housing cable clamp capacity shall be two clamps for the 12-position fiber optic patch panel housings. Additional cable clamps shall be available as an accessory kit.

The 12-position fiber optic patch panel housings shall utilize a slide-out tray for connector access. These connector housings shall have metal front and rear doors and jumpers shall route out the sides of the housing. Front and rear doors shall utilize a set of swell latches to provide ready

access and closing. The front and rear doors shall be lockable when used with an optional key lock kit.

The connector housings shall have a labeling scheme that complies with ANSI/TIA/EIA-606. Provisions for the mounting of fiber optic fan-out kits shall be incorporated into the housing.

Connector Modules

A connector module is defined as a modular removable case containing optical fiber connector adapters and provisions for strain-relief, slack storage, and the furcation of fiber optic cables. The connector module shall have the following characteristics:

The connector panel shall utilize a single mounting footprint and shall be available with three, four, six, eight or twelve connector adapters in each panel. The panel shall be attached with two push-pull latches to allow quick installation and removal.

Blank connector panels shall be available to fill unused space within the housings. The blank connector panel shall be attached with at least two push-pull latches to allow quick installation and removal. Housings shall be supplied with blank connector panels for all available positions unless the housing is ordered with optical fiber adapters or copper jacks pre-installed. The blank panels shall be manufactured from injection molded polycarbonate and shall be finished with a wrinkled black texture to match the housing.

Connector modules shall be manufactured from 16 gauge cold rolled steel or injection molded polycarbonate for structural integrity.

Connector modules shall be finished with a wrinkled black texture to match other hardware.

The connector module shall consist of a panel incorporated into a protective case with a removable cover for access to the interior connectors and fibers.

The 12-Position Fiber Optic Patch Panel shall include a total of two connector modules with six Type SC single mode connectors on each. Connectors shall be field mountable and shall not exceed 0.15 dB loss rating.

Pigtails

The 12-Position Fiber Optic Patch Panel shall include and be capable of terminating up to 12 connectorized pigtails. The pigtails shall be factory made. The Patch Panels shall use connectorized pigtails to connect the 12 strand fiber optic cable entering the field cabinet to the patch panel connectors. The Contractor shall furnish pigtails and splice them to the fiber optic cables. The fiber optic strand of the connectorized pigtail shall have matching optical properties as the fiber optic strand used on the fiber optic cable.

All splices shall be fusion type. All strands of all fiber optic cables shall be spliced to pigtails and terminated on the patch panel. The Contractor shall provide all equipment and consumable supplies necessary for performing the splices. Prior to the start of each shift, fusion splicing equipment shall be cleaned, calibrated and specifically adjusted to the present fiber and environmental conditions. Splice enclosures, tools and procedures, shall be approved by the cable manufacturer as being compatible with the cable type being delivered.

Each spliced fiber shall be packaged in a protective waterproof sleeving. Bare fibers shall be completely re-coated with a protective room temperature vulcanizing (RTV) coating gel or similar approved substance, prior to application of the sleeve, so as to protect the fiber from scoring, dirt or microbending.

Average splice loss shall not exceed a mean of 0.1 dB. If a splice is measured to exceed 0.15 dB during the splicing process, it shall be remade until its loss falls below 0.15 dB. Each attempt shall be recorded for purposes of acceptance.

All splice losses shall be recorded in tabular form and submitted to the Engineer for approval. An optical time domain reflectometer (OTDR) shall be used to record splice loss, and chart recordings of the "signature" and shall be submitted with the splice data with a record of all OTDR settings and the OTDR locations written on the trace.

The Contractor shall supply and install a shelf or rack mounted splice tray housing as directed by the Engineer and two splice trays. The Patch Panel shall include a restraining system to hold the splice trays securely in place.

The splice trays shall each accommodate twelve single mode fusion splices. All of the splice trays shall be used to connect all strands of the 12 strand fiber optic cable entering the field cabinet to the patch panel connectors. The splice trays meeting the following requirements:

The splice trays shall incorporate a system to retain and provide strain relief to the fiber optic buffers tubes and connector pigtails. The splice trays shall incorporate grooves where the fiber optic splice can be held in place. Each splice tray shall incorporate a snap on lid.

The 12-Position Fiber Optic Patch Panel shall incorporate cable guides that maintain fiber strands and fiber buffer tubes bending radius greater than the minimum allowed by the manufacturer.

The 12-Position Fiber Optic Patch Panel shall incorporate a restraining mechanism to hold the fiber optic cable central member and outside jacket.

Environmental Requirements:

All equipment shall be certified to operate over a temperature range of -20° C to +60° C with a relative humidity of 10% to 95%, non-condensing.

Construction Methods:

Installation

The installation of the 12-Position Fiber Optic Patch Panels shall conform to all the manufacturer's recommended installation procedures and as described in this specification. The manufacturer's installation procedures shall supersede in the case of conflicting details.

The Contractor shall install the 12-Position Fiber Optic Patch Panels in the field cabinets as directed by the Engineer. The Contractor shall provide and install all interconnection fiber optic patch cords between the optical equipment in the cabinet, as shown on contract documents. Sufficient lengths of cable between the patch panel and the optical equipment installed in the rack shall be coiled in the equipment cabinet to allow the splice closures to be removed from the cabinet for splicing.

Submittals

In addition to the submittal requirements specified elsewhere, the Contractor shall submit the following:

- o Product data, installation manuals, materials, system configuration options and features, and accessories for the 12-Position Fiber Optic Patch Panels.
- o Shop Drawings shall be completely dimensioned and shall indicate the intended installation method and details for the 12-Position Fiber Optic Patch Panels.

- o "As-built" installation prints and equipment manuals for the 12-Position Fiber Optic Patch Panels.

Delivery, Storage, and Handling

The Contractor shall deliver, store, handle and install all materials and equipment in such a manner as not to degrade quality, serviceability or appearance. The Contractor shall be responsible for storage of the materials and equipment prior to installation in a clean, dry location free from construction dust, precipitation and excess moisture. The Contractor shall replace any damaged materials and equipment, at no additional cost.

Manufacturer's Requirements

A minimum of ten (10) year's experience in the design, manufacture, and testing of the 12-Position Fiber Optic Patch Panels is required. The equipment shall be designed and manufactured according to world class quality standards. The manufacturer shall be ISO 9001 certified.

Method of Measurement:

This item shall be measured for payment for each installed 12-Position Fiber Optic Patch Panel complete, as specified and shown on the drawings and these specifications

Basis of Payment:

The unit price bid for each 12-Position Fiber Optic Patch Panel shall include the cost of furnishing all labor, materials, tools and equipment necessary to complete the work. Payment for all miscellaneous hardware, cabling, necessary documentation, and testing shall be included under this item.

Pay Item:

12-Position Fiber Optic Patch Panel

Unit:

EA

ITEM# 1111201A – TEMPORARY DETECTION (SITE NO. 1)

Description:

Provide a Temporary Detection (TD) system at signalized intersections throughout the duration of construction, as noted on the contract plans or directed by the Engineer. TD is intended to provide an efficient traffic-responsive operation which will reduce unused time for motorists travelling through the intersection. A TD system shall consist of all material, such as pedestrian pushbutton, conduit, handholes, cable, messenger, sawcut, loop amplifier, microwave detector, Video Image Detection System (VIDS), Self Powered Vehicle Detector (SPVD), etc. that is needed to achieve an actuated traffic signal operation.

Materials:

Material used for TD is either owned by the Contractor that is in good working condition or existing material that will be removed upon completion of the contract. Approval by the Engineer is needed prior to using existing material that will be incorporated into the permanent installation. New material that will become part of the permanent installation is not included or paid for under TD.

Construction Methods:

This item includes furnishing, installation, relocating, realigning, and maintaining the necessary detection systems as to provide vehicle detection during each phase of construction. If not shown on the plan, program the TD modes (pulse or presence) as the existing detectors or as directed by the Engineer. If the TD method (loops [saw cut or preformed], SPVD, microwave, VIDS, or other) is not shown on the contract plan it may be the Contractor's choice. The method chosen for TD must be indicated on the TD Plan submission.

The traffic signal plan-of-record, if not in the controller cabinet will be provided upon request. Ensure the controller phase mode (recall, lock, non-lock) and phase timing are correct for the TD. Adjust these settings as needed or as directed by the Engineer.

At least 30 days prior to implementation of each phase of construction submit a TD proposal to the Engineer for approval. Submit the TD proposal at the same time as the Temporary Signalization plan. Indicate the following information for each intersection approach:

- Phase Mode
- Temporary Detection Method
- Area of Detection
- Detector Mode

Submit the proposed temporary phase timing settings and the TD installation schedule with the TD proposal. See the example below.

Example Proposed Temporary Detection and Timing

Site 1

Warren, Rt. 45 at Rt. 341, Location #149-201

Approach	Phase	Phase Mode	TD Method	Area of Detection	Det Mode
Rt. 45 NB	2	Min Recall	VIDS	150' from Stop Bar	Pulse
Rt. 45 SB	2	Min Recall	SPVD	150' from Stop Bar	Pulse
Rt. 341	4	Lock	Microwave	30' from Stop Bar	Pulse

Temporary Phase Timing Settings:

Phase	Min	Ped	Ped Clr	Ext	Max 1	Max2	Yel	Red
2	20	0	0	6	45	60	4	1
4	14	7	9	3	27	35	3	1

Scheduled TD: July 4, 2011

Site 2

Scotland, Rt. 14 at Rt. 97, Location #123-201

Approach	Phase	Phase Mode	TD Method	Area of Detection	Det Mode
Rt. 15 WB Left Turn	1	Non-Lock	VIDS	5' in front to 10' Behind Stop Bar	Presence
Rt. 14 EB	2	Min Recall	Existing Loop	150' from Stop Bar	Pulse
Rt. 14 WB	6	Min Recall	VIDS	150' from Stop Bar	Pulse
Rt. 97	4	Lock	Loop, Pre- formed	20' from Stop Bar	Pulse

Temporary Phase Timing Settings:

Phase	Min	Ped	Ped Clr	Ext	Max 1	Max2	Yel	Red
1	5	0	0	2	12	18	3	0
2 & 6	24	0	4	4	26	36	4	1
4	14	7	9	3	27	35	3	1

Scheduled TD: July 4, 2011

When at any time during construction the existing vehicle detection becomes damaged, removed, or disconnected, install TD to actuate the affected approaches. Install TD sensors and make operational prior to removing existing detection. TD must be operational throughout all construction phases.

Provide to the Engineer a list of telephone numbers of personnel who will be responsible for the TD. If the TD malfunctions or is damaged, notify the Engineer and place the associated phase on max recall.

Respond to TD malfunctions by having a qualified representative at the site within three (3) hours. Restore detection to the condition prior to the malfunction within twenty-four (24) hours.

If the Engineer determines that the nature of a malfunction requires immediate attention and the Contractor does not respond within three (3) hours following the initial contact, then an alternative maintenance service will be called to restore TD. Expenses incurred by the State for alternative service will be deducted from monies due to the Contractor with a minimum deduction of \$500.00 for each service call. The alternate maintenance service may be the traffic signal owner or another qualified Contractor.

TD will terminate when the detection is no longer required. This may be either when the temporary signal is taken out of service or when the permanent detectors are in place and fully operational.

Any material and equipment supplied by the Contractor specifically for TD will remain the Contractor's property. Existing material not designated as scrap or salvage will become the property of the Contractor. Return and deliver to the owner all existing equipment used as TD that is removed and designated as salvage.

Method of Measurement:

Temporary Detection is measured as a percentage of the contract Lump Sum price. Fifty percent (50%) shall be paid when Temporary Detection is initially set up, approved, and becomes fully operational. Fifty percent (50%) shall be paid when Temporary Detection terminates and all temporary equipment is removed to the satisfaction of the Engineer.

Basis of Payment:

This work will be paid at the contract Lump Sum price for "Temporary Detection (Site No.)". The price includes furnishing, installing, relocating, realigning, and maintaining the necessary detection systems and all incidental material, labor, tools, and equipment. This price also includes any detector mode setting changes, timing or program modifications to the controller that are associated with TD. All Contractor supplied material that will remain the Contractor's property will be included in the contract Lump Sum price for "Temporary Detection (Site No.)". Any items installed for TD that will become part of the permanent installation will not be paid for under this item but are paid for under the bid item for that work.

<u>Pay Item</u>	<u>Pay Unit</u>
Temporary Detection (Site No.)	L. S.

ITEM #1111407A – VIDEO VEHICLE DETECTION SYSTEM

DESCRIPTION

The work under this item shall consist of furnishing and installing Video Vehicle Detection System of type as shown on the plans or as directed and in accordance with these specifications:

REQUIRED SUBMITTALS

Shop Drawings:

Submit 3 copies of shop drawings for the Video Vehicle Detection System and all hardware accessories in accordance with these specifications and the contract general requirements.

MATERIALS

All items and materials furnished shall be new, unused, current production models installed and operational in a user environment and shall be items currently in distribution.

The video vehicle detection system shall be the latest version of GridSmart Detection system as manufactured by Aldis Corp or approved equal. "Approved Equal" equipment shall be permitted only when written approval is obtained from the Town. In order for the Town to determine if the proposed detection equipment is equal to the GridSmart Detection system, the vendor must provide a live demonstration of their equipment for the Town. This demonstration must show that **ALL** features of the GridSmart system are provided. In addition to the demonstration, the equipment vendor must provide evidence that their system has been successfully installed in the field for at least three locations.

This system shall include the following equipment:

- The detection system components shall include all the components to make the detection system operate and support the field conditions. The main components of the system shall include one Dual Camera Processor unit, one Camera Domes, all input/output cables, one Candy Cane and self-leveling brackets and other miscellaneous hardware to complete the installation.
- GridSmart Vehicle and Pedestrian Data collection modules.
- Gridsmart Realtime Data Module.
- Gridsmart Auto Reports and Alerts Module.
- Each of the candy cane bracket shall be supplied with 2 Pelco Triton brackets with cable mounts.
- An outdoor rated TFT-LCD display unit with VGA connector, VGA cable, a shelf mount stand, and power supply.
- A Linksys wireless Router for NEMA cabinet use and a USB mouse and a keyboard.

Warranty and Training:

All the components shall be warranted for **three(3) years from the date of final acceptance** and all the software (including detection, pedestrian data collection, Turning Movement data collection) shall be upgraded for 3 years at no additional cost to the City.

The video detection system shall be warranted against manufacturing defects in materials and workmanship. It shall also be warranted for any manufacturer's hardware upgrades during this

period irrespective of the functionality during this period. A written warranty shall be provided by the vendor for repair and/or replacement of all the components in this item. The video detection supplier shall provide all documentation necessary to maintain and operate the system.

CONSTRUCTION METHODS

The product manufacturer or supplier of the video detection system shall supervise the installation and the testing of the video equipment. The contractor shall install, make fully operational, and test the video vehicle detection system to operate the intersection drawings and this specification. The detection equipment shall compatible with the NEMA TS-2 controller specification. All the equipment shall be wired in the cabinet in a neat manner.

The camera position should be carefully adjusted to accommodate the field conditions such as any existing utility lines and other hardware blocking the view or any sun or lighting related issues. The camera mounting location and position shall accommodate error free detection under all lighting conditions. When required based on the intersection geometry, sun shade due to buildings, any trees or items blocking the view of one of the approaches the second camera installation may be needed and will be decided at the time of installation by the Engineer. Any unused components shall be returned to the City in original boxes.

METHOD OF MEASUREMENT

The quantity to be paid for under this item will be the number of completed, installed and accepted Video Detection Systems of the type specified. Each of the systems shall include all the listed components, cables, and connectors.

BASIS OF PAYMENT

This work will be paid for at the contract unit price each for "Video Vehicle Detection System" of the type specified, which price shall include all materials, connectors, cables, tools, labor, training and work incidental thereto.

<u>PAY ITEM</u>	<u>DESCRIPTION</u>	<u>PAY UNIT</u>
Item 1111407A	Video Vehicle Detection System	EA

ITEM #1112242A FIBER OPTIC SPLICE ENCLOSURE (SIGNAL)

ITEM #1113028A 48 STRAND FIBER OPTIC INTERCONNECT CABLE

ITEM #1113030A 12 STRAND FIBER OPTIC DROP CABLE

Description:

The Contractor shall furnish and install the required fiber optic cables and splice enclosures in accordance with these requirements and as directed by the Engineer.

The Contractor shall furnish and install the fiber optic interconnects, and all necessary components required to form a complete cable interconnect system and shall conduct acceptance tests for this interconnect as specified.

The passive components that shall be provided under this specification include the following:

- o All Fiber Optic Cable Connectors and Splices
- o Fiber Optic Splice Trays
- o Fiber Optic Splice Enclosures

Other passive components that are required to form a complete communication system include (1) terminations and (2) moisture and water sealants and cable caps for below-grade applications. The components supplied shall be commercially available components whose specifications indicate state-of-the-art capability for the application.

The Contractor shall furnish, install, splice, and test all of the fiber optic cables as part of the installation of the fiber optic cable splice enclosure and as shown on the Drawings. All equipment for installation, splicing, and testing shall be provided by the Contractor. All fibers in the fiber optic cable shall be spliced and/or terminated in designated equipment as specified or as directed by the Engineer.

Materials:

Fiber Optic Cable

The single mode fiber optic drop cable to be provided shall be a loose, flexible buffer tube cable design as specified herein. The fiber optic drop cable shall contain twelve (12) fibers, as shown in the Drawings. The fiber optic cable shall be suitable for outside duct, aerial, and direct buried installations, and for indoor use when installed in accordance with NEC Article 770 and local building code requirements. All cables shall consist of the number of fibers as specified on the plans.

The single mode fiber optic drop cable shall be unterminated. One end shall be fusion spliced in the splice enclosure to the designated trunk fiber strand as shown in the Drawings. The other end of the fiber optic drop cable shall be spliced to fiber optic pigtails in the fiber optic patch panel (specified elsewhere). The contractor shall test the fiber optic cable splices using approved materials, methods and fiber optic test equipment.

The drop cable shall be sufficient length to be installed as shown on the Drawings, with a minimum of 10 meters of slack provided in the handhole or as shown on the Drawings.

The Contractor shall follow the drop cable manufacturer's recommendation in the installation of the drop cables, including the individual breakout fibers.

Fiber optic drop cables shall be installed on aerial messenger cable or in conduit, connected to the fiber optic backbone cable and equipment cabinet fiber optic patch panels as shown on the Drawings. The fiber optic drop cables shall be spliced to the designated fiber strands within approved spliced closures installed on the messenger wire, on the utility pole or in handholes as shown on the Drawings or as directed by the Engineer.

The cable shall meet the requirements of REA 7 CFR 1755.900 at a minimum, and shall be new, unused and of current design and manufacture.

The cable shall meet all requirements stated in this specification. The cable shall be an accepted Product of the United States Department of Agriculture Rural Utilities Service (RUS) 7 CFR 1755.900 and meet the requirements of ANSI/ICEA Standard for Fiber Optic Outside Plant Communications Cable, ANSI/ICEA S-87-640-1992.

Optical Requirements:

- o Nominal Attenuation: < 0.4 dB/km 1310 nm, < 0.3 dB/km at 1550 nm
- o Attenuation Uniformity: No point discontinuity greater than 0.10 dB at either 1310 nm or 1550 nm.
- o Maximum Attenuation: Each individual fiber shall not be greater than 0.15 dB/km at 1550 nm.
- o Attenuation at the Water Peak: The attenuation at 1383 ± 3 nm shall not exceed 2.1 dB/km.
- o Cutoff Wavelength: The cabled fiber cutoff wavelength (λ_{ccf}) shall be < 1250 nm.
- o Mode-Field Diameter: 9.30 ± 0.50 μm at 1310 nm, 10.50 ± 1.00 μm at 1550 nm.
- o Zero Dispersion Wavelength (λ_0): $1301.5 \text{ nm} \leq \lambda_0 \leq 1321.5 \text{ nm}$.
- o Zero Dispersion Slope (S_0): $\leq 0.092 \text{ ps}/(\text{nm}^2 \cdot \text{km})$.
- o Fiber Polarization Mode Dispersion (PMD): $\leq 0.5 \text{ ps} \cdot \text{km}$.
- o Chromatic Dispersion: The maximum dispersion shall be $\leq 3.2 \text{ ps}/(\text{nm} \cdot \text{km})$ from 1285 nm to 1330 nm and shall be < 18 ps/(nm•km) at 1550 nm as measured in accordance with TIA/EIA Standard FOTP-169.

Mechanical Requirements: All fibers in the cable must be usable fibers. All fibers within a given cable shall be from the same manufacturer, shall contain no factory splices, and conform to the following minimum requirements:

- o Typical Core Diameter: 8.3 μm .
- o Cladding Diameter: 125.0 ± 1.0 μm .
- o Core-to-Cladding Offset: ≤ 0.6 μm .
- o Cladding Non-Circularity: $\leq 1.0\%$.
- o Fiber Curl: ≥ 4.0 m radius of curvature

Color Coating: Each fiber shall have a color coating applied to it by the manufacturer. The coating shall not affect the optical characteristics of the fiber. Each fiber shall be distinguishable by means of color coding in accordance with TIA/EIA-598-A, "Optical Fiber Cable Color Coding." The fibers shall be colored with ultraviolet (UV) curable inks. The nominal diameter of the colored fiber shall be 250 μm .

Primary Coating: The coating shall be a dual layered, UV-cured acrylate applied by the fiber manufacturer. The coating shall be mechanically strippable without damaging the fiber. The coating diameter shall be $245 \pm 10 \mu\text{m}$.

The force required to mechanically remove at least 30 mm of unaged coating shall not exceed 10 N as measured in accordance with TIA/EIA Standard FOTP-178.

Central Strength Member: The central anti-buckling member shall consist of a dielectric, glass reinforced plastic (GRP) rod. The purpose of the central member is to prevent buckling of the cable. The GRP rod shall be over-coated with a black colored thermoplastic when required to achieve dimensional sizing to accommodate buffer tubes/fillers.

Buffering: All fibers shall be placed inside a non-conductive loose buffer tube. Each buffer tube shall contain up to twelve (12) fibers. The Contractor shall submit the fiber count per buffer tube and the buffer tube count configuration to the Engineer for approval. The fiber shall not adhere to the inside of the buffer tube. Buffer tubes containing fibers shall be color coded with distinct and recognizable colors in accordance with TIA/EIA-598-A, "Optical Fiber Cable Color Coding."

In buffer tubes containing multiple fibers, the colors shall be stable across the specified storage and operating temperature range and not subject to fading or smearing onto each other or into the gel filling material. Coloring medium shall not cause fibers to stick together.

Buffer tubes shall be of dual layer construction, standard colors are used for tubes 1 through 12 and stripes are used to denote tubes 13 through 24. The color sequence applies to tubes containing fibers only, and shall begin with the first tube. If fillers are required, they shall be placed in the inner layer of the cable. The tube color sequence shall start from the inside layer and progress outward.

Each buffer tube shall be filled with a non-hygroscopic, non-nutritive to fungus, electrically non-conductive, homogeneous gel to prevent water and moisture penetration. The gel shall contain anti-oxidant additives, and the gel shall be readily removable with conventional solvents. The gel shall be non-toxic and safe to exposed skin. It shall be chemically and mechanically compatible with all cable components.

The nominal outer diameter of the buffer tube shall be 3.0 mm. The buffer tubes shall be resistant to external forces and shall meet the buffer tube cold bend and shrink back requirements of 7 CFR 1755.900. Buffer tube colored stripes shall be inlaid in the tube by means of co-extrusion when required. The nominal stripe width shall be 1 mm.

Filler Rods: Filler rods shall be used to fill all unused buffer tubes, or shall be used instead of unused buffer tubes in the cable core to lend symmetry to the cable cross-section where needed. Fillers shall be placed so that they do not interrupt the consecutive positioning of the buffer tubes. In dual layer cables, any fillers shall be placed in the inner layer. Fillers shall be nominally 3.0 mm in outer diameter.

Stranding: Buffer tubes shall be stranded around the dielectric central member using the reverse oscillation, or "S-Z", stranding process. Water blocking yarn(s) shall be applied longitudinally along the central member during stranding. Two polyester yarn binders shall be applied in contra helix form with sufficient tension to secure each buffer tube layer to the dielectric central member without crushing the buffer tubes. The binders shall be non-hygroscopic, non-wicking, and dielectric with low shrinkage.

Core and Cable Flooding: For single layer cables, a water blocking tape shall be applied longitudinally around the outside of the stranded tubes/fillers. The tape shall be held in place by a single polyester binder yarn. The water blocking tape shall be non-nutritive to fungus, electrically non-conductive and homogenous. It shall also be free from dirt and foreign matter.

For dual layer cables, a second (outer) layer of buffer tubes shall be stranded over the original core to form a two-layer core. A water blocking tape shall be applied longitudinally over both the inner and outer layer with each being held in place with a single polyester binder yarn. The water blocking tape shall be non-nutritive to fungus, electrically non-conductive and homogenous. It shall also be free from dirt and foreign matter.

Tensile Strength Provisions: Tensile strength shall be provided by dielectric yarns. The high tensile strength dielectric yarns shall be helical stranded evenly around the cable core. The maximum pulling tension shall be 2700 N (608 lbf) during installation (short term) and 890 N (200 lbf) long term installed.

Inner Jacket: The cable shall have an inner jacket of medium density polyethylene (MPDE) with a minimum nominal jacket thickness of 1.0 mm. The inner jacket shall be applied directly over the tensile strength members and the water blocking tape.

Outer Jacket: The outer jacket shall be medium density polyethylene (MPDE) with a minimum nominal jacket thickness of 1.4 mm. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus. The cable jacket shall contain no metal elements and shall be of a consistent thickness. The jacket shall be free of holes, splits, and blisters.

The MPDE jacket material shall be as defined by ASTM D1248, Type II, Class C and Grades J4, E7 and E8.

The jacket shall be marked in contrasting color at one (1) meter intervals with the following information and in accordance with Section 350G of the National Electrical Safety Code (NESC).

- o FIBER OPTIC CABLE - XXX - MM/YY
- o XXX = Number of optical fibers in the cable
- o MM/YY = Month and Year that the cable was manufactured

In addition, the outer jacket shall have sequential meter markings as approved by the Engineer. The actual length of the cable shall be within 1% of the length markings.

RipCORDS: The cable shall contain two (2) ripCORDS under the sheath for easy sheath removal of all-dielectric cable. The cable shall contain one ripCORD under the inner sheath and one under the steel armor for armored cable. The ripCORD color shall be orange for non-armored sheaths and yellow for armored sheaths

Bend Radius: The cable shall be capable of withstanding a minimum bending radius of 10 times its outer diameter during operation and 15 times its outer diameter during installation without changing the characteristics of the optical fibers.

Diameter: The nominal outer diameter of the various cable sizes shall be the following:

- o 12 Fiber - 11.5 mm (0.46 in)

- o 72 Fiber - 12.5 mm (0.50 in)

Manufacturer's Certification

The following tests shall be performed and the test results documented for the type of cable supplied. The cable manufacturer shall certify that each reel of cable furnished meet or exceeds the following specifications:

Attenuation Change: When tested in accordance with TIA/EIA Standard FOTP-3, "Procedure to Measure Temperature Cycling Effects on Optical Fibers, Optical Cable, and Other Passive Fiber Optic Components," the change in attenuation at extreme operational temperatures (-40°C and +70°C) shall not exceed 0.05 dB/km at 1550 nm.

Water Penetration: When tested in accordance with TIA/EIA Standard FOTP-82, "Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable," a one meter length of unaged cable shall withstand a one meter static head or equivalent continuous pressure of water for 24 hours, without leakage through the open cable end. If the first sample fails, subsequent test shall be done in accordance with either Bellcore TR-TSY-000020 or REA PE-90.

Filling Compound Flow: When tested in accordance with TIA/EIA Standard FOTP-81, "Compound Flow (Drip) Test for Filled Fiber Optic Cable", the cable shall exhibit no flow (drip or leak) of filling and/or flooding material at 80°C. If material flow is detected, the weight of any compound that drips from the sample shall be less than 0.05 grams.

Comprehensive Strength: When tested in accordance with TIA/EIA Standard FOTP-41, "Compressive Loading Resistance of Fiber Optic Cables," the cable shall withstand a minimum compressive load of 440 N/cm (250 lbf/in) uniformly over the length of the sample. The load shall be applied at the rate of 3 mm to 20 mm per minute and maintained for ten minutes. The magnitude of the fibers shall be within the repeatability measurement system for 90% of the test fibers. The remaining 10% of the fibers shall not experience an attenuation greater than 0.1 dB. The repeatability of the measurement system is typically ± 0.05 dB or less. No fibers shall exhibit a measurable change in attenuation after load removal.

Impact Resistance: When tested in accordance with TIA/EIA Standard FOTP-25, "Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies," the cable shall withstand 25 impact cycles. The magnitude of the attenuation change shall be within the repeatability measurement system for 90% of the test fibers. The remaining 10% of the fibers shall not experience an attenuation change greater than 0.1dB at 1550 nm. The repeatability of the measurement system shall be ± 0.05 dB or less. The cable jacket shall exhibit no cracking or splitting when observed under 5X magnification.

Cable Flex: When tested in accordance with TIA/EIA Standard FOTP-104, "Fiber Optic Cable Cyclic Flexing Test," the cable shall withstand 25 mechanical flexing cycles at a rate of $30 \pm$ cycles per minute with a sheave diameter not greater than 20 times the cable diameter. The magnitude of the attenuation change shall be within the repeatability measurement system for 90% of the test fibers. The remaining 10% of the fibers shall not experience an attenuation change greater than 0.1dB at 1550 nm. The repeatability of the measurement system shall be ± 0.05 dB or less. The cable jacket shall exhibit no cracking or splitting when observed under 5X magnification.

Cable Freezing: When tested in accordance with TIA/EIA Standard FOTP-98, the cable shall be immersed in water. Upon freezing, the magnitude of the attenuation change shall be within the repeatability measurement system for 90% of the test fibers. The remaining 10% of the fibers shall not experience an attenuation change greater than 0.1dB at 1550 nm. The repeatability of the

measurement system shall be ± 0.05 dB or less. The cable jacket shall exhibit no cracking or splitting when observed under 5X magnification.

Jacket Shrinkage: When tested in accordance with TIA/EIA Standard FOTP-86, the maximum outer cable jacket shrinkage shall be less than 5%.

Outer Jacket Adhesion: When tested in accordance with Bellcore TR-TSY-000020, the force required to initiate slippage between the cable outer jacket and the steel armor shall be a minimum of 14.0 N/mm of a cable circumference.

Lightning Protection: When tested in accordance with TIA/EIA Standard FOTP-181, "Lightning Damage Susceptibility Test for Optic Cables with Metallic Components," the cable shall withstand a simulated lightning strike with a peak value of the current pulse equal to 105 kA without loss of fiber continuity. A damped oscillatory test current shall be used with a maximum time-to-peak value of 15 μ s (which corresponds to a minimum frequency of 16.7 kHz) and a maximum frequency of 30 kHz. The time to half-value of the wave form envelope shall be from 40 - 70 μ s. In addition to the analysis criterion set forth in FOTP-181, the integrity of the buffer tubes (or analogous loose tube and strength members) must be intact after removal of the cable specimens from the test box.

Cable Twist: When tested in accordance with TIA/EIA Standard FOTP-85, "Fiber Optic Cable Twist Test," a length of cable no greater than 4 meters shall withstand 10 cycles of mechanical twisting. The magnitude of the attenuation change shall be within the repeatability measurement system for 90% of the test fibers. The remaining 10% of the fibers shall not experience an attenuation change greater than 0.1dB at 1550 nm. The repeatability of the measurement system shall be ± 0.05 dB or less. The cable jacket shall exhibit no cracking or splitting when observed under 5X magnification.

Tensile Strength: When tested in accordance with TIA/EIA Standard FOTP-33, "Fiber Optic Cable Tensile Loading and Bending Test," using a maximum mandrel and sheave diameter of 560 mm, the cable shall withstand a tensile load of 2700 N (608 lbf). The magnitude of the attenuation change shall be within the repeatability measurement system for 90% of the test fibers. The remaining 10% of the fibers shall not experience an attenuation change greater than 0.2dB during loading and 0.1 dB after loading at 1550 nm. The repeatability of the measurement system shall be ± 0.05 dB or less. The cable jacket shall exhibit no cracking or splitting when observed under 5X magnification.

Cable Bend: When tested in accordance with TIA/EIA Standard FOTP-37, "Low or High Temperature Bend Test for Fiber Optic Cable", the cable shall withstand four full turns around a mandrel of ≤ 10 times the cable diameter for non-armored cables and ≤ 20 times the cable diameter for armored cables after conditioning for four hours at test temperatures of -30°C and $+60^{\circ}\text{C}$. Neither the inner or outer surfaces of the jacket shall exhibit visible cracks, splits, tears or other openings. Optical continuity shall be maintained throughout the test.

Fiber Optic Splices

All fiber optic splices shall be fusion splices. A factory fabricated fusion splice kit containing materials necessary for quality fusion splicing shall be provided for each fiber splice. All fusion splice kits shall have a specified maximum loss of 0.1 dB at 1310 nm.

Fiber Optic Splice Enclosures

The Contractor shall furnish and install fiber optic splice enclosures as shown on the Drawings and as directed by the Engineer. The fiber optic splice enclosure shall be capable of accepting the specified fiber optic cable used. The fiber optic splice enclosure shall meet all requirements stated in the following specification:

- o The splice enclosure housing shall be non-metallic. It shall be resistant to solvents, stress cracking, and creep. The housing materials shall also be compatible with chemicals and other materials to which they might be exposed in normal applications.
- o The fiber optic closure shall be available in distinct sizes to accommodate a variety of cable entries. A small fiber optic closure shall be capable of accommodating up to five cables in a butt or branch configuration. A medium sized fiber optic closure shall accommodate six cables in a butt configuration or twelve cables in a through configuration. A large fiber optic closure shall accommodate eight or sixteen cables in a butt or through configuration, respectively. A mid-span (express) configuration shall be achievable using two cable entry ports located at the seam of the end cap halves.
- o The closure shall be capable of accepting additional cables without removal of the sheath retention or strength member clamping hardware on previously installed cables or disturbing existing splices. The fiber optic splice closure shall provide a robust clamping mechanism to prevent pistoning of the central member or strength members and to prevent cable sheath slip or pullout.
- o The splice closure shall have available appropriate hardware and installation procedures to facilitate the bonding and grounding of metal components in the closure and the cable armored sheath. The cable bonding hardware shall be able to accommodate a copper conductor equal to or larger than a #6 AWG.
- o Aerial splice closures shall have available the necessary hardware to attach and secure the closure to an aerial strand.
- o The splice organizer used in the closure shall accommodate splice trays suitable for single fiber splices.
- o The splice closure shall accommodate a minimum of 12 single fiber splices.
- o Spliced fibers shall not be subjected to a bend radius smaller than 30 mm (1.2 inches). Buffer tubes shall not be subjected to a bend radius smaller than 38 mm (1.5 inches).
- o The installation of the splice closure shall not require specialized tools or equipment, other than those normally carried by construction crews.
- o The splice closure shall incorporate a mechanical compression and/or mastic tape sealing system to maintain a barrier against water penetration.

A bond clamp shall remain firmly attached to the cable armor sheath while under a tensile load of 9 kg (20 lbf). Following removal of the load, there shall be no evidence of clamp loosening or damage to the cable sheath, armor, or clamp that would reduce its current carrying capacity as required by the AC fault test.

- o The electrically conductive path used for continuity and grounding of the splice closure metallic components shall be capable of withstanding an AC current of 1000 Amperes for 20 seconds.

- o The cable clamping and sealing hardware used to terminate fiber optic cable shall not cause an attenuation change greater than ± 0.05 dB per fiber, when tested with a source operating at $1550 \text{ nm} \pm 20 \text{ nm}$.
- o An axial load of 100 lbf, individually applied to each cable, shall not cause mechanical damage to the cable or clamping hardware. The load to the fiber optic cable shall not cause an attenuation change greater than ± 0.05 dB per fiber, when tested with a source operating at $1550 \text{ nm} \pm 20 \text{ nm}$.
- o Subjecting the closure/cable interface to 90° flexing for 8 cycles at ambient temperatures of $-18^\circ\text{C} \pm 2^\circ\text{C}$ ($0^\circ\text{F} \pm 3.6^\circ\text{F}$) and $40^\circ\text{C} \pm 2^\circ\text{C}$ ($104^\circ\text{F} \pm 3.6^\circ\text{F}$) shall not cause any mechanical damage to the cable or clamping hardware. In addition, flexing of the fiber optic cable shall not cause an attenuation change greater than ± 0.05 dB per fiber, when tested with a source operating at $1550 \text{ nm} \pm 20 \text{ nm}$.
- o Subjecting the closure/cable interface to 10 cycles of torsional loading at ambient temperatures of $-18^\circ\text{C} \pm 2^\circ\text{C}$ ($0^\circ\text{F} \pm 3.6^\circ\text{F}$) and $40^\circ\text{C} \pm 2^\circ\text{C}$ ($104^\circ\text{F} \pm 3.6^\circ\text{F}$) shall not cause any mechanical damage to the cable or clamping hardware. In addition, torsional loading of the fiber optic cable shall not exceed allowable attenuation changes.
- o The diameter of the fiber optic splice closure shall not permanently deform more than 10 %, nor temporarily deform more than 20%, when it is compressed by a uniformly distributed load of 300 lbf. Additionally, the compressive load shall cause no mechanical damage to the closure or its contents.
- o A closure shall not exhibit any mechanical damage after being subjected to mechanical impact of 85 lbf (115 Nm) at temperatures of $-18^\circ\text{C} \pm 2^\circ\text{C}$ ($0^\circ\text{F} \pm 3.6^\circ\text{F}$) and $40^\circ\text{C} \pm 2^\circ\text{C}$ ($104^\circ\text{F} \pm 3.6^\circ\text{F}$).
- o The closure central member clamp shall prevent movement (e.g. bowing, pistoning, or breaking) of the cable central member (CM) when the CM exerts a force of 100 lbf on the clamp.
- o Sealing components (gaskets, grommets, O-rings) used in a closure, shall not permit the entry of water into the closure after thermal aging at $90^\circ\text{C} \pm 1^\circ\text{C}$ ($194^\circ\text{F} \pm 1.8^\circ\text{F}$) for 720 hours (30 days).
- o The closure shall be capable of being safely and properly assembled at temperatures of $0^\circ\text{C} \pm 2^\circ\text{C}$ ($32^\circ\text{F} \pm 3.6^\circ\text{F}$) and $40^\circ\text{C} \pm 2^\circ\text{C}$ ($104^\circ\text{F} \pm 3.6^\circ\text{F}$) using materials and procedures specified by the manufacturer.
- o The splice closure shall show no evidence of water penetration following exposure to a 20-foot water-head for a period of 7 days.
- o A closure shall show no evidence of corrosion following exposure to salt-fog for a period of 90 days.

- o Samples of polymeric closure materials shall not support fungus growth when tested per ASTM G 21. A rating of 0 is required.

Splice Trays

The Contractor shall furnish and install fiber optic splice trays to organize and store splices within splice closures. The trays shall be compatible with the fiber optic splices and splice closures specified herein and shall meet the following minimum requirements:

- o The tray shall have the capacity of up to 12 splices. It shall be compatible with the fusion splices specified herein and provide optimum physical protection.
- o The trays shall be engineered for use with loose tube optical cable designs. They shall not induce attenuation due to fiber bending. No cable ties are to be used. The loose tube buffers shall be secured with a tube guide or channel snap.
- o Slack fiber within the tray shall be placed in an oval shape along an inside wall of the tray.

Quality Assurance

All optical fibers shall be proof tested by the fiber manufacturer to a minimum load of 0.7 GN/m^2 (100 kpsi). All optical fibers shall be attenuation tested. The attenuation of each fiber shall be provided for each reel of cable furnished. The cable manufacturer shall be ISO 9001 registered.

Environmental Requirements

The cable shall function within the specifications over the following temperature ranges:

- o Shipping/Storage: -50°C to 70°C
- o Installation: -30°C to 70°C
- o Operation: -40°C to 70°C

Construction Methods

Prior to the installation of the fiber optic cable, the Contractor shall submit his proposed cable plant design to the Engineer for approval. The cable plant design shall include the following at a minimum:

- o Catalog cuts and shop drawings for all cable, connectors, splice equipment, splice enclosures, splice trays and cable installation and test equipment.
- o Locations of all proposed splices.

Fiber Optic Drop Cable

The fiber optic cable installation techniques and procedures shall be specified by the cable manufacturer and shall be such that the optical and mechanical characteristics of the cables are not degraded at the time of installation.

Experience Requirements

Personnel involved in the installation, splicing and testing of the fiber optic cable shall meet the following requirements:

- o A minimum of seven (7) years experience in the installation of fiber optic cables, including fusion splicing, terminating, and testing single mode fibers.

- o Shall have installed at least five (5) communication systems where fiber optic cables in aerial/outdoor conduits and the systems are in continuous satisfactory operation for at least two (2) years. The Contractor shall submit as proof, photographs or other supporting documents, and the names, addresses and telephone numbers of the operating personnel who can be contacted regarding the fiber optic systems.
- o Personnel performing Splicing shall have been trained and certified by the manufacturer of the fiber splice equipment and material to be used, in fiber optic splicing procedures. Proof of this training must be submitted to the Engineer for approval.
- o Installers shall have been trained and certified by the manufacturer of the fiber optic cable to be used, in fiber optic cable installation and handling procedures. Proof of this training must be submitted to the Engineer for approval.
- o Personnel involved in testing shall have been trained and certified by the manufacturer of the fiber optic cable test equipment to be used, in fiber optic cable testing procedures. Proof of this training must be submitted to the Engineer for approval.

Installation

All fiber optic cables to be installed in a new or existing conduit, duct facility or overhead shall be pulled as a unit. The Contractor shall ensure the cable is not damaged during storage, delivery and installation. The cable shall not be pulled along the ground or over or around obstructions. The cable shall not be stepped on by workmen, nor run over by vehicles or equipment. All cable shall be inspected and approved by the Engineer prior to installation. All cables shall be pulled in conduit and along a cable messenger with a cable grip designed to provide a firm hold on the exterior covering of the cable. Heat shrinkable end caps shall be placed on the cable ends. Conduit ends shall be sealed with a urethane compound after the cable installation.

When installing cable in existing conduits which already have cables within them, the Contractor shall not damage existing cables. Should the Contractor cause damage to the fiber optic cable, or any existing cables, he shall immediately notify the Engineer and the affected owner. Corrective action will be made by the cable owner. The cost to repair damages caused by the Contractor's actions shall be deducted from the payment due to the Contractor and paid to the cable owner for cable repair purposes.

The cable pulling operation shall be performed such that a minimum bending of the cable shall occur in the unreeling and pulling operations. Entry guide chutes shall be used to guide the cable into the pull-box conduit ports. Lubricating compound shall be used to minimize friction. Corner rollers (wheels), if used, shall not have radii less than the minimum installation bending radius of the cable. A series array of smaller wheels can be used for accomplishing the bend if the array is specifically approved by the cable manufacturer. The pulling tension shall be continuously measured and it shall not be allowed to exceed the maximum tension specified by the measured and it shall not be allowed to exceed the maximum tension specified by the manufacturer of the cable; breakaway swivels must be used to insure cable tensile strength is not exceeded. The pulling system shall have an audible alarm that shall sound whenever a pre-selected tension level is reached. Tension levels shall be recorded continuously and shall be given to the Engineer upon request.

The central strength member and aramid yarn shall be attached directly to the pulling eye during cable pulling. "Basket grip" or "Chinese finger" type attachments to the cable outer jacket will not be permitted. A breakaway swivel with a cable manufacturer approved tensile rating shall be used on all pulls.

Cable slack of 10 meters shall be provided in pull boxes.

Splicing Requirements

All optical fibers shall be spliced to provide continuous runs. Splices shall be allowed in locations shown on the Drawings.

All splices shall use the fusion technique. Fusion splicing equipment shall be provided by the Contractor and shall be clean, calibrated and specifically adjusted to the fiber and environmental conditions at the start of each shift. Splice enclosures, tools and procedures, shall be approved by the cable manufacturer as being compatible with the cable type being delivered.

Each spliced fiber shall be packaged in a protective sleeving or housing. Bare fibers shall be completely recoated with a protective RTV, gel or similar substance, prior to application of the sleeve or housing, so as to protect the fiber from scoring, dirt or microbending.

Splice losses shall not exceed an average of 0.10 dB. If a splice is measured to exceed 0.15 dB during the splicing process, it shall be remade until its loss falls below 0.15 dB @ 1310 nm. Each attempt shall be recorded for purposes of acceptance.

All splice losses shall be recorded in tabular form and submitted to the Engineer for approval. An optical time domain reflectometer (OTDR) shall be used to record splice loss, and chart recordings of the "signature" and shall be submitted with the splice data with a record of all OTDR settings and the OTDR locations written on the trace.

Unused optical fibers shall be properly protected with sealed end caps.

Documentation Requirements:

Four (4) complete sets of operation and maintenance manuals shall be provided. The manuals shall, as a minimum, include the following:

- o Complete and accurate as-built schematic diagrams showing the fiber optic cable and locations of all splices.
- o Complete performance data of the cable showing the losses at each splice joint and each terminal connector.
- o Installation, splicing, terminating and testing procedures.
- o Complete maintenance and trouble-shooting procedures.

One (1) month prior to installation, four (4) copies of the Contractor's Installation Practices shall be submitted for approval. This shall include installation methods, list of installation equipment, and splicing and test equipment. Field quality control procedures shall be detailed as well as procedures for corrective action.

Testing Requirements

The following tests shall be conducted. All tests shall be conducted in accordance with the approved test procedures. The Contractor shall submit test procedures and forms for approval to the Engineer.

Pre-Installation Tests: The fiber optic cable shall be tested at the storage site prior to installation. Each optical fiber in the cable shall be tested from one end with an OTDR with wavelength (1310 and 1550

nm) and fiber type. Testing shall check for continuity, length, anomalies, and attenuation. Each measurement shall be recorded with color, location, and type of fiber measure. In the event that a meaningful measurement cannot be made from one end, it shall be performed from the opposite end of that fiber.

Post-Installation Tests: After installation, each optical fiber in the cable shall be tested again for loss characteristics. Both directions of operation of the fiber shall be tested with an OTDR with wavelengths 1310 and 1550 nm.

After each fiber splice and connector installation, the cable shall be tested with an OTDR and the data shall be submitted to the Engineer as a basis for acceptance.

Subsystem Tests: The Contractor shall conduct approved fiber optic network subsystem tests after the integration of the fiber optic terminal equipment to the fiber optic network. The tests, as a minimum, shall demonstrate the capability of the fiber optic cable to transmit the specified signals. The tests shall run continuously for a minimum of twenty four (24) hours without any network outage. Approved data forms shall be completed and turned over to the Engineer for review as the basis for acceptance/rejection.

If a subsystem fails because of any components in the subsystem, the particular components shall be corrected or replaced with other components and the tests shall be repeated.

If a component has been modified as a result of the subsystem test failure, a report shall be prepared and delivered to the Engineer prior to testing.

Method of Measurement:

The quantity of single mode fiber optic drop cable to be paid will be measured for payment as the number of linear feet actually furnished and installed.

The quantity of fiber optic cable splice enclosures to be paid will be measured as the number of splice enclosures actually furnished and installed.

Basis of Payment:

The unit price paid per linear foot for Fiber Optic Drop Cable shall include the cost of furnishing, installing, grounding and bonding, connecting and testing the fiber optic cable of the type specified. The price shall also include furnishing all labor, tools, materials, documentation, equipment, storage, transportation, and other incidentals necessary to complete the work.

The unit price paid for Fiber Optic Cable Splice Enclosure shall include the cost of furnishing, installing, connecting and testing of the splice enclosure. The price shall also include furnishing all labor, tools, materials, documentation, equipment, storage, transportation, and other incidentals necessary to complete the work.

Pay Item:

Unit:

Fiber Optic Splice Enclosure (Signal)
12 Strand Fiber Optic Drop Cable
48 Strand Fiber Optic Interconnect Cable

EA
LF
LF

ITEM #1113812A – UNINTERRUPTIBLE POWER SUPPLY

DEFINITIONS

UPS: means Uninterruptible Power Supply.

AGM VRLA Battery: means sealed battery using Absorbed Glass Mat & Valve Regulated Lead Acid technology

Gel Cell Battery: means sealed battery contains acid in a gel form so it does not leak.

The contractor shall provide a complete UPS system for all intersection locations within the proposed traffic controller cabinets. For the Glastonbury Boulevard intersection, the UPS shall include provisions for external generator hookup for extended periods of non-power situations.

MATERIALS

1.1 General

The UPS system shall provide uninterruptible power and conditioning of the utility power required for the operation of all electronic equipment used to operate the traffic control signals in the event of main utility power supply failure or voltage or frequency fluctuations.

The UPS system shall be supplied complete with UPS automatic switch.

The UPS control unit shall be a line interactive or double conversion type with automatic voltage regulation for 120V, 60Hz, single phase.

The UPS system shall include all wiring necessary to interconnect the UPS control unit to the power source and to the traffic signal control components.

The UPS control unit must latch from line to battery and from battery to line (transfer time) in less than 60 milliseconds.

When installed at a traffic signal using LED signal lamps, the UPS system shall be capable of maintaining full signal display operation for a minimum of 4 hours after which it shall be capable of maintaining a flashing signal display for a further 6 hours minimum.

Switching from full operation to a flashing operation may be determined by a timer circuit or based on battery capacity.

If the UPS control unit or the batteries fail, the system shall automatically switch back to utility line power.

The UPS cabinet shall be supplied complete within the traffic signal controller based mounted cabinet as indicated in the Contract Documents.

The battery installation and wiring to the batteries shall be according to National Electric Code requirements as applicable.

The UPS system components shall operate properly for the time periods specified above under the following conditions:

- Ambient temperature -37°C to $+74^{\circ}\text{C}$
- Humidity: 5 percent to 95 percent
- The UPS system components shall withstand shock and vibration according to NEMA TS 2-2003

The system shall have provisions for external generator back up.

5.3 Batteries:

Batteries shall be AGM VRLA or Gel Cell technology.

Battery leads to UPS control unit shall be of suitable length and not less than 2.5 metres.

Each battery shall be placed on its own heater mat with all heater mats being supplied with AC power by the UPS control unit.

Battery mats shall become inoperable with loss of line voltage.

The batteries shall be protected by a circuit breaker or a fuse.

Each battery shall be labelled with the date of manufacture. The label shall be at a visible location on the top of the battery.

In addition to any other warranty, the Contractor shall provide a 3 year warranty on the batteries. The warranty period for each battery shall be 3 years, commencing from the date of "switch on" for operation of the UPS system in which the batteries are used. Any defective battery shall be replaced within 30 days. The warranty shall include all labor, equipment, and materials required to replace the batteries, including traffic control and all removal and disposal work. The Contractor shall be responsible for the removal and disposal of any defective batteries replaced under warranty. The Owner shall be the sole judge in determining if a battery is defective.

1.4 UPS Control Unit

The UPS control unit shall be rack mountable with the following maximum dimensions: Width of 483 mm (19-inch), depth of 254 mm (10 inches), and height of 153 mm (6 inches).

The front face of the control unit shall have indicators capable of displaying the following:

- Number of times the system was on battery supply
- Total time on battery supply
- Battery charge status to indicate the battery capacity

Each of the battery supply indicators listed above shall have a manual reset switch.

The UPS control unit shall have a minimum of one standard 120V grounded socket located on either the back or the front panel.

The UPS control unit shall contain over-current protection located on the front panel to switch power On/Off from the batteries and to switch AC input and output power On/Off.

The UPS control unit shall have a self-test feature to test the UPS Automatic Switch and the control circuitry.

The UPS control unit shall have an open collector output or an AC or DC contact closure to indicate when the traffic signal is operating on battery supply.

The UPS control unit shall have an open collector output or an AC or DC contact closure to indicate low battery alarm.

The UPS control unit shall have a minimum of 1 switched AC output that will switch on when the traffic signal has been on battery supply continuously for 4 hours.

A 9 pin male serial port shall be located on the front panel to allow for communication to a laptop computer for changing software settings.

A set of battery voltage test points, or a readout indicating battery voltage condition shall be located on the front panel.

1.5 UPS Automatic Switch

The UPS automatic switch shall allow the UPS control unit to be removed for replacement or maintenance without turning off the traffic signal system.

The utility line power shall be connected to the input of the automatic switch. Under normal operating conditions the automatic switch shall connect the utility line power to the UPS control unit. In the event that the UPS control unit is not present or does not function, the automatic switch shall automatically connect the utility line power directly to the traffic signal system, bypassing the UPS control unit.

The switch shall also allow for transferring power to an external receptacle for portable generator powering of the traffic controller during extended periods of power loss.

1.6 Power Conditioning and the Use of Batteries by the UPS

Under normal operating conditions the utility line power shall flow through the UPS control unit to the traffic signal system and any other connected loads.

When the utility line power is within the operating parameters specified by the UPS manufacturer and the Contract Documents the UPS control unit shall condition and deliver the power to the loads without drawing power from the batteries.

When the utility line power is not within the operating parameters specified by the UPS manufacturer and the Contract Documents the UPS control unit shall condition and deliver the power to the loads by drawing power from the batteries as required.

5.7 Electrical

The UPS system shall accept an AC voltage input range of 85 to 135 VAC, single phase, 2 wire plus ground without drawing on battery power.

The UPS system shall provide voltage regulation at 120 VAC \pm 3 percent under any line, load or battery conditions other than "low battery", and a frequency regulation of 60 Hz \pm 3 Hz synchronized to the utility line power.

Power rating shall be a minimum of 1000 VA (700W). The UPS system shall provide pure sine wave output, computer grade power compatible with all equipment loads, with power factor correction.

The UPS system shall include full time protection from sudden voltage increase with inrush protection and AC line filtering.

The UPS system shall provide complete isolation from the line operating as a separately derived power source in accordance with NEC requirements.

Duct seal compound is to be used to adequately seal all duct ends inside the cabinet.

All cables entering into the UPS shall be labeled using a permanent marking system to the satisfaction of the Town.

The Contractor shall coordinate turn-on with the Town.

1.7 PRODUCTION

All wires and leads shall be tied and secured within the UPS cabinet prior to delivery.

1.8 BASIS OF PAYMENT

The unit price identified in the schedule of unit prices shall be full compensation to Supply and Install a Battery Backup System or UPS for the traffic signal system. The unit price bid shall also include but not limited to Alpha Novus FXM with 1100 W/VA output, Alpha Outdoor Enclosure Side Mount 6, Universal Automatic Transfer Switch, AlphaGuard Battery Balancer, Battery heater mats, Surge Suppression device, Generator support, locking generator access door and L5-30 F1 plug, Universal Generator Transfer switch, On Battery indicator light, door activated interior light, tilt switch, Tamper switch, ground mount kit, and 4 – GXL 210 AlphaCell Batteries or approved equivalent. UPS equipment shall be installed in accordance with manufacturer's specifications.

ITEM #1118012A REMOVAL AND/OR RELOCATION OF TRAFFIC SIGNAL EQUIPMENT

Section 11.18: Replace the entire section with the following:

11.18.01 – Description:

Remove all abandon traffic signal equipment. Restore the affected area. Where indicated on the plans remove and reinstall existing traffic signal equipment to the location(s) shown.

11.18.02 – Materials:

The related sections of the following specifications apply to all incidental and additional material required for the proper relocation of existing equipment and the restoration of any area affected by this work.

- Division III, “Materials Section” of the Standard Specifications.
- Current Supplemental Specifications to the Standard Specifications.
- Applicable Special Provisions to the Standard Specifications.
- Current Department of Transportation, Functional Specifications for Traffic Control Equipment.

Article 11.18.03 - Construction Methods:

Schedule/coordinate the removal and/or relocation of existing traffic signal equipment with the installation of new equipment to maintain uninterrupted traffic signal control. This includes but is not limited to vehicle signals and detectors, pedestrian signals and pushbuttons, co-ordination, and pre-emption.

Abandoned Equipment

The contract traffic signal plan usually does not show existing equipment that will be abandoned. Consult the existing traffic signal plan for the location of abandoned material especially messenger strand, conduit risers, and handholes that are a distance from the intersection. A copy of the existing plan is usually in the existing controller cabinet. If not, a plan is available from the Division of Traffic Engineering upon request.

Unless shown on the plans it is not necessary to remove abandoned conduit in-trench and conduit under-roadway

When a traffic signal support strand, rigid metal conduit, down guy, or other traffic signal equipment is attached to a utility pole, secure from the pole custodian permission to work on the pole. All applicable Public Utility Regulatory Authority (PURA) regulations and utility company requirements govern. Keep utility company apprised of the schedule and the nature of the work. Remove all abandoned hardware, conduit risers, and down guys, Remove anchor rods, to 6” (150mm) below grade.

When underground material is removed, backfill the excavation with clean fill material. Compact the fill to eliminate settling. Remove entirely the following material: pedestal foundation; controller foundation; handhole; pressure sensitive vehicle detector complete with concrete base. Unless otherwise shown on the plan, remove steel pole and mast arm foundation to a depth of 2 feet (600mm) below grade. Restore the excavated area to a grade and condition compatible with the surrounding area.

- If in an unpaved area apply topsoil and establish turf in accordance with Section 9.44 and Section 9.50 of the Standard Specifications.
- If in pavement or sidewalk, restore the excavated area in compliance with the applicable Sections of Division II, "Construction Details" of the Standard Specifications.

Relocated Equipment

In the presence of the Engineer, verify the condition of all material that will be relocated and reused at the site. Carefully remove all material, fittings, and attachments in a manner to safeguard parts from damage or loss. Replace at no additional cost, all material which becomes damaged or lost during removal, storage, or reinstallation.

Salvage Equipment

Salvage Material	Stock No.	Value
Controller Cabinet, Complete including but not limited to the following: Conflict Monitor Coordination Equipment Vehicle Detection Equipment	330-03-7010	\$ 500.00
Controller Unit	330-03-7005	\$ 500.00
Aluminum Pedestal 8 foot (2.4 m)	330-16-7108	\$ 100.00
4 foot, 4 inch (1.3 m)	330-16-7112	\$ 100.00
Steel Span Pole, 30' (9.0 m)	330-16-7050	\$ 250.00
Steel Span Pole, all other lengths	330-16-7016	\$ 250.00

All material not listed as salvage becomes the property of the Contractor. Properly handle, transport, then dispose in a suitable dump or recycle this material. Comply with all Federal and State hazardous waste laws and regulations.

In the presence of the Engineer, verify the condition and quantity of salvage material prior to removal. After removal transport and store the material protected from moisture, dirt, and other damage. Coil and secure copper cable separate from other cable such as galvanized support strand.

Within 4 working days of removal, return the State owned salvage material to the Department of Transportation Stores warehouse listed below. Supply all necessary manpower and equipment to load, transport, and unload the material. The condition and quantity of the material after unloading will be verified by the Engineer.

DOT Salvage Store #134
660 Brook Street

Rocky Hill, CT

Contact Materials Management Salvage Coordinator, at (860) 258-1980, at least 24 hours prior to delivery.

Municipal Owned Traffic Signal Equipment

Return all municipal owned material such as pre-emption equipment to the Town.

Article 11.18.04 – Method of Measurement:

This work will be measured as a Lump Sum.

Article 11.18.05 – Basis of Payment:

This work will be paid for at the contract lump sum price for “Removal and/or Relocation of Traffic Signal Equipment” which price shall include relocating signal equipment and associated hardware, all equipment, material, tools and labor incidental thereto. This price shall also include removing, loading, transporting, and unloading of signal equipment/materials designated for salvage and all equipment, material, tools and labor incidental thereto. This price shall also include removing and disposing of traffic signal equipment not to be salvaged and all equipment, material, tools and labor incidental thereto.

Payment is at the contract lump sum price for “Removal and/or Relocation of Traffic Signal Equipment” inclusive of all labor, vehicle usage, storage, and incidental material necessary for the complete removal of abandoned equipment/material and/or relocation of existing traffic signal equipment/material. Payment will also include the necessary labor, equipment, and material for the complete restoration of all affected areas.

A credit will be calculated and deducted from monies due the Contractor equal to the listed value of salvage material not returned or that has been damaged and deemed unsalvageable due to the Contractor’s operations.

Pay Item	Pay Unit
Removal and/or Relocation of Traffic Signal Equipment	L.S. (L.S.)

ITEM #1118051A – TEMPORARY SIGNALIZATION (SITE NO. 1)

Description:

Provide Temporary Signalization (TS) at the intersections shown on the plans or as directed by the Engineer.

1. Existing Signalized Intersection: Keep each traffic signal completely operational at all times during construction through the use of existing signal equipment, temporary signal equipment, new signal equipment, or any combination thereof once TS has started as noted in the section labeled Duration.

2. Unsignalized Intersection: Provide TS during construction activities and convert the temporary condition to a permanent traffic signal upon project completion. Furnish, install, maintain, and relocate equipment to provide a complete temporary traffic signal, including but not limited to the necessary support structures, electrical energy, vehicle and pedestrian indications, vehicle and pedestrian detection, pavement markings, and signing.

Materials:

- Pertinent articles of the Standard Specifications
- Supplemental Specifications and Special Provisions contained in this contract

Construction Methods:

Preliminary Inspection

In the presence of the Engineer and a representative from the DOT Electrical Maintenance Office (Town representative for a Town owned signal), inspect and document the existing traffic signal's physical and operational condition prior to Temporary Signalization. Include but do not limit the inspection to the following:

- Controller Assembly (CA)
 - Controller Unit (CU)
 - Detection Equipment
 - Pre-emption Equipment
 - Coordination Equipment
- Vehicle and Pedestrian Signals
- Vehicle and Pedestrian Detectors
- Emergency Vehicle Pre-emption System (EVPS) *
- Interconnect Cable and Splice Enclosures
- Support Structures
- Handholes, Conduit and Cable

It may be necessary to repair or replace equipment that is missing, damaged, or malfunctioning. Develop a checklist of items for replacement or repair after the inspection. If authorized by the Engineer, this work will be considered "Extra Work" under Article 1.09.04.

* At a State owned signal the EVPS equipment is usually owned by the municipality. It is recommended to apprise the municipality of the inspection schedule and results.

TS Plan

At least 30 days prior to implementation of each stage, submit a 1:40 (1:500 metric) scale TS plan for each location to the Engineer for review and comment. Include but do not limit the plan to the following:

- Survey Ties
- Dimensions of Lanes, Shoulders, and Islands
- Slope Limits
- Clearing and Grubbing Limits
- Signal Phasing and Timing

- Location of Signal Appurtenances such as Supports, Signal Heads, Pedestrian Push buttons, Pedestrian Signals
- Location of Signing and Pavement Markings (stop bars, lane lines, etc.)
- Location, method, and mode of Temporary Detection

Review of the TS plan does not relieve the Contractor of ensuring the TS meets the requirements of the MUTCD. A copy of the existing traffic signal plan for State-owned traffic signals is available from the Division of Traffic Engineering upon request. Request existing traffic signal plans for Town-owned traffic signals from the Town. Do not implement the TS plan until all review comments have been addressed.

Earthwork

Perform the necessary clearing and grubbing and the grading of slopes required for the installation, maintenance, and removal of the TS equipment. After TS terminates restore the affected area to the prior condition and to the satisfaction of the Engineer.

Maintenance and Protection of Traffic

Furnish, install, maintain, relocate, and remove signal-related signing (lane-use, signal ahead, NTOR, etc.) and pavement markings as needed. Install, relocate, and/or remove equipment in a manner to cause no hazard to pedestrians, traffic or property. Maintain traffic as specified in the Special Provisions "Prosecution and Progress" and "Maintenance and Protection of Traffic."

Electrical Service and Telephone Service at Existing Signalized Intersections

If the electrical service or the telephone service source must be changed or relocated make all arrangements with the utility company and assume all charges. The party previously responsible for the monthly payment of service shall continue to be responsible during TS.

Electrical Service at Unsignalized Intersections

Assume all charges and make all arrangements with the power company, including service requests, scheduling, and monthly bills in accordance with Section 10.00.12 and Section 10.00.13 of the Standard Specifications,. A metered service is recommended where TS equipment will be removed when no longer needed.

Temporary Signalization

Furnish, install, maintain, relocate, and remove existing, temporary, and proposed traffic signal equipment and all necessary hardware; modify or furnish a new CA; reprogram the CU phasing and timing; as many times as necessary for each stage/phase of construction to maintain and protect traffic and pedestrian movements as shown on the plans or as directed by the Engineer.

Inspection

When requested by the Engineer, the TS will be subject to a field review by a representative of the Division of Traffic Engineering and/or the Town, which may generate additional comments requiring revisions to the temporary signal.

Detection

Provide vehicle detection on the existing, temporary, and/or new roadway alignment for all intersection approaches that have existing detection, that have detection in the final condition as shown on the signal plan, or as directed by the Engineer. Keep existing pedestrian pushbuttons accessible and operational at all times during TS. Temporary Detection is described and is paid for under Item # 11112XXA - Temporary Detection (Site No. X)

Emergency Vehicle Pre-emption System (EVPS)

Furnish, install, maintain, relocate, and remove the equipment necessary to keep the existing EVPS operational as shown on the plan. Do not disconnect or alter the EVPS without the knowledge and concurrence of the Engineer and the EVPS owner. Schedule all EVPS relocations so that the system is

out of service only when the Contractor is actively working. Ensure EVPS is returned to service and is completely operational at the end of the work day. Keep the EVPS owner apprised of all changes to the EVPS.

Coordination

Furnish, install, maintain, relocate, and remove the equipment necessary to keep the intersection coordinated to adjacent signals as shown on the plan. Do not disconnect the interconnect without the approval of the Engineer.

- Closed Loop System: If it is necessary to disconnect the communication cable, notify the Engineer and the Bridgeport Operation Center (BOC) or the Newington Operation Center (NOC) prior to disconnect and also after it is reconnected.
- Time Base System: Program and synchronize all Time Clock/Time Base Coordination (TC/TBC) units as necessary.

Maintenance

Once TS is in effect, assume maintenance responsibilities of the entire installation in accordance with Section 1.07.12 of the Standard Specifications. Notify the Engineer for the project records the date that Temporary Signalization begins. Notify the following parties that maintenance responsibility has been transferred to the Contractor:

Signal Owner
CT DOT Electrical Maintenance Office or
Town Representative
Local Police Department

Provide the Engineer a list of telephone numbers of personnel who will be on-call during TS. Respond to traffic signal malfunctions by having a representative at the site within three hours from the initial contact. Within twenty-four (24) hours have the traffic signal operating according to plan.

If the Engineer determines that the nature of a malfunction requires immediate attention and/or the Contractor does not respond within three (3) hours, then an alternate maintenance service will be called to repair the signal. Expenses incurred by the alternate maintenance service for each call will be deducted from monies due to the Contractor with a minimum deduction of \$1,000. The alternate maintenance service may be the owner of the signal or another qualified electrical contractor.

Duration

Temporary Signalization shall commence when any existing signal equipment is disturbed, relocated, or altered based on the inspection checklist in any way for the TS.

For intersections with a State furnished controller, TS terminates when the inspection of the permanent signal is complete and operational and is accepted by the Engineer. For intersections with a Contractor furnished controller, Temporary Signalization terminates at the beginning of the 30 day test period for the permanent signal.

Ownership

Existing equipment, designated as salvage, remains the property of the owner. Salvable equipment will be removed and delivered to the owner upon completion of use. Temporary equipment supplied by the Contractor remains the Contractor's property unless noted otherwise.

Method of Measurement:

Temporary Signalization shall be paid only once per site on a percentage of the contract Lump Sum price. Fifty percent (50%) shall be paid when TS is operational as shown on the plan or to the satisfaction of the Engineer. Fifty percent (50%) shall be paid when TS terminates.

Basis of Payment:

This work shall be paid at the contract Lump Sum price for "Temporary Signalization (Site No.)" for each site. This price includes the preliminary inspection, TS plan for each stage/phase, furnishing, installing, maintaining, relocating and revising traffic signal equipment, controller assembly modifications, controller unit program changes such as phasing and timing, removing existing, temporary, and proposed traffic signal equipment, arrangements with utility companies, towns or cities including the fees necessary for electric and telephone service, clearing and grubbing, grading, area restoration and all necessary hardware, materials, labor, and work incidental thereto.

All material and work for signing and pavement markings is paid for under the appropriate Contract items.

All material and work necessary for vehicle and pedestrian detection for TS is paid for under item 11112XXA - Temporary Detection (Site No. X).

All Contractor supplied items that will remain the Contractor's property shall be included in the contract Lump Sum price for "Temporary Signalization."

Any items installed as part of the permanent installation are not paid for under this item but are paid for under the bid item for that work.

<u>Pay Item</u>	<u>Pay Unit</u>
Temporary Signalization (Site No.)	L.S.

**ATTACHMENT A:
NON-COLLUSION AFFIDAVIT
AND OTHER REQUIRED FORMS**

NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

State of _____)
County of _____) ss.

_____, being first
duly sworn, deposes and says that:

(1) He is (owner, partner, officer, representative or agent) of _____
_____, the Bidder that has submitted the attached bid;

(2) He is fully informed respecting the preparation and contents of the attached Bid and of
all pertinent circumstances respecting such Bid;

(3) Such Bid is genuine and is not a collusive or sham Bid;

(4) Neither the said Bidder nor any of its officers, partners, owners, agents,
representatives, employees or parties in interest, including this affiant, has in any way
colluded, conspired, connived or agreed, directly or indirectly with any other Bidder,
firm or person to submit a collusive or sham Bid in connection with the Contract for
which the attached Bid has been submitted or to refrain from Bidding in connection
with such Contract, or has in any manner, directly or indirectly, sought by agreement
or collusion or communication or conference with any other Bidder, firm or person to
fix the price or prices in the attached Bid or of any other Bidder, or to fix any
overhead, profit or cost element of the Bid price or the Bid price of any other Bidder
or to secure through any collusion, conspiracy, connivance or unlawful agreement any
advantage against the Owner or any person interested in the proposed Contract; and

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted
by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder
or any of its agents, representatives, owners, employees, or parties in interest, including
this affiant.

(Signed) _____

(Title)

Subscribed and sworn to before me
this _____ day of _____ 20 ____

(Title)

My Commission expires _____, 20 ____.

CONTRACTOR'S PROPOSED PROGRESS CHART – HIGHWAY CONSTRUCTION BAR CHART

Project Number(s): _____

Town(s) of: _____

Date Submitted: _____

Description: _____

Operation	Quantity	Duration
Organization		
Clearing & Grubbing		
Earth Excavation		
Rock Excavation		
Channel Excavation		
Borrow		
Drainage (Trench, Pipe)		
Pile Driving		
Footing		
Abutments & Wings		
Steel Erection		
Floor Slabs		
Concrete Pavement		
Bit. Conc. Pavement		
Bridge Railing		
Curbing		
Sidewalk		
Fencing		
Electrical Work		
Traffic Items		
Misc. & Clean up		

Equipment to expect to use:

Calendar Days
 Total Calendar Days: _____
 Signed By: _____

CONNECTICUT DEPARTMENT OF TRANSPORTATION (CTDOT)

Rev 02/2012

PRE-AWARD DBE COMMITMENT APPROVAL REQUEST

TO BE SUBMITTED WITHIN THE TIME FRAME INDICATED IN THE BID DOCUMENTS

Sheet _____ of _____

CDOT Project Number (s): _____

DBE Subcontractor: _____ FEIN Number: _____

Town(s) of: _____

Address: _____

Submitted By: _____

Is this DBE firm a 1st or 2nd tier subcontractor? 1st 2nd*

Original Bid (\$): _____

Dollar amount subcontracted to this DBE firm (\$): _____

* The CDOT prefers 1st tier subcontractors; however, credit for 2nd tier DBE firms will be approved provided this page is signed by both the prime and the DBE firm, the 1st tier subcontractor is identified, the extent of the 2nd tier work is clearly identified, and the prime makes the assertion that regardless of its arrangement with the 1st tier subcontractor, this DBE firm will be used and its replacement is subject to the conditions of the DBE specification and contract requirements.

Dollar amount requested for CREDIT for this DBE Firm (\$): _____ **

** Please be advised that by submitting this form you (the prime) agree that the Credited amount will be the amount of commitment to the project by you

<u>Item Number & Description</u>	<u>Is This item Partial</u> <u>Yes No</u>	<u>Firm Type Code</u> ***	<u>Quantity and Unit of item as bid</u>	<u>Contract Unit Price</u>	<u>Quantity and Unit for item Subcontracted</u>	<u>Subcontract Unit Price</u>	<u>Total Item price subcontracted</u>	<u>Total item prices credited to the subcontractor</u> ****
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

If any of the items above are checked **Yes** as to **Partial**, please use the space provided or use an attachment to offer an explanation of the work involved. Also please identify who is responsible for the remainder of the partial items.

*** Firm Type Code: **S** (subcontractor), **M** (manufacturer), **P** (supplier), **T** (trucking), **V** (services) Any DBE Trucking firm (**T**) nominated on this form must self perform not less than 30% of their contract value.

**** The credited amount includes adjustments for supply items (60%) or items further subcontracted to NON-DBE firms.

Only certified DBE firms and only for work which they have been certified for will be approved by CDOT toward the goal. Department's DBE directory is available on CTDOT's website or by calling 860-594-2171

Signature of Prime Contractor, Title

Date

Signature of Subcontractor, Title

Date

After this submittal is approved by the Department, any proposed changes to it must be submitted to the Department for approval.

**ANTICIPATED SOURCE
OF MATERIAL**

REV. 8/98
PRINTED ON RECYCLED PAPER

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
P.O. BOX 317546
NEWINGTON, CT 06111-7546

PROJECT NUMBER
TOWN

MATERIALS	SOURCE OF SUPPLY AND MAILING ADDRESS PG. 1 of 2
AGGREGATES:	
Coarse	
Fine	
BITUMINOUS CONCRETE	
BITUMEN:	
Asphalt Cement	
Asphalt Cutbacks	
Emulsion	
Tar	
BRICK	
CEMENT - PORTLAND	
Type I	
Type II	
Type 1A	
Type IIA	
TYPE OF DELIVERY:	
Truck	
R.R. Car	
CONCRETE BLOCKS	
CONCRETE, PORTLAND CEMENT	
CURING MATERIAL:	
Mats	
Paper	
Compound	
Other	
DAMP PROOFING and/or WATERPROOFING:	
Primer	
Seal	
Fabric	
FENCE:	
Property or Wire	
Posts: Steel	
Wood	
Chain Link	
Fittings for Chain Link	
GRAVEL	
GUIDE RAIL:	
Wire Rope	
Fittings	
Posts:	
Metal	
Wood	
JOINT FILLER	
JOINT SEALER	
LOAD TRANSFER UNIT	
METAL FLASHING	
METAL BEAM TYPE RAIL (BRIDGE)	
METAL BEAM TYPE RAIL	
METAL BRIDGE RAIL	
OVERHEAD SIGN SUPPORTS	
PAINT:	
2nd Prime Coat (Field)	
1st Field Coat	

MATERIALS	SOURCE OF SUPPLY AND MAILING ADDRESS PG. 2 of 2
PILING:	
Sheets	
Bearing	
Pipe	
Wood (Pressure Treated)	
Precast, Prestressed	
PIPE:	
C.C.M.	
Cast Iron	
Reinf. Concrete	
Vitrified Clay	
PRECAST, PRESTRESSED UNITS	
STEEL:	
Bar Mat Fabric and/or Wire Mesh	
Metal Cribbing	
Reinforcement	
Scuppers	
SHEAR CONNECTORS:	
Spiral	
Welded	
STRUCTURAL (BRIDGES)	
STRUCTURAL (Side mounted sign supports)	

CONTRACTOR

SIGNED BY

DATE

NOTE: Items not listed above shall be listed below.

STATE OF CONNECTICUT
Certificate of Compliance with
Connecticut General Statute Section 31 - 57b

I hereby certify that all of the statements herein contained below have been examined by me, and to the best of my knowledge and belief are true and correct.

The _____ **HAS / HAS NOT**
Company Name (Cross out Non-applicable)

been cited for three (3) or more willful or serious or serious violations of any Occupational Safety and Health Act (OSHA) or of any standard, order or regulation promulgated pursuant to such act, during the three year period preceding the bid, provided such violations were cited in accordance with the provisions of any State Occupational Safety and Health Act of 1970, and not abated within the time fixed by the citation and such citation has not been set aside following appeal to the appropriate agency of court having jurisdiction or **HAS / HAS NOT** (Cross out Non-applicable) received one or more criminal convictions related to the injury or death of any employee in the three-year period preceding the bid.

The list of violations (if applicable) is attached.

(Name of Firm, Organization or Corporation)

Signed:

Written Signature:

Name Typed:

(Corporation Seal)

Title:

(Title of Above Person, typed)

Dated:

State of _____)

County of _____)

ss:

A.D., 20 _____)

Sworn to and personally appeared before me for the above, _____,
(Name of Firm, Organization, Corporation)

Signer and Sealer of the foregoing instrument of and acknowledged the same to be the free act and deed of

_____, and his/her free act and deed as
(Name of Person appearing in front of Notary or Clerk)

(Title of Person appearing in front of Notary or Clerk)

My Commission Expires:

(Notary Public)

(Seal)

AFFIRMATIVE ACTION PROGRAM CERTIFICATION

City/Town of _____

Firm Name: _____

Address: _____

Project Description: _____

Bid Amount: _____

Date: _____

I _____ of _____
(Name of Person) (Name of Firm)

intend to honor our Affirmative Action Program on file with the Connecticut Department of Transportation, Office of Contract Compliance. I further certify that our Affirmative Action Program is current and that the last approval was on (Date) _____, 20____ and it expires on (Date) _____, 20____.

Signed By: _____

Title: _____

EEO Officer: _____

**ATTACHMENT B:
REQUIRED CONTRACT PROVISIONS /
STATE AND FEDERAL WAGE RATES**

Construction Contracts - Required Contract Provisions (FHWA Funded Contracts)

Index

1. Federal Highway Administration (FHWA) Form 1273 (Revised May 1, 2012)
2. Title VI of the Civil Rights Act of 1964 / Nondiscrimination Requirements
3. Contractor Work Force Utilization (Federal Executive Order 11246) / Specific Equal Employment Opportunity
4. Requirements of Title 49, CFR , Part 26
5. Contract Wage Rates
6. Americans with Disabilities Act of 1990
7. Connecticut Statutory Labor Requirements
 - a. Construction, Alteration or Repair of Public Works Projects; Wage Rates
 - b. Debarment List - Limitation on Awarding Contracts
 - c. Construction Safety and Health Course
 - d. Awarding of Contracts to Occupational Safety and Health Law Violators Prohibited
 - e. Residents Preference in Work on Other Public Facilities (Not Applicable to Federal Aid Contracts)
8. Tax Liability - Contractor's Exempt Purchase Certificate (CERT – 141)
9. Executive Orders (State of CT)
10. Non Discrimination Requirement (pursuant to section 4a-60 and 4a-60a of the Connecticut General Statutes, as revised)
11. Whistleblower Provision
12. Connecticut Freedom of Information Act
 - a. Disclosure of Records
 - b. Confidential Information
13. Service of Process
14. Substitution of Securities for Retainages on State Contracts and Subcontracts
15. Health Insurance Portability and Accountability Act of 1996 (HIPAA)
16. Forum and Choice of Law
17. Summary of State Ethics Laws

18. Audit and Inspection of Plants, Places of Business and Records
19. Campaign Contribution Restriction
20. Tangible Personal Property
21. Bid Rigging and/or Fraud – Notice to Contractor
22. Consulting Agreement Affidavit

Index of Exhibits

- EXHIBIT A – FHWA Form 1273 (Begins on page 13)
- EXHIBIT B – Title VI Contractor Assurances (page 34)
- EXHIBIT C – Contractor Work Force Utilization (Federal Executive Order 11246) / Equal Employment Opportunity (page 35)
- EXHIBIT D – Health Insurance Portability and Accountability Act of 1996 (HIPAA) (page 42)
- EXHIBIT E - Campaign Contribution Restriction (page 50)
- EXHIBIT F – Federal Wage Rates (Attached at the end)
- EXHIBIT G - State Wage Rates (Attached at the end)

1. Federal Highway Administration (FHWA) Form 1273

The Contractor shall comply with the Federal Highway Administration (FHWA), Form 1273 attached at Exhibit A, as revised, which is hereby made part of this contract. The Contractor shall also require its subcontractors to comply with the FHWA – Form 1273 and include the FHWA – Form 1273 as an attachment to all subcontracts and purchase orders.

2. Title VI of the Civil Rights Act of 1964 / Nondiscrimination Requirements

The Contractor shall comply with Title VI of the Civil Rights Act of 1964 as amended (42 U.S.C. 2000 et seq.), all requirements imposed by the regulations of the United States Department of Transportation (49 CFR Part 21) issued in implementation thereof, and the Title VI Contractor Assurances attached hereto at Exhibit B, all of which are hereby made a part of this Contract.

3. Contractor Work Force Utilization (Federal Executive Order 11246) / Equal Employment Opportunity

- (a) The Contractor shall comply with the Contractor Work Force Utilization (Federal Executive Order 11246) / Equal Employment Opportunity requirements attached at Exhibit C and hereby made part of this Contract, whenever a contractor or subcontractor at any tier performs construction work in excess of \$10,000. These goals shall be included in each contract and subcontract. Goal achievement is calculated for each trade using the hours worked under each trade.
- (b) Companies with contracts, agreements or purchase orders valued at \$10,000 or more will develop and implement an Affirmative Action Plan utilizing the ConnDOT Affirmative Action Plan Guideline. This Plan shall be designed to further the provision of equal employment opportunity to all persons without regard to their race, color, religion, sex or national origin, and to promote the full realization of equal employment opportunity through a positive continuation program. Plans shall be updated as required by ConnDOT.

4. Requirements of Title 49, Code of Federal Regulations (CFR), Part 26

Pursuant to 49 CFR 26.13, the following paragraph is part of this Contract and shall be included in each subcontract the Contractor enters into with a subcontractor:

“The Contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of U.S. DOT-assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this Contract, which may result in the termination of this contract or such other remedy as ConnDOT (recipient) deems appropriate.”

5. Contract Wage Rates

The Contractor shall comply with:

The Federal and State wage rate requirements indicated in Exhibits F and G hereof are hereby made part of this Contract. If a conflict exists between the Federal and State wage rates, the higher rate shall govern.

Prevailing Wages for Work on State Highways; Annual Adjustments. With respect to contracts for work on state highways and bridges on state highways, the Contractor shall comply with the provisions of Section 31-54 and 31-55a of the Connecticut General Statutes, as revised.

As required by section 1.05.12 (Payrolls) of the State of Connecticut, Department of Transportation's Standard Specification for Roads, Bridges and Incidental Construction (FORM 816), as may be revised, every Contractor or subcontractor performing project work on a federal aid project is required to post the relevant prevailing wage rates as determined by the United States Secretary of Labor. The wage rate determinations shall be posted in prominent and easily accessible places at the work site.

6. Americans with Disabilities Act of 1990

This provision applies to those Contractors who are or will be responsible for compliance with the terms of the Americans with Disabilities Act of 1990, (42 U.S.C. 12101 et seq.), (Act), during the term of the Contract. The Contractor represents that it is familiar with the terms of this Act and that it is in compliance with the Act. Failure of the Contractor to satisfy this standard as the same applies to performance under this Contract, either now or during the term of the Contract as it may be amended, will render the Contract voidable at the option of the State upon notice to the contractor. The Contractor warrants that it will hold the State harmless and indemnify the State from any liability which may be imposed upon the State as a result of any failure of the Contractor to be in compliance with this Act, as the same applies to performance under this Contract.

7. Connecticut Statutory Labor Requirements

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

(b) Debarment List. Limitation on Awarding Contracts. The Contractor shall comply with Section 31-53a of the Connecticut General Statutes, as revised.

(c) Construction Safety and Health Course. The Contractor shall comply with section 31-53b of the Connecticut General Statutes, as revised. The contractor shall furnish proof to the Labor Commissioner with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 of the Connecticut General Statutes, as revised, on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of

telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

Any employee required to complete a construction safety and health course as required that has not completed the course, shall have a maximum of fourteen (14) days to complete the course. If the employee has not been brought into compliance, they shall be removed from the project until such time as they have completed the required training.

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

(d) Awarding of Contracts to Occupational Safety and Health Law Violators Prohibited. The Contract is subject to Section 31-57b of the Connecticut General Statutes, as revised.

(e) Residents Preference in Work on Other Public Facilities. NOT APPLICABLE TO FEDERAL AID CONTRACTS. Pursuant to Section 31-52a of the Connecticut General Statutes, as revised, in the employment of mechanics, laborers or workmen to perform the work specified herein, preference shall be given to residents of the state who are, and continuously for at least six months prior to the date hereof have been, residents of this state, and if no such person is available, then to residents of other states

8. Tax Liability - Contractor's Exempt Purchase Certificate (CERT – 141)

The Contractor shall comply with Chapter 219 of the Connecticut General Statutes pertaining to tangible personal property or services rendered that is/are subject to sales tax. The Contractor is responsible for determining its tax liability. If the Contractor purchases materials or supplies pursuant to the Connecticut Department of Revenue Services' "Contractor's Exempt Purchase Certificate (CERT-141)," as may be revised, the Contractor acknowledges and agrees that title to such materials and supplies installed or placed in the project will vest in the State simultaneously with passage of title from the retailers or vendors thereof, and the Contractor will have no property rights in the materials and supplies purchased.

Forms and instructions are available anytime by:

Internet: Visit the DRS website at www.ct.gov/DRS to download and print Connecticut tax forms; or Telephone: Call 1-800-382-9463 (Connecticut calls outside the Greater Hartford calling area only) and select Option 2 or call 860-297-4753 (from anywhere).

9. Executive Orders

This Contract is subject to the provisions of Executive Order No. Three of Governor Thomas J. Meskill, promulgated June 16, 1971, concerning labor employment practices, Executive Order No. Seventeen of Governor Thomas J. Meskill, promulgated February 15, 1973, concerning the listing of employment openings and Executive Order No. Sixteen of Governor John G. Rowland promulgated August 4, 1999, concerning violence in the workplace, all of which are incorporated into and are made a part of the Contract as if they had been fully set forth in it. The Contract may also be subject to the applicable parts of Executive Order No. 7C of Governor M. Jodi Rell, promulgated July 13, 2006, concerning contracting reforms and Executive Order No. 14 of Governor M. Jodi Rell, promulgated April 17, 2006, concerning procurement of cleaning products and services, in accordance with their

respective terms and conditions. If Executive Orders 7C and 14 are applicable, they are deemed to be incorporated into and are made a part of the Contract as if they had been fully set forth in it. At the Contractor's request, the Department shall provide a copy of these orders to the Contractor.

10. Non Discrimination Requirement (pursuant to section 4a-60 and 4a-60a of the Connecticut General Statutes, as revised): References to "minority business enterprises" in this Section are not applicable to Federal-aid projects/contracts. Federal-aid projects/contracts are instead subject to the Federal Disadvantaged Business Enterprise Program.

(a) For purposes of this Section, the following terms are defined as follows:

- i. "Commission" means the Commission on Human Rights and Opportunities;
- ii. "Contract" and "contract" include any extension or modification of the Contract or contract;
- iii. "Contractor" and "contractor" include any successors or assigns of the Contractor or contractor;
- iv. "gender identity or expression" means a person's gender-related identity, appearance or behavior, whether or not that gender-related identity, appearance or behavior is different from that traditionally associated with the person's physiology or assigned sex at birth, which gender-related identity can be shown by providing evidence including, but not limited to, medical history, care or treatment of the gender-related identity, consistent and uniform assertion of the gender-related identity or any other evidence that the gender-related identity is sincerely held, part of a person's core identity or not being asserted for an improper purpose.
- v. "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations;
- vi. "good faith efforts" shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements;
- vii. "marital status" means being single, married as recognized by the state of Connecticut, widowed, separated or divorced;
- viii. "mental disability" means one or more mental disorders, as defined in the most recent edition of the American Psychiatric Association's "Diagnostic and Statistical Manual of Mental Disorders", or a record of or regarding a person as having one or more such disorders;
- ix. "minority business enterprise" means any small contractor or supplier of materials fifty-one percent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise, and (3) who are members of a minority, as such term is defined in subsection (a) of Connecticut General Statutes § 32-9n; and
- x. "public works contract" means any agreement between any individual, firm or corporation and the State or any political subdivision of the State other than a municipality for construction, rehabilitation, conversion, extension, demolition or repair of a public building, highway or other changes or improvements in real property, or which is financed in whole or in part by the State, including, but not limited to, matching expenditures, grants, loans, insurance or guarantees.

For purposes of this Section, the terms "Contract" and "contract" do not include a contract where each contractor is (1) a political subdivision of the state, including, but not limited to, a municipality, (2) a quasi-public agency, as defined in Conn. Gen. Stat. Section 1-120, (3) any other state, including but not limited to any federally recognized Indian tribal governments, as defined in Conn. Gen. Stat. Section 1-267, (4) the federal government, (5) a foreign government, or (6) an agency of a subdivision, agency, state or government described in the immediately preceding enumerated items (1), (2), (3), (4) or (5).

- (b) (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such Contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the State of Connecticut; and the Contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by the Contractor that such disability prevents performance of the work involved; (2) the Contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the Commission; (3) the Contractor agrees to provide each labor union or representative of workers with which the Contractor has a collective bargaining Agreement or other contract or understanding and each vendor with which the Contractor has a contract or understanding, a notice to be provided by the Commission, advising the labor union or workers' representative of the Contractor's commitments under this section and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) the Contractor agrees to comply with each provision of this Section and Connecticut General Statutes §§ 46a-68e and 46a-68f and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes §§ 46a-56, 46a-68e and 46a-68f; and (5) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor as relate to the provisions of this Section and Connecticut General Statutes § 46a-56. If the contract is a public works contract, the Contractor agrees and warrants that he will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works projects.
- (c) Determination of the Contractor's good faith efforts shall include, but shall not be limited to, the following factors: The Contractor's employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the Commission may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.
- (d) The Contractor shall develop and maintain adequate documentation, in a manner prescribed by the Commission, of its good faith efforts.
- (e) The Contractor shall include the provisions of subsection (b) of this Section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by

regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes §46a-56; provided if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.

- (f) The Contractor agrees to comply with the regulations referred to in this Section as they exist on the date of this Contract and as they may be adopted or amended from time to time during the term of this Contract and any amendments thereto.
- (g) (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or the State of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) the Contractor agrees to provide each labor union or representative of workers with which such Contractor has a collective bargaining Agreement or other contract or understanding and each vendor with which such Contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the Contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (3) the Contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes § 46a-56; and (4) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor which relate to the provisions of this Section and Connecticut General Statutes § 46a-56.
- (h) The Contractor shall include the provisions of the foregoing paragraph in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes § 46a-56; provided, if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.”

The Nondiscrimination Certifications can be found at the Office of Policy and Management website.

<http://www.ct.gov/opm/cwp/view.asp?a=2982&Q=390928>

11. Whistleblower Provision

The following clause is applicable if the Contract has a value of Five Million Dollars (\$5,000,000) or more.

Whistleblowing. This Contract may be subject to the provisions of Section 4-61dd of the Connecticut General Statutes. In accordance with this statute, if an officer, employee or appointing authority of the Contractor takes or threatens to take any personnel action against any employee of the Contractor in retaliation for such employee's disclosure of information to any employee of the contracting state or quasi-public agency or the Auditors of Public Accounts or the Attorney General under the provisions of subsection (a) of such statute, the Contractor shall be liable for a civil penalty of not more than five thousand dollars for each offense, up to a maximum of twenty per cent of the value of this Contract. Each violation shall be a separate and distinct offense and in the case of a continuing violation, each calendar day's continuance of the violation shall be deemed to be a separate and distinct offense. The State may request that the Attorney General bring a civil action in the Superior Court for the Judicial District of Hartford to seek imposition and recovery of such civil penalty. In accordance with subsection (f) of such statute, each large state contractor, as defined in the statute, shall post a notice of the provisions of the statute relating to large state contractors in a conspicuous place which is readily available for viewing by the employees of the Contractor.

12. Connecticut Freedom of Information Act

- (a) **Disclosure of Records.** This Contract may be subject to the provisions of section 1-218 of the Connecticut General Statutes. In accordance with this statute, each contract in excess of two million five hundred thousand dollars between a public agency and a person for the performance of a governmental function shall (a) provide that the public agency is entitled to receive a copy of records and files related to the performance of the governmental function, and (b) indicate that such records and files are subject to FOIA and may be disclosed by the public agency pursuant to FOIA. No request to inspect or copy such records or files shall be valid unless the request is made to the public agency in accordance with FOIA. Any complaint by a person who is denied the right to inspect or copy such records or files shall be brought to the Freedom of Information Commission in accordance with the provisions of sections 1-205 and 1-206 of the Connecticut General Statutes.
- (b) **Confidential Information.** The State will afford due regard to the Contractor's request for the protection of proprietary or confidential information which the State receives from the Contractor. However, all materials associated with the Contract are subject to the terms of the FOIA and all corresponding rules, regulations and interpretations. In making such a request, the Contractor may not merely state generally that the materials are proprietary or confidential in nature and not, therefore, subject to release to third parties. Those particular sentences, paragraphs, pages or sections that the Contractor believes are exempt from disclosure under the FOIA must be specifically identified as such. Convincing explanation and rationale sufficient to justify each exemption consistent with the FOIA must accompany the request. The rationale and explanation must be stated in terms of the prospective harm to the competitive position of the Contractor that would result if the identified material were to be released and the reasons why the materials are legally exempt from release pursuant to the FOIA. To the extent that any other provision or part of the Contract conflicts or is in any way inconsistent with this section, this section controls and shall apply and the conflicting provision or part shall not be given effect. If the Contractor indicates that certain documentation is submitted in confidence, by specifically and clearly marking the documentation as "CONFIDENTIAL," DOT will first review the Contractor's claim for consistency with the FOIA (that is, review that the documentation is actually a trade secret or commercial or financial information and not required by statute), and if determined to be consistent, will endeavor to keep such information confidential to the extent permitted by law. See, *e.g.*, Conn. Gen. Stat. §1-210(b)(5)(A-B). The State, however, has no obligation to initiate, prosecute or defend any legal proceeding or to seek a protective order or other similar relief to prevent disclosure of any information that is sought pursuant to a FOIA request. Should the State withhold such documentation from a

Freedom of Information requester and a complaint be brought to the Freedom of Information Commission, the Contractor shall have the burden of cooperating with DOT in defense of that action and in terms of establishing the availability of any FOIA exemption in any proceeding where it is an issue. In no event shall the State have any liability for the disclosure of any documents or information in its possession which the State believes are required to be disclosed pursuant to the FOIA or other law.

13. Service of Process

The Contractor, if not a resident of the State of Connecticut, or, in the case of a partnership, the partners, if not residents, hereby appoints the Secretary of State of the State of Connecticut, and his successors in office, as agent for service of process for any action arising out of or as a result of this Contract; such appointment to be in effect throughout the life of this Contract and six (6) years thereafter.

14. Substitution of Securities for Retainages on State Contracts and Subcontracts

This Contract is subject to the provisions of Section 3-112a of the General Statutes of the State of Connecticut, as revised.

15. Health Insurance Portability and Accountability Act of 1996 (HIPAA)

The Contractor shall comply, if applicable, with the Health Insurance Portability and Accountability Act of 1996 and, pursuant thereto, the provisions attached at Exhibit D, and hereby made part of this Contract.

16. Forum and Choice of Law

Forum and Choice of Law. The parties deem the Contract to have been made in the City of Hartford, State of Connecticut. Both parties agree that it is fair and reasonable for the validity and construction of the Contract to be, and it shall be, governed by the laws and court decisions of the State of Connecticut, without giving effect to its principles of conflicts of laws. To the extent that any immunities provided by Federal law or the laws of the State of Connecticut do not bar an action against the State, and to the extent that these courts are courts of competent jurisdiction, for the purpose of venue, the complaint shall be made returnable to the Judicial District of Hartford only or shall be brought in the United States District Court for the District of Connecticut only, and shall not be transferred to any other court, provided, however, that nothing here constitutes a waiver or compromise of the sovereign immunity of the State of Connecticut. The Contractor waives any objection which it may now have or will have to the laying of venue of any Claims in any forum and further irrevocably submits to such jurisdiction in any suit, action or proceeding.

17. Summary of State Ethics Laws

Pursuant to the requirements of section 1-101qq of the Connecticut General Statutes, the summary of State ethics laws developed by the State Ethics Commission pursuant to section 1-81b of the Connecticut General Statutes is incorporated by reference into and made a part of the Contract as if the summary had been fully set forth in the Contract.

18. Audit and Inspection of Plants, Places of Business and Records

- (a) The State and its agents, including, but not limited to, the Connecticut Auditors of Public Accounts, Attorney General and State's Attorney and their respective agents, may, at reasonable hours, inspect and examine all of the parts of the Contractor's and Contractor

Parties' plants and places of business which, in any way, are related to, or involved in, the performance of this Contract. For the purposes of this Section, "Contractor Parties" means the Contractor's members, directors, officers, shareholders, partners, managers, principal officers, representatives, agents, servants, consultants, employees or any one of them or any other person or entity with whom the Contractor is in privity of oral or written contract and the Contractor intends for such other person or entity to Perform under the Contract in any capacity.

- (b) The Contractor shall maintain, and shall require each of the Contractor Parties to maintain, accurate and complete Records. The Contractor shall make all of its and the Contractor Parties' Records available at all reasonable hours for audit and inspection by the State and its agents.
- (c) The State shall make all requests for any audit or inspection in writing and shall provide the Contractor with at least twenty-four (24) hours' notice prior to the requested audit and inspection date. If the State suspects fraud or other abuse, or in the event of an emergency, the State is not obligated to provide any prior notice.
- (d) The Contractor shall keep and preserve or cause to be kept and preserved all of its and Contractor Parties' Records until three (3) years after the latter of (i) final payment under this Agreement, or (ii) the expiration or earlier termination of this Agreement, as the same may be modified for any reason. The State may request an audit or inspection at any time during this period. If any Claim or audit is started before the expiration of this period, the Contractor shall retain or cause to be retained all Records until all Claims or audit findings have been resolved.
- (e) The Contractor shall cooperate fully with the State and its agents in connection with an audit or inspection. Following any audit or inspection, the State may conduct and the Contractor shall cooperate with an exit conference.
- (f) The Contractor shall incorporate this entire Section verbatim into any contract or other agreement that it enters into with any Contractor Party.

19. Campaign Contribution Restriction

For all State contracts, defined in Conn. Gen. Stat. §9-612(g)(1) as having a value in a calendar year of \$50,000 or more, or a combination or series of such agreements or contracts having a value of \$100,000 or more, the authorized signatory to this Agreement expressly acknowledges receipt of the State Elections Enforcement Commission's notice advising state contractors of state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice, as set forth in "Notice to Executive Branch State Contractors and Prospective State Contractors of Campaign Contribution and Solicitation Limitations," attached as Exhibit E.

20. Tangible Personal Property

- (a) The Contractor on its behalf and on behalf of its Affiliates, as defined below, shall comply with the provisions of Conn. Gen. Stat. §12-411b, as follows:
 - (1) For the term of the Contract, the Contractor and its Affiliates shall collect and remit to the State of Connecticut, Department of Revenue Services, any Connecticut use tax due under the provisions of Chapter 219 of the Connecticut General Statutes for items of tangible personal property sold by the Contractor or by any of its Affiliates in the same manner as if the Contractor and such Affiliates were engaged in the business of selling tangible personal property for use in Connecticut and had sufficient nexus under the provisions of Chapter 219 to be required to collect Connecticut use tax;
 - (2) A customer's payment of a use tax to the Contractor or its Affiliates relieves the customer of liability for the use tax;
 - (3) The Contractor and its Affiliates shall remit all use taxes they collect from customers on or before the due date specified in the Contract, which may not be later than the last day of the month next succeeding the end of a calendar quarter or other tax collection period during which the tax was collected;
 - (4) The Contractor and its Affiliates are not liable for use tax billed by them but not paid to them by a customer; and

(5) Any Contractor or Affiliate who fails to remit use taxes collected on behalf of its customers by the due date specified in the Contract shall be subject to the interest and penalties provided for persons required to collect sales tax under chapter 219 of the general statutes.

- (b) For purposes of this section of the Contract, the word “Affiliate” means any person, as defined in section 12-1 of the general statutes, that controls, is controlled by, or is under common control with another person. A person controls another person if the person owns, directly or indirectly, more than ten per cent of the voting securities of the other person. The word “voting security” means a security that confers upon the holder the right to vote for the election of members of the board of directors or similar governing body of the business, or that is convertible into, or entitles the holder to receive, upon its exercise, a security that confers such a right to vote. “Voting security” includes a general partnership interest.
- (c) The Contractor represents and warrants that each of its Affiliates has vested in the Contractor plenary authority to so bind the Affiliates in any agreement with the State of Connecticut. The Contractor on its own behalf and on behalf of its Affiliates shall also provide, no later than 30 days after receiving a request by the State’s contracting authority, such information as the State may require to ensure, in the State’s sole determination, compliance with the provisions of Chapter 219 of the Connecticut General Statutes, including, but not limited to, §12-411b.

21. Bid Rigging and/or Fraud – Notice to Contractor

The Connecticut Department of Transportation is cooperating with the U.S. Department of Transportation and the Justice Department in their investigation into highway construction contract bid rigging and/or fraud.

A toll-free “HOT LINE” telephone number 800-424-9071 has been established to receive information from contractors, subcontractors, manufacturers, suppliers or anyone with knowledge of bid rigging and/or fraud, either past or current. The “HOT LINE” telephone number will be available during normal working hours (8:00 am – 5:00 pm EST). Information will be treated confidentially and anonymity respected.

22. Consulting Agreement Affidavit

The Contractor shall comply with Connecticut General Statutes Section 4a-81(a) and 4a-81(b), as revised. Pursuant to Public Act 11-229, after the initial submission of the form, if there is a change in the information contained in the form, a contractor shall submit the updated form, as applicable, either (i) not later than thirty (30) days after the effective date of such change or (ii) prior to execution of any new contract, whichever is earlier.

The Affidavit/Form may be submitted in written format or electronic format through the Department of Administrative Services (DAS) website.

EXHIBIT A

FHWA-1273 -- Revised May 1, 2012

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.
3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.
4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential

minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating

areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 “Contract provisions and related matters” with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or

any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

- (i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is

registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit

any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term “perform work with its own organization” refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;
- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under

construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered

transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with

obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency,

a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR
APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL
ACCESS ROAD CONTRACTS**

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

EXHIBIT B**TITLE VI CONTRACTOR ASSURANCES**

During the performance of this Contract, the contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "Contractor") agrees as follows:

1. **Compliance with Regulations:** The Contractor shall comply with the regulations relative to nondiscrimination in federally assisted programs of the United States Department of Transportation (hereinafter, "USDOT"), Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time (hereinafter referred to as the "Regulations"), which are herein incorporated by reference and made a part of this contract.

2. **Nondiscrimination:** The Contractor, with regard to the work performed by it during the Contract, shall not discriminate on the grounds of race, color, national origin, sex, age, or disability in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor shall not participate either directly or indirectly in the discrimination prohibited by Subsection 5 of the Regulations, including employment practices when the Contract covers a program set forth in Appendix B of the Regulations.

3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:**

In all solicitations either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the Contractor of the Contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, national origin, sex, age, or disability.

4. **Information and Reports:** The Contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Connecticut Department of Transportation (ConnDOT) or the Funding Agency (FHWA, FTA and FAA) to be pertinent to ascertain compliance with such Regulations, orders, and instructions. Where any information required of a Contractor is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to ConnDOT or the Funding Agency, as appropriate, and shall set forth what efforts it has made to obtain the information.

5. **Sanctions for Noncompliance:** In the event of the Contractor's noncompliance with the nondiscrimination provisions of this Contract, the ConnDOT shall impose such sanctions as it or the Funding Agency may determine to be appropriate, including, but not limited to:

- A. Withholding contract payments until the Contractor is in-compliance; and/or
- B. Cancellation, termination, or suspension of the Contract, in whole or in part.

6. **Incorporation of Provisions:** The Contractor shall include the provisions of paragraphs 1 through 5 in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations or directives issued pursuant thereto. The Contractor shall take such action with respect to any subcontract or procurement as the ConnDOT or the Funding Agency may -direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the Contractor may request the ConnDOT to enter into such litigation to protect the interests of the Funding Agency, and, in addition, the Contractor may request the United States to enter into such litigation to protect the interests of the United States

EXHIBIT C**CONTRACTOR WORKFORCE UTILIZATION (FEDERAL EXECUTIVE ORDER 11246) /
EQUAL EMPLOYMENT OPPORTUNITY
(Federal - FHWA)****1. Project Workforce Utilization Goals:**

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or Federally assisted or funded) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for the geographical area where the work is actually performed.

Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications which contain the applicable goals for minority and female participation.

The goals for minority and female utilization are expressed in percentage terms for the contractor's aggregate work-force in each trade on all construction work in the covered area, are referenced in the attached Appendix A.

2. Executive Order 11246

The Contractor's compliance with Executive Order 11246 and 41-CFR Part 60-4 shall be based on its implementation of the specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(A) and its efforts to meet the goals established for the geographical area where the contract is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from contractor to contractor or from project to project for the sole purpose of meeting the contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hour performed.

If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or subcontractors toward a goal in an approved Pan does not excuse any covered Contractor's or subcontractor's failure to take good faith efforts to achieve the plan goals and timetables.

The Contractor shall implement the specific affirmative action standards provided in a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in

which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form and such notices may be obtained from any Office of Federal Contract Compliance Programs (OFCCP) Office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant hereto.

In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

- a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites; and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
- b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
- c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off the street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason thereafter; along with whatever additional actions the Contractor may have taken.
- d. Provide immediate written notification to the Director when the Union or Unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or women sent by the Contractor, or when the Contractor has other

information that the Union referral process has impeded the Contractor's efforts to meet its obligations.

- e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under b above.
- f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO Policy on bulletin boards accessible to all employees at each location where construction work is performed.
- g. Review, at least annually, the company EEO Policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment, decisions including specific Foreman, etc. prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- h. Disseminate the Contractor's EEO Policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and subcontractors with whom the Contractor does or anticipates doing business.
- i. Direct its recruitment efforts, both oral and written, to minority female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the contractor shall send written notification to organizations such as the above, describing the openings, screening procedures and tests to be used in the selection process.
- j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work-force.
- k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
- l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
- m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and

employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

- n. Ensure that all facilities and company activities are non-segregated except that separate or single user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
- o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
- p. Conduct a review at least annually of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (a through p). The efforts of a contractor association, joint contractor union, contractor community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under a through p of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work-force participation, makes a good faith effort to meet with individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of Executive Order 11246 if a particular group is employed in a substantially disparate manner, (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is under utilized).

The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in these

specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status, (e.g. mechanic, apprentice, trainee, helper, or laborer) dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

Nothing herein provided shall be construed as a limitation upon the application of their laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g. those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

The Director of the Office of Federal Contract Compliance Programs, from time to time, shall issue goals and timetables for minority and female utilization which shall be based on appropriate workforce, demographic or other relevant data and which shall cover construction projects or construction contracts performed in specific geographical areas. The goals, which shall be applicable to each construction trade in a covered contractor's or timetables, shall be published as notices in the Federal Register, and shall be inserted by the Contracting officers and applicants, as applicable, in the Notice required by 41 CFR 60-4.2.

FEDERALLY FUNDED OR ASSISTED PROJECTS
APPENDIX A
(Labor Market Goals)

Standard Metropolitan Statistical Area (SMSA)

Female

Minority

Bridgeport – Stamford – Norwalk – Danbury	10.2%
6.9%	

Bethel	Bridgeport	Brookfield	Danbury
Darien	Derby	Easton	Fairfield
Greenwich	Milford	Monroe	New Canaan
New Fairfield	Newton	Norwalk	Redding
Shelton	Stamford	Stratford	Trumbull
Weston	Westport	Wilton	

Hartford – Bristol – New Britain	6.9%
6.9%	

Andover	Avon	Berlin	Bloomfield
Bolton	Bristol	Burlington	Canton
Colchester	Columbia	Coventry	Cromwell
East Granby	East Hampton	East Hartford	East Windsor
Ellington	Enfield	Farmington	Glastonbury
Granby	Hartford	Hebron	Manchester
Marlborough	New Britain	New Hartford	Newington
Plainville	Plymouth	Portland	Rocky Hill
Simsbury	South Windsor	Southington	Stafford
Suffield	Tolland	Vernon	West Hartford
Wethersfield	Willington	Windsor	Windsor Locks

New Haven – Waterbury – Meriden	9.0%
6.9%	

Beacon Falls	Bethany	Branford	Cheshire
Clinton	East Haven	Guilford	Hamden
Madison	Meriden	Middlebury	Naugatuck
New Haven	North Branford	North Haven	Orange
Prospect	Southbury	Thomaston	Wallingford
Waterbury	Watertown	West Haven	Wolcott
Woodbridge	Woodbury		

New London – Norwich	4.5%
6.9%	

Bozrah	East Lyme	Griswold	Groton
Ledyard	Lisbon	Montville	New London
Norwich	Old Lyme	Old Saybrook	Preston
Sprague	Stonington	Waterford	

Non SMSA**Female****Minority**

Litchfield – Windham			5.9%
6.9%			
Abington	Ashford	Ballouville	Bantam
Barkhamsted	Bethlehem	Bridgewater	Brooklyn
Canaan	Canterbury	Central Village	Cahplin
Colebrook	Cornwall	Cornwall Bridge	Danielson
Dayville	East Canaan	East Killingly	East Woodstock
Eastford	Falls Village	Gaylordsville	Goshen
Grosvenor Dale	Hampton	Harwinton	Kent
Killigly	Lakeside	Litchfield	Moosup
Morris	New Milford	New Preston	New Preston Marble Dale
Norfolk	North Canaan	No. Grosvenordale	North Windham
Oneco	Pequabuck	Pine Meadow	Plainfield
Pleasant Valley	Pomfret	Pomfret Center	Putnam
Quinebaug	Riverton	Rogers	Roxbury
Salisbury	Scotland	Sharon	South Kent
South Woodstock	Sterling	Taconic	Terryville
Thompson	Torrington	Warren	Warrenville
Washington	Washington Depot	Wauregan	West Cornwall
Willimantic	Winchester	Winchester Center	Windham
Winsted	Woodstock	Woodstock Valley	

EXHIBIT D**Health Insurance Portability and Accountability Act of 1996 (“HIPAA”).**

- (a) If the Contactor is a Business Associate under the requirements of the Health Insurance Portability and Accountability Act of 1996 (“HIPAA”), the Contractor must comply with all terms and conditions of this Section of the Contract. If the Contractor is not a Business Associate under HIPAA, this Section of the Contract does not apply to the Contractor for this Contract.
- (b) The Contractor is required to safeguard the use, publication and disclosure of information on all applicants for, and all clients who receive, services under the Contract in accordance with all applicable federal and state law regarding confidentiality, which includes but is not limited to HIPAA, more specifically with the Privacy and Security Rules at 45 C.F.R. Part 160 and Part 164, subparts A, C, and E; and
- (c) The State of Connecticut Agency named on page 1 of this Contract (hereinafter the “Department”) is a “covered entity” as that term is defined in 45 C.F.R. § 160.103; and
- (d) The Contractor, on behalf of the Department, performs functions that involve the use or disclosure of “individually identifiable health information,” as that term is defined in 45 C.F.R. § 160.103; and
- (e) The Contractor is a “business associate” of the Department, as that term is defined in 45 C.F.R. § 160.103; and
- (f) The Contractor and the Department agree to the following in order to secure compliance with the HIPAA, the requirements of Subtitle D of the Health Information Technology for Economic and Clinical Health Act (hereinafter the HITECH Act), (Pub. L. 111-5, sections 13400 to 13423), and more specifically with the Privacy and Security Rules at 45 C.F.R. Part 160 and Part 164, subparts A, C, and E.
- (g) Definitions
 - (1) “Breach shall have the same meaning as the term is defined in section 13400 of the HITECH Act (42 U.S.C. §17921(1))
 - (2) “Business Associate” shall mean the Contractor.
 - (3) “Covered Entity” shall mean the Department of the State of Connecticut named on page 1 of this Contract.
 - (4) “Designated Record Set” shall have the same meaning as the term “designated record set” in 45 C.F.R. § 164.501.
 - (5) “Electronic Health Record” shall have the same meaning as the term is defined in section 13400 of the HITECH Act (42 U.S.C. §17921(5))

- (6) "Individual" shall have the same meaning as the term "individual" in 45 C.F.R. § 160.103 and shall include a person who qualifies as a personal representative as defined in 45 C.F.R. § 164.502(g).
 - (7) "Privacy Rule" shall mean the Standards for Privacy of Individually Identifiable Health Information at 45 C.F.R. part 160 and parts 164, subparts A and E.
 - (8) "Protected Health Information" or "PHI" shall have the same meaning as the term "protected health information" in 45 C.F.R. § 160.103, limited to information created or received by the Business Associate from or on behalf of the Covered Entity.
 - (9) "Required by Law" shall have the same meaning as the term "required by law" in 45 C.F.R. § 164.103.
 - (10) "Secretary" shall mean the Secretary of the Department of Health and Human Services or his designee.
 - (11) "More stringent" shall have the same meaning as the term "more stringent" in 45 C.F.R. § 160.202.
 - (12) "This Section of the Contract" refers to the HIPAA Provisions stated herein, in their entirety.
 - (13) "Security Incident" shall have the same meaning as the term "security incident" in 45 C.F.R. § 164.304.
 - (14) "Security Rule" shall mean the Security Standards for the Protection of Electronic Protected Health Information at 45 C.F.R. part 160 and parts 164, subpart A and C.
 - (15) "Unsecured protected health information" shall have the same meaning as the term as defined in section 13402(h)(1)(A) of HITECH. Act. (42 U.S.C. §17932(h)(1)(A)).
- (h) Obligations and Activities of Business Associates.
- (1) Business Associate agrees not to use or disclose PHI other than as permitted or required by this Section of the Contract or as Required by Law.
 - (2) Business Associate agrees to use appropriate safeguards to prevent use or disclosure of PHI other than as provided for in this Section of the Contract.
 - (3) Business Associate agrees to use administrative, physical and technical safeguards that reasonably and appropriately protect the confidentiality, integrity, and availability of electronic protected health information that it creates, receives, maintains, or transmits on behalf of the Covered Entity.
 - (4) Business Associate agrees to mitigate, to the extent practicable, any harmful effect that is known to the Business Associate of a use or disclosure of PHI by Business Associate in violation of this Section of the Contract.

- (5) Business Associate agrees to report to Covered Entity any use or disclosure of PHI not provided for by this Section of the Contract or any security incident of which it becomes aware.
- (6) Business Associate agrees to insure that any agent, including a subcontractor, to whom it provides PHI received from, or created or received by Business Associate, on behalf of the Covered Entity, agrees to the same restrictions and conditions that apply through this Section of the Contract to Business Associate with respect to such information.
- (7) Business Associate agrees to provide access, at the request of the Covered Entity, and in the time and manner agreed to by the parties, to PHI in a Designated Record Set, to Covered Entity or, as directed by Covered Entity, to an Individual in order to meet the requirements under 45 C.F.R. § 164.524.
- (8) Business Associate agrees to make any amendments to PHI in a Designated Record Set that the Covered Entity directs or agrees to pursuant to 45 C.F.R. § 164.526 at the request of the Covered Entity, and in the time and manner agreed to by the parties.
- (9) Business Associate agrees to make internal practices, books, and records, including policies and procedures and PHI, relating to the use and disclosure of PHI received from, or created or received by, Business Associate on behalf of Covered Entity, available to Covered Entity or to the Secretary in a time and manner agreed to by the parties or designated by the Secretary, for purposes of the Secretary determining Covered Entity's compliance with the Privacy Rule.
- (10) Business Associate agrees to document such disclosures of PHI and information related to such disclosures as would be required for Covered Entity to respond to a request by an Individual for an accounting of disclosures of PHI in accordance with 45 C.F.R. § 164.528 and section 13405 of the HITECH Act (42 U.S.C. § 17935) and any regulations promulgated thereunder.
- (11) Business Associate agrees to provide to Covered Entity, in a time and manner agreed to by the parties, information collected in accordance with clause h. (10) of this Section of the Contract, to permit Covered Entity to respond to a request by an Individual for an accounting of disclosures of PHI in accordance with 45 C.F.R. § 164.528 and section 13405 of the HITECH Act (42 U.S.C. § 17935) and any regulations promulgated thereunder. Business Associate agrees at the Covered Entity's direction to provide an accounting of disclosures of PHI directly to an individual in accordance with 45 C.F.R. § 164.528 and section 13405 of the HITECH Act (42 U.S.C. § 17935) and any regulations promulgated thereunder.
- (12) Business Associate agrees to comply with any state or federal law that is more stringent than the Privacy Rule.
- (13) Business Associate agrees to comply with the requirements of the HITECH Act relating to privacy and security that are applicable to the Covered Entity and with the requirements of 45 C.F.R. sections 164.504(e), 164.308, 164.310, 164.312, and 164.316.

- (14) In the event that an individual requests that the Business Associate (a) restrict disclosures of PHI; (b) provide an accounting of disclosures of the individual's PHI; or (c) provide a copy of the individual's PHI in an electronic health record, the Business Associate agrees to notify the covered entity, in writing, within two business days of the request.
- (15) Business Associate agrees that it shall not, directly or indirectly, receive any remuneration in exchange for PHI of an individual without (1) the written approval of the covered entity, unless receipt of remuneration in exchange for PHI is expressly authorized by this Contract and (2) the valid authorization of the individual, except for the purposes provided under section 13405(d)(2) of the HITECH Act,(42 U.S.C. § 17935(d)(2)) and in any accompanying regulations
- (16) Obligations in the Event of a Breach
- A. The Business Associate agrees that, following the discovery of a breach of unsecured protected health information, it shall notify the Covered Entity of such breach in accordance with the requirements of section 13402 of HITECH (42 U.S.C. 17932(b) and the provisions of this Section of the Contract.
- B. Such notification shall be provided by the Business Associate to the Covered Entity without unreasonable delay, and in no case later than 30 days after the breach is discovered by the Business Associate, except as otherwise instructed in writing by a law enforcement official pursuant to section 13402 (g) of HITECH (42 U.S.C. 17932(g)) . A breach is considered discovered as of the first day on which it is, or reasonably should have been, known to the Business Associate. The notification shall include the identification and last known address, phone number and email address of each individual (or the next of kin of the individual if the individual is deceased) whose unsecured protected health information has been, or is reasonably believed by the Business Associate to have been, accessed, acquired, or disclosed during such breach.
- C. The Business Associate agrees to include in the notification to the Covered Entity at least the following information:
1. A brief description of what happened, including the date of the breach and the date of the discovery of the breach, if known.
 2. A description of the types of unsecured protected health information that were involved in the breach (such as full name, Social Security number, date of birth, home address, account number, or disability code).
 3. The steps the Business Associate recommends that individuals take to protect themselves from potential harm resulting from the breach.
 4. A detailed description of what the Business Associate is doing to investigate the breach, to mitigate losses, and to protect against any further breaches.
 5. Whether a law enforcement official has advised either verbally or in writing the Business Associate that he or she has determined that notification or notice to

individuals or the posting required under section 13402 of the HITECH Act would impede a criminal investigation or cause damage to national security and; if so, include contact information for said official.

- D. Business Associate agrees to provide appropriate staffing and have established procedures to ensure that individuals informed by the Covered Entity of a breach by the Business Associate have the opportunity to ask questions and contact the Business Associate for additional information regarding the breach. Such procedures shall include a toll-free telephone number, an e-mail address, a posting on its Web site and a postal address. Business Associate agrees to include in the notification of a breach by the Business Associate to the Covered Entity, a written description of the procedures that have been established to meet these requirements. Costs of such contact procedures will be borne by the Contractor.
 - E. Business Associate agrees that, in the event of a breach, it has the burden to demonstrate that it has complied with all notifications requirements set forth above, including evidence demonstrating the necessity of a delay in notification to the Covered Entity.
- (i) Permitted Uses and Disclosure by Business Associate.
- (1) General Use and Disclosure Provisions Except as otherwise limited in this Section of the Contract, Business Associate may use or disclose PHI to perform functions, activities, or services for, or on behalf of, Covered Entity as specified in this Contract, provided that such use or disclosure would not violate the Privacy Rule if done by Covered Entity or the minimum necessary policies and procedures of the Covered Entity.
 - (2) Specific Use and Disclosure Provisions
 - (A) Except as otherwise limited in this Section of the Contract, Business Associate may use PHI for the proper management and administration of Business Associate or to carry out the legal responsibilities of Business Associate.
 - (B) Except as otherwise limited in this Section of the Contract, Business Associate may disclose PHI for the proper management and administration of Business Associate, provided that disclosures are Required by Law, or Business Associate obtains reasonable assurances from the person to whom the information is disclosed that it will remain confidential and used or further disclosed only as Required by Law or for the purpose for which it was disclosed to the person, and the person notifies Business Associate of any instances of which it is aware in which the confidentiality of the information has been breached.
 - (C) Except as otherwise limited in this Section of the Contract, Business Associate may use PHI to provide Data Aggregation services to Covered Entity as permitted by 45 C.F.R. § 164.504(e)(2)(i)(B).
- (j) Obligations of Covered Entity.

- (1) Covered Entity shall notify Business Associate of any limitations in its notice of privacy practices of Covered Entity, in accordance with 45 C.F.R. § 164.520, or to the extent that such limitation may affect Business Associate's use or disclosure of PHI.
 - (2) Covered Entity shall notify Business Associate of any changes in, or revocation of, permission by Individual to use or disclose PHI, to the extent that such changes may affect Business Associate's use or disclosure of PHI.
 - (3) Covered Entity shall notify Business Associate of any restriction to the use or disclosure of PHI that Covered Entity has agreed to in accordance with 45 C.F.R. § 164.522, to the extent that such restriction may affect Business Associate's use or disclosure of PHI.
- (k) Permissible Requests by Covered Entity. Covered Entity shall not request Business Associate to use or disclose PHI in any manner that would not be permissible under the Privacy Rule if done by the Covered Entity, except that Business Associate may use and disclose PHI for data aggregation, and management and administrative activities of Business Associate, as permitted under this Section of the Contract.
- (l) Term and Termination.
- (1) Term. The Term of this Section of the Contract shall be effective as of the date the Contract is effective and shall terminate when the information collected in accordance with clause h. (10) of this Section of the Contract is provided to the Covered Entity and all of the PHI provided by Covered Entity to Business Associate, or created or received by Business Associate on behalf of Covered Entity, is destroyed or returned to Covered Entity, or, if it is infeasible to return or destroy PHI, protections are extended to such information, in accordance with the termination provisions in this Section.
 - (2) Termination for Cause Upon Covered Entity's knowledge of a material breach by Business Associate, Covered Entity shall either:
 - (A) Provide an opportunity for Business Associate to cure the breach or end the violation and terminate the Contract if Business Associate does not cure the breach or end the violation within the time specified by the Covered Entity; or
 - (B) Immediately terminate the Contract if Business Associate has breached a material term of this Section of the Contract and cure is not possible; or
 - (C) If neither termination nor cure is feasible, Covered Entity shall report the violation to the Secretary.
 - (3) Effect of Termination
 - (A) Except as provided in (l)(2) of this Section of the Contract, upon termination of this Contract, for any reason, Business Associate shall return or destroy all PHI received from Covered Entity, or created or received by Business Associate on behalf of Covered Entity. Business Associate shall also provide the information collected in accordance with clause h. (10) of this Section of the Contract to the Covered Entity

within ten business days of the notice of termination. This provision shall apply to PHI that is in the possession of subcontractors or agents of Business Associate. Business Associate shall retain no copies of the PHI.

(B) In the event that Business Associate determines that returning or destroying the PHI is infeasible, Business Associate shall provide to Covered Entity notification of the conditions that make return or destruction infeasible. Upon documentation by Business Associate that return or destruction of PHI is infeasible, Business Associate shall extend the protections of this Section of the Contract to such PHI and limit further uses and disclosures of PHI to those purposes that make return or destruction infeasible, for as long as Business Associate maintains such PHI. Infeasibility of the return or destruction of PHI includes, but is not limited to, requirements under state or federal law that the Business Associate maintains or preserves the PHI or copies thereof.

(m) Miscellaneous Provisions.

(1) Regulatory References. A reference in this Section of the Contract to a section in the Privacy Rule means the section as in effect or as amended.

(2) Amendment. The Parties agree to take such action as is necessary to amend this Section of the Contract from time to time as is necessary for Covered Entity to comply with requirements of the Privacy Rule and the Health Insurance Portability and Accountability Act of 1996, Pub. L. No. 104-191.

(3) Survival. The respective rights and obligations of Business Associate shall survive the termination of this Contract.

(4) Effect on Contract. Except as specifically required to implement the purposes of this Section of the Contract, all other terms of the Contract shall remain in force and effect.

(5) Construction. This Section of the Contract shall be construed as broadly as necessary to implement and comply with the Privacy Standard. Any ambiguity in this Section of the Contract shall be resolved in favor of a meaning that complies, and is consistent with, the Privacy Standard.

(6) Disclaimer. Covered Entity makes no warranty or representation that compliance with this Section of the Contract will be adequate or satisfactory for Business Associate's own purposes. Covered Entity shall not be liable to Business Associate for any claim, civil or criminal penalty, loss or damage related to or arising from the unauthorized use or disclosure of PHI by Business Associate or any of its officers, directors, employees, contractors or agents, or any third party to whom Business Associate has disclosed PHI contrary to the provisions of this Contract or applicable law. Business Associate is solely responsible for all decisions made, and actions taken, by Business Associate regarding the safeguarding, use and disclosure of PHI within its possession, custody or control.

(7) Indemnification. The Business Associate shall indemnify and hold the Covered Entity harmless from and against any and all claims, liabilities, judgments, fines, assessments, penalties, awards and any statutory damages that may be imposed or assessed pursuant to HIPAA, as amended or the

HITECH Act, including, without limitation, attorney's fees, expert witness fees, costs of investigation, litigation or dispute resolution, and costs awarded thereunder, relating to or arising out of any violation by the Business Associate and its agents, including subcontractors, of any obligation of Business Associate and its agents, including subcontractors, under this section of the contract, under HIPAA, the HITECH Act, the Privacy Rule and the Security Rule.

Notice to Executive Branch State Contractors and Prospective State Contractors of Campaign Contribution and Solicitation Limitations

This notice is provided under the authority of Connecticut General Statutes §9-612(g)(2), as amended by P.A. 10-1, and is for the purpose of informing state contractors and prospective state contractors of the following law (*italicized words are defined on the reverse side of this page*).

CAMPAIGN CONTRIBUTION AND SOLICITATION LIMITATIONS

No *state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor*, with regard to a *state contract or state contract solicitation* with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall make a contribution to (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee (which includes town committees).

In addition, no holder or principal of a holder of a valid prequalification certificate, shall make a contribution to (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of State senator or State representative, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

On and after January 1, 2011, no state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor, with regard to a state contract or state contract solicitation with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall **knowingly solicit** contributions from the state contractor's or prospective state contractor's employees or from a *subcontractor or principals of the subcontractor* on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

DUTY TO INFORM

State contractors and prospective state contractors are required to inform their principals of the above prohibitions, as applicable, and the possible penalties and other consequences of any violation thereof.

PENALTIES FOR VIOLATIONS

Contributions or solicitations of contributions made in violation of the above prohibitions may result in the following civil and criminal penalties:

Civil penalties—Up to \$2,000 or twice the amount of the prohibited contribution, whichever is greater, against a principal or a contractor. Any state contractor or prospective state contractor which fails to make reasonable efforts to comply with the provisions requiring notice to its principals of these prohibitions and the possible consequences of their violations may also be subject to civil penalties of up to \$2,000 or twice the amount of the prohibited contributions made by their principals.

Criminal penalties—Any knowing and willful violation of the prohibition is a Class D felony, which may subject the violator to imprisonment of not more than 5 years, or not more than \$5,000 in fines, or both.

CONTRACT CONSEQUENCES

In the case of a state contractor, contributions made or solicited in violation of the above prohibitions may result in the contract being voided.

In the case of a prospective state contractor, contributions made or solicited in violation of the above prohibitions shall result in the contract described in the state contract solicitation not being awarded to the prospective state contractor, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

The State shall not award any other state contract to anyone found in violation of the above prohibitions for a period of one year after the election for which such contribution is made or solicited, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

Additional information may be found on the website of the State Elections Enforcement Commission, www.ct.gov/seec. Click on the link to "Lobbyist/Contractor Limitations."

DEFINITIONS

“State contractor” means a person, business entity or nonprofit organization that enters into a state contract. Such person, business entity or nonprofit organization shall be deemed to be a state contractor until December thirty-first of the year in which such contract terminates. “State contractor” does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person’s capacity as a state or quasi-public agency employee.

“Prospective state contractor” means a person, business entity or nonprofit organization that (i) submits a response to a state contract solicitation by the state, a state agency or a quasi-public agency, or a proposal in response to a request for proposals by the state, a state agency or a quasi-public agency, until the contract has been entered into, or (ii) holds a valid prequalification certificate issued by the Commissioner of Administrative Services under section 4a-100. “Prospective state contractor” does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person’s capacity as a state or quasi-public agency employee.

“Principal of a state contractor or prospective state contractor” means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a state contractor or prospective state contractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization, (ii) an individual who is employed by a state contractor or prospective state contractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a state contractor or prospective state contractor, which is not a business entity, or if a state contractor or prospective state contractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any state contractor or prospective state contractor who has *managerial or discretionary responsibilities with respect to a state contract*, (v) the spouse or a *dependent child* who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the state contractor or prospective state contractor.

“State contract” means an agreement or contract with the state or any state agency or any quasi-public agency, let through a procurement process or otherwise, having a value of fifty thousand dollars or more, or a combination or series of such agreements or contracts having a value of one hundred thousand dollars or more in a calendar year, for (i) the rendition of services, (ii) the furnishing of any goods, material, supplies, equipment or any items of any kind, (iii) the construction, alteration or repair of any public building or public work, (iv) the acquisition, sale or lease of any land or building, (v) a licensing arrangement, or (vi) a grant, loan or loan guarantee. “State contract” does not include any agreement or contract with the state, any state agency or any quasi-public agency that is exclusively federally funded, an education loan, a loan to an individual for other than commercial purposes or any agreement or contract between the state or any state agency and the United States Department of the Navy or the United States Department of Defense.

“State contract solicitation” means a request by a state agency or quasi-public agency, in whatever form issued, including, but not limited to, an invitation to bid, request for proposals, request for information or request for quotes, inviting bids, quotes or other types of submittals, through a competitive procurement process or another process authorized by law waiving competitive procurement.

“Managerial or discretionary responsibilities with respect to a state contract” means having direct, extensive and substantive responsibilities with respect to the negotiation of the state contract and not peripheral, clerical or ministerial responsibilities.

“Dependent child” means a child residing in an individual’s household who may legally be claimed as a dependent on the federal income tax of such individual.

“Solicit” means (A) requesting that a contribution be made, (B) participating in any fund-raising activities for a candidate committee, exploratory committee, political committee or party committee, including, but not limited to, forwarding tickets to potential contributors, receiving contributions for transmission to any such committee or bundling contributions, (C) serving as chairperson, treasurer or deputy treasurer of any such committee, or (D) establishing a political committee for the sole purpose of soliciting or receiving contributions for any committee. Solicit does not include: (i) making a contribution that is otherwise permitted by Chapter 155 of the Connecticut General Statutes; (ii) informing any person of a position taken by a candidate for public office or a public official, (iii) notifying the person of any activities of, or contact information for, any candidate for public office; or (iv) serving as a member in any party committee or as an officer of such committee that is not otherwise prohibited in this section.

“Subcontractor” means any person, business entity or nonprofit organization that contracts to perform part or all of the obligations of a state contractor’s state contract. Such person, business entity or nonprofit organization shall be deemed to be a subcontractor until December thirty first of the year in which the subcontract terminates. “Subcontractor” does not include (i) a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or (ii) an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person’s capacity as a state or quasi-public agency employee.

“Principal of a subcontractor” means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a subcontractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization, (ii) an individual who is employed by a subcontractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a subcontractor, which is not a business entity, or if a subcontractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any subcontractor who has managerial or discretionary responsibilities with respect to a subcontract with a state contractor, (v) the spouse or a dependent child who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the subcontractor.

EXHIBIT F

(federal wage rate package will be inserted here)

General Decision Number: CT150014 02/13/2015 CT14

Superseded General Decision Number: CT20140014

State: Connecticut

Construction Type: Heavy

County: Hartford County in Connecticut.

HEAVY CONSTRUCTION PROJECTS

Note: Executive Order (EO) 13658 establishes an hourly minimum wage of \$10.10 for 2015 that applies to all contracts subject to the Davis-Bacon Act for which the solicitation is issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.10 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/02/2015
1	01/09/2015
2	01/30/2015
3	02/13/2015

* BRCT0001-012 12/29/2014

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 32.50	28.34

 CARP0024-014 05/05/2014

Berlin, Bristol, Burlington, Canton, Marlborough, New Britain, Newington, Plainville and Southington

	Rates	Fringes
CARPENTER		
CARPENTERS, PILEDRIVERS.....	\$ 31.00	22.50
DIVER TENDER.....	\$ 31.00	22.50
DIVER.....	\$ 39.46	22.50
MILLWRIGHTS.....	\$ 31.60	22.75

 CARP0043-005 05/05/2014

Avon, Bloomfield, East Branby, East Hartford, East Windsor, Enfield, Farmington, Glastonbury, Granby, Hartford, Hartland, Manchester, Rocky Hill, Simsbury, South Windsor, Suffield, West Hartford, Wethersfield, Windsor, Windsor Locks

	Rates	Fringes
CARPENTER		
CARPENTER, PILED RIVER.....	\$ 31.00	22.50
DIVER TENDER.....	\$ 31.00	22.50
DIVER.....	\$ 39.46	22.50
MILLWRIGHT.....	\$ 31.60	22.75

ELEC0035-006 06/01/2014

Entire County excluding Berlin, Bristol, Hartland, New Britain, Newington, Plainville and Southington Townships

	Rates	Fringes
ELECTRICIAN.....	\$ 38.10	23.86

ELEC0090-005 06/01/2014

Berlin, Bristol, New Britain, Newington, Plainville, Southington Townships

	Rates	Fringes
ELECTRICIAN.....	\$ 37.05	24.37

ELEC0488-005 06/01/2014

Hartland Township

	Rates	Fringes
ELECTRICIAN.....	\$ 37.27	23.37

ENGI0478-001 04/06/2014

	Rates	Fringes
Power equipment operators:		
GROUP 1.....	\$ 36.80	22.30
GROUP 2.....	\$ 36.48	22.30
GROUP 3.....	\$ 35.74	22.30
GROUP 4.....	\$ 35.35	22.30
GROUP 5.....	\$ 34.76	22.30
GROUP 6.....	\$ 34.45	22.30
GROUP 7.....	\$ 34.11	22.30
GROUP 8.....	\$ 33.71	22.30
GROUP 9.....	\$ 33.28	22.30
GROUP 10.....	\$ 31.24	22.30
GROUP 11.....	\$ 31.24	22.30
GROUP 12.....	\$ 31.18	22.30
GROUP 13.....	\$ 32.71	22.30
GROUP 14.....	\$ 30.60	22.30
GROUP 15.....	\$ 30.29	22.30
GROUP 16.....	\$ 29.46	22.30
GROUP 17.....	\$ 29.05	22.30
GROUP 18.....	\$ 28.40	22.30

Hazardous waste premium \$3.00 per hour over classified rate.

Crane with boom, including jib, 150 feet - \$1.50 extra.
 Crane with boom, including jib, 200 feet - \$2.50 extra.
 Crane with boom, including jib, 250 feet - \$5.00 extra.
 Crane with boom, including jib, 300 feet - \$7.00 extra.
 Crane with boom, including jib, 400 feet - \$10.00 extra

All Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra \$1.00 premium in addition to the hourly wage rate and benefit contributions:

- 1) Crane handling or erecting structural steel or stone, hoisting engineer(2 drums or over)
- 2) Cranes(100 ton rated capacity and over) Bauer Drill/Caisson
- 3) Cranes(under 100 ton rated capacity)

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.

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

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. and over.

GROUP 2: Cranes (100 ton capacity & over), Excavator over 2 cubic yards, piledriver (\$3.00 premium when operator controls hammer), Bauer Drill/Caisson

GROUP 3: Excavator, 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 or operation) Rubber Tire Excavator (drott 1085 or similar); Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.)

GROUP 4: Trenching machines, lighter derrick, concrete finishing machine, CMI machine or similar, Koehring Loader (skoooper).

GROUP 5: Specialty railroad equipment, asphalt spreader, asphalt reclaiming machine, line grider, concrete pumps, drills with self contained power units, boring machine, post hole digger, auger, pounder, well digger, milling machine (over 24' mandrel), side boom, combination hoe and loader, directional driller

GROUP 6: Front end loader (3 cu. yds. up to 7 cu. yards), bulldozer (Rough grade dozer) .

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).

GROUP 8: Mechanic, grease truck operator, hydoblaster, barrier mover, power stone spreader, welder, work boat under 26 ft. transfer machine.

GROUP 9: Front end loader (under 3 cubic yards), skid steer loader (regardless of attachments), bobcat or similar, forklift, power chipper, landscape equipment (including hydroseeder).

GROUP 10: Vibratory hammer, ice machine, diesel & air, hammer, etc.

GROUP 11: Conveyor, earth roller, power pavement breaker (whiphammer), robot demolition equipment.

GROUP 12: Wellpoint operator.

GROUP 13: Portable asphalt plant operator, portable concrete plant operator, portable crusher plant operator.

GROUP 14: Compressor battery operator.

GROUP 15: Power Safety boat, Vacuum truck, Zim mixer, Sweeper; (Minimum for any job requiring a CDL license) .

GROUP 16: Elevator operator, tow motor operator (solid tire no rough terrain).

GROUP 17: Generator operator, compressor operator, pump operator, welding machine operator; Heater operator.

GROUP 18: Maintenance engineer.

ENGI0478-010 04/06/2014

	Rates	Fringes
POWER EQUIPMENT OPERATOR:		
Asphalt Paver.....	\$ 34.76	22.30
Asphalt Roller.....	\$ 34.11	22.30
Asphalt Spreader.....	\$ 34.76	22.30
Bulldozer (Rough Grade Dozer).....	\$ 34.45	22.30
Bulldozer Fine Grade(includes slopes, shaping, laser or gps).....	\$ 35.74	22.30
Crane handling or erecting structural steel or stone...	\$ 36.80	22.30
Cranes (100 ton capacity & over).....	\$ 36.48	22.30
Cranes (under 100 ton rated capacity).....	\$ 35.74	22.30
Drills with self contained power units; Directional driller.....	\$ 34.76	22.30
Earth Roller.....	\$ 31.24	22.30
Excavator/Backhoe 2 cubic yards and over.....	\$ 36.48	22.30
Excavator/Backhoe under 2		

cubic yards.....	\$ 35.74	22.30
Forklift.....	\$ 33.28	22.30
Front End Loader (3 cubic yards up to 7 cubic yards).. <td>\$ 34.45</td> <td>22.30</td>	\$ 34.45	22.30
Front End Loader (7 cubic yards or over).....	\$ 36.80	22.30
Front End Loader (under 3 cubic yards).....	\$ 33.28	22.30
Grader/Blade.....	\$ 35.74	22.30
Maintenance Engineer/Oiler..	\$ 28.40	22.30
Mechanic.....	\$ 33.71	22.30

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.

- b. Crane with boom, including jib, 150 feet - \$1.50 extra .
- Crane with boom, including jib, 200 feet- \$2.50 extra.
- Crane with boom, including jib, 250 feet - \$5.00 extra.
- Crane with boom, including jib, 300 feet - \$7.00 extra.
- Crane with boom, including jib, 400 feet - \$10.00 extra.

All Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra \$1.00 premium in addition to the hourly wage rate and benefit contributions:

- 1) Crane handling or erecting structural steel or stone, hoisting engineer(2 drums or over)
- 2) Cranes(100 ton rated capacity and over) Bauer Drill/Caisson
- 3) Cranes(under 100 ton rated capacity)

IRON0015-007 06/30/2014

	Rates	Fringes
IRONWORKER, STRUCTURAL.....	\$ 34.47	29.74

a. PAID HOLIDAY: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

LABO0056-004 04/06/2014

	Rates	Fringes
Laborers: (TUNNEL CONSTRUCTION)		
CLEANING, CONCRETE AND CAULKING TUNNEL:		
Concrete Workers, Form Movers and Strippers.....	\$ 30.37	17.80
Form Erectors.....	\$ 30.68	17.80
ROCK SHAFT, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:		

Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers.....\$ 30.37	17.80
Laborers Topside, Cage Tenders, Bellman.....\$ 30.26	17.80
Miners.....\$ 31.28	17.80
SHIELD DRIVE AND LINER	
PLATE TUNNELS IN FREE AIR:	
Brakemen and Trackmen.....\$ 30.37	17.80
Miners, Motormen, Mucking Machine Operators, Nozzlemen, Grout Men, Shaft and Tunnel, Steel and Rodmen, Shield and Erector, Arm Operator, Cable Tenders.....\$ 31.28	17.80
TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR:	
Blaster.....\$ 37.41	17.80
Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders.....\$ 37.22	17.80
Change House Attendants, Powder Watchmen, Top on Iron Bolts.....\$ 35.35	17.80
Mucking Machine Operator...\$ 37.97	17.80

a. PAID HOLIDAYS: On tunnel work only: 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.

LABO0056-006 04/06/2014

	Rates	Fringes
LABORERS		
GROUP 1.....\$ 27.05	27.05	17.80
GROUP 2.....\$ 27.30	27.30	17.80
GROUP 3.....\$ 27.55	27.55	17.80
GROUP 4.....\$ 28.05	28.05	17.80
GROUP 5.....\$ 28.80	28.80	17.80
GROUP 6.....\$ 29.05	29.05	17.80
GROUP 7.....\$ 16.00	16.00	17.80

LABORERS CLASSIFICATIONS

GROUP 1: Laborers (Unskilled), acetylene burner, concrete specialist

GROUP 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators and powdermen.

GROUP 3: Pipelayers, Jackhammer/Pavement breaker (handheld),

mason
 tenders/catch basin builders, asphalt rakers, air track
 operators, block paver and curb setter

GROUP 4: Asbestos/lead removal

GROUP 5: Blasters

GROUP 6: Toxic waste remover

GROUP 7: Traffic control signalman

 PAIN0011-013 06/01/2013

	Rates	Fringes
PAINTER		
Brush and Roller.....	\$ 30.62	17.75
Spray Only.....	\$ 33.62	17.75
Steel Only.....	\$ 32.62	17.75

 TEAM0064-001 04/06/2014

	Rates	Fringes
Truck drivers:		
2 Axle Ready Mix.....	\$ 28.43	19.14
2 Axle.....	\$ 28.33	19.14
3 Axle Ready Mix.....	\$ 28.48	19.14
3 Axle.....	\$ 28.43	19.14
4 Axle Ready Mix.....	\$ 28.58	19.14
4 Axle.....	\$ 28.53	19.14
Heavy Duty Trailer 40 tons and over.....	\$ 28.78	19.14
Heavy Duty Trailer up to 40 tons.....	\$ 28.53	19.14
Specialized (Earth moving equipment other than conventional type on-the- road trucks and semi- trailers, including Euclids).....	\$ 28.58	19.14

Hazardous waste removal work receives additional \$1.25 per hour.

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.

 TEAM0064-006 04/06/2014

	Rates	Fringes
TRUCK DRIVER: 4 Axle Truck.....	\$ 28.53	19.14

Hazardous waste removal work receives additional \$1.25 per hour.

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.

SUCT2002-009 12/16/2008

	Rates	Fringes
IRONWORKER, REINFORCING.....	\$ 27.13	13.57
LABORER: Common or General.....	\$ 21.03	5.30
OPERATOR: Excavator.....	\$ 27.77	7.60
TRUCK DRIVER: 3 Axle & Semi - Truck.....	\$ 19.93	7.39

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

=====
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 clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing

the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

=====

END OF GENERAL DECISION

General Decision Number: CT150003 02/13/2015 CT3

Superseded General Decision Number: CT20140003

State: Connecticut

Construction Type: Highway

County: Hartford County in Connecticut.

HIGHWAY CONSTRUCTION PROJECTS

Note: Executive Order (EO) 13658 establishes an hourly minimum wage of \$10.10 for 2015 that applies to all contracts subject to the Davis-Bacon Act for which the solicitation is issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.10 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/02/2015
1	01/09/2015
2	01/30/2015
3	02/13/2015

* BRCT0001-003 12/29/2014

	Rates	Fringes
BRICKLAYER		
BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, PLASTERERS, STONE MASONS....	\$ 32.50	28.34

 CARP0024-005 05/05/2014

	Rates	Fringes
Carpenters: (Berlin, Bristol, Burlington, Canton, Marlborough, New Britain, Newington, Plainville, Southington)		
CARPENTERS; PILEDRIVERS.....	\$ 31.00	22.50
DIVER TENDERS.....	\$ 31.00	22.50
DIVERS.....	\$ 39.46	22.50
MILLWRIGHTS.....	\$ 31.60	22.75

 CARP0043-003 05/05/2014

	Rates	Fringes
Carpenters: (Avon, Bloomfied,		

East Granby, East Hartford,
 East Windsor, Enfield,
 Farmington, Glastonbury,
 Granby, Hartford, hartland,
 Manchester, Rocky Hill,
 Simsbury, South Windsor,
 Suffield, West Hartford,
 Wethersfield, Windsor,
 Windsor Locks)

CARPENTERS; PILEDRIVERS.....	\$ 31.00	22.50
DIVER TENDERS.....	\$ 31.00	22.50
DIVERS.....	\$ 39.46	22.50
MILLWRIGHTS.....	\$ 31.60	22.75

 ELEC0035-002 06/01/2014

Rates Fringes

Electricians:

Entire County, excluding Berlin, Bristol, Hartland, New Britain, Newington, Plainville and Southington..	\$ 38.10	23.86
---	----------	-------

 ELEC0090-001 06/01/2014

Rates Fringes

Electricians:

Berlin, Bristol, New Britain, Newington, Plainville, Southington.....	\$ 37.05	24.37
---	----------	-------

 ELEC0488-004 06/01/2014

Rates Fringes

Electricians:.....	\$ 37.27	23.37
--------------------	----------	-------

 ENGI0478-002 04/06/2014

Rates Fringes

Power equipment operators:

GROUP 1.....	\$ 36.80	22.30
GROUP 2.....	\$ 36.48	22.30
GROUP 3.....	\$ 35.74	22.30
GROUP 4.....	\$ 35.35	22.30
GROUP 5.....	\$ 34.76	22.30
GROUP 6.....	\$ 34.45	22.30
GROUP 7.....	\$ 34.11	22.30
GROUP 8.....	\$ 33.71	22.30
GROUP 9.....	\$ 33.28	22.30
GROUP 10.....	\$ 31.24	22.30
GROUP 11.....	\$ 31.24	22.30
GROUP 12.....	\$ 31.18	22.30
GROUP 13.....	\$ 32.71	22.30
GROUP 14.....	\$ 30.60	22.30
GROUP 15.....	\$ 30.29	22.30
GROUP 16.....	\$ 29.46	22.30

GROUP 17.....	\$ 29.05	22.30
GROUP 18.....	\$ 28.40	22.30

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 Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra \$1.00 premium in addition to the hourly wage rate and benefit contributions:

- 1) Crane handling or erecting structural steel or stone, hoisting engineer(2 drums or over)
- 2) Cranes(100 ton rated capacity and over) Bauer Drill/Caisson
- 3) Cranes(under 100 ton rated capacity)

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.

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Crane Handling or Erecting Structural Steel or tone; Hoisting Engineer (2 drums or over); Front End Loader (7 cubic yards or over) Work Boat 26 ft. & over.

GROUP 2: Cranes (100 ton rated capacity and over); Excavator over 2 cubic yards; Piledriver (\$3.00 premium when operator controls hammer); Bauer Drill/Caisson

GROUP 3: Excavator; 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.)

GROUP 4: Trenching machines; Lighter Derrick; Concrete Finishing Machine, cmi Machine or Similar; Koehring Loader Skooper).

GROUP 5: Specialty Railroad Equipment; Asphalt Spreader; Asphalt Reclaiming achine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell); Side Boom; Combination Hoe and Loader; Directional Driller.

GROUP 6: Front End Loader (3 cu. yds. up to 7 cubic yards); Bulldozer (Rough grade dozer).

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).

GROUP 8: Mechanic; Grease Truck Operator; Hydroblaster; Barrier Mover; Power Stone Spreader; Welder; Work Boat Under 26 ft.; Transfer Machine.

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).

GROUP 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.

GROUP 11: Conveyor; Earth Roller; Power Pavement Breaker (Whiphammer); Robot Demolition Equipment.

GROUP 12: Wellpoint Operator.

GROUP 13: Portable Asphalt Plant Operator; Portable Concrete Plant Operator; Portable Crusher Plant Operator.

GROUP 14: Compressor Battery Operator.

GROUP 15: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (Minimum for any job requiring a CDL License)

GROUP 16: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).

GROUP 17: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater operator.

GROUP 18: Maintenance Engineer.

IRON0015-002 06/30/2014

	Rates	Fringes
Ironworkers: (Reinforcing, Structural and Precast Concrete Erection).....	\$ 34.47	29.74

a. PAID HOLIDAY: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

LABO0056-003 04/06/2014

	Rates	Fringes
Laborers:		
GROUP 1.....	\$ 27.05	17.80
GROUP 2.....	\$ 27.30	17.80
GROUP 3.....	\$ 27.55	17.80
GROUP 4.....	\$ 28.05	17.80
GROUP 5.....	\$ 28.80	17.80
GROUP 6.....	\$ 29.05	17.80

GROUP 7.....\$ 16.00 17.80

LABORERS CLASSIFICATIONS

GROUP 1: Laborers (Unskilled), acetylene burner, concrete specialist

GROUP 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators and powdermen.

GROUP 3: Pipelayers, Jackhammer/Pavement breaker (handheld), mason tenders/catch basin builders, asphalt rakers, air track operators, block paver and curb setter

GROUP 4: Asbestos/lead removal

GROUP 5: Blasters

GROUP 6: Toxic waste remover

GROUP 7: Traffic control signalman

LABO0056-004 04/06/2014

	Rates	Fringes
Laborers: (TUNNEL CONSTRUCTION)		
CLEANING, CONCRETE AND CAULKING TUNNEL:		
Concrete Workers, Form Movers and Strippers.....	\$ 30.37	17.80
Form Erectors.....	\$ 30.68	17.80
ROCK SHAFT, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:		
Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers.....	\$ 30.37	17.80
Laborers Topside, Cage Tenders, Bellman.....	\$ 30.26	17.80
Miners.....	\$ 31.28	17.80
SHIELD DRIVE AND LINER PLATE TUNNELS IN FREE AIR:		
Brakemen and Trackmen.....	\$ 30.37	17.80
Miners, Motormen, Mucking Machine Operators, Nozzlemen, Grout Men, Shaft and Tunnel, Steel and Rodmen, Shield and Erector, Arm Operator, Cable Tenders.....	\$ 31.28	17.80
TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR:		
Blaster.....	\$ 37.41	17.80
Brakemen, Trackmen, Groutman, Laborers,		

Outside Lock Tender, Gauge Tenders.....	\$ 37.22	17.80
Change House Attendants, Powder Watchmen, Top on Iron Bolts.....	\$ 35.35	17.80
Mucking Machine Operator...	\$ 37.97	17.80

a. PAID HOLIDAYS: On tunnel work only: 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.

PAIN0011-003 06/01/2014

	Rates	Fringes
Painters: (BRIDGE CONSTRUCTION)		
Brush, Roller, Blasting (Sand, Water, etc.) Spray...	\$ 45.10	18.55

PAIN0011-004 06/01/2014

	Rates	Fringes
Painters:		
Blast and Spray.....	\$ 34.02	18.55
Brush and Roll.....	\$ 31.02	18.55
Tanks, Towers, Swing.....	\$ 33.02	18.55

TEAM0064-005 04/06/2014

	Rates	Fringes
Truck drivers:		
2 Axle Ready Mix.....	\$ 28.43	19.14
2 Axle.....	\$ 28.33	19.14
3 Axle Ready Mix.....	\$ 28.48	19.14
3 Axle.....	\$ 28.43	19.14
4 Axle Ready Mix.....	\$ 28.58	19.14
4 Axle.....	\$ 28.53	19.14
Heavy Duty Trailer 40 tons and over.....	\$ 28.78	19.14
Heavy Duty Trailer up to 40 tons.....	\$ 28.53	19.14
Specialized (Earth moving equipment other than conventional type on-the- road trucks and semi- trailers, including Euclids).....	\$ 28.58	19.14

Hazardous waste removal work receives additional \$1.25 per hour.

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.

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

=====

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 clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates

the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

=====

END OF GENERAL DECISION

EXHIBIT G

(state wages will be inserted here)

Project: Proposed Intersection Improvements On Griswold Street At House Street And Harris Street

**Minimum Rates and Classifications
for Heavy/Highway Construction**

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

ID#: H 20410

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

Project Number:

Project Town: Glastonbury

FAP Number:

State Number:

Project: Proposed Intersection Improvements On Griswold Street At House Street And Harris Street

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	28.34
---	-------	-------

2) Carpenters, Piledrivermen	31.00	22.50
------------------------------	-------	-------

As of:

Friday, March 27, 2015

Project: Proposed Intersection Improvements On Griswold Street At House Street And Harris Street

2a) Diver Tenders	31.00	22.50
-------------------	-------	-------

3) Divers	39.46	22.50
-----------	-------	-------

4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	45.10	18.55
--	-------	-------

4a) Painters: Brush and Roller	31.02	18.55
--------------------------------	-------	-------

4b) Painters: Spray Only	34.02	18.55
--------------------------	-------	-------

4c) Painters: Steel Only	33.02	18.55
--------------------------	-------	-------

4d) Painters: Blast and Spray	34.02	18.55
-------------------------------	-------	-------

As of:

Friday, March 27, 2015

Project: Proposed Intersection Improvements On Griswold Street At House Street And Harris Street

4e) Painters: Tanks, Tower and Swing 33.02 18.55

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) 38.10 22.72 + 3% of gross wage

6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection 34.47 29.74 + 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) 40.31 26.82

---LABORERS----

8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist 27.05 17.80

9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen, air tool operator 27.30 17.80

Project: Proposed Intersection Improvements On Griswold Street At House Street And Harris Street

10) Group 3: Pipelayers 27.55 17.80

11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders 27.55 17.80
(cement/concrete), catch basin builders, asphalt rakers, air track operators, block
pavers and curb setters

12) Group 5: Toxic waste removal (non-mechanical systems) 29.05 17.80

13) Group 6: Blasters 28.80 17.80

Group 7: Asbestos Removal, non-mechanical systems (does not include 28.05 17.80
leaded joint pipe)

Group 8: Traffic control signalmen 16.00 17.80

---LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and
Liner Plate Tunnels in Free Air.----

As of:

Friday, March 27, 2015

Project: Proposed Intersection Improvements On Griswold Street At House Street And Harris Street

13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	31.28	17.80 + a
---	-------	-----------

13b) Brakemen, Trackmen	30.37	17.80 + a
-------------------------	-------	-----------

---CLEANING, CONCRETE AND CAULKING TUNNEL---

14) Concrete Workers, Form Movers, and Strippers	30.37	17.80 + a
--	-------	-----------

15) Form Erectors	30.68	17.80 + a
-------------------	-------	-----------

---ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL
IN FREE AIR:---

16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	30.37	17.80 + a
---	-------	-----------

As of:

Friday, March 27, 2015

Project: Proposed Intersection Improvements On Griswold Street At House Street And Harris Street

17) Laborers Topside, Cage Tenders, Bellman 30.26 17.80 + a

18) Miners 31.28 17.80 + a

---TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED
AIR: ----

18a) Blaster 37.41 17.80 + a

19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge
Tenders 37.22 17.80 + a

20) Change House Attendants, Powder Watchmen, Top on Iron Bolts 35.35 17.80 + a

21) Mucking Machine Operator 37.97 17.80 + a

As of:

Friday, March 27, 2015

Project: Proposed Intersection Improvements On Griswold Street At House Street And Harris Street

---TRUCK DRIVERS---(*see note below)

Two axle trucks	28.33	19.14 + a
-----------------	-------	-----------

Three axle trucks; two axle ready mix	28.43	19.14 + a
---------------------------------------	-------	-----------

Three axle ready mix	28.48	19.14 + a
----------------------	-------	-----------

Four axle trucks, heavy duty trailer (up to 40 tons)	28.53	19.14 + a
--	-------	-----------

Four axle ready-mix	28.58	19.14 + a
---------------------	-------	-----------

Heavy duty trailer (40 tons and over)	28.78	19.14 + a
---------------------------------------	-------	-----------

As of:

Friday, March 27, 2015

Project: Proposed Intersection Improvements On Griswold Street At House Street And Harris Street

Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	28.58	19.14 + a
---	-------	-----------

---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)	36.80	22.30 + a
---	-------	-----------

Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 cubic yards; Piledriver (\$3.00 premium when operator controls hammer); Bauer Drill/Caisson. (Trade License Required)	36.48	22.30 + 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)	35.74	22.30 + a
---	-------	-----------

Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper)	35.35	22.30 + a
---	-------	-----------

Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell)	34.76	22.30 + a
--	-------	-----------

Project: Proposed Intersection Improvements On Griswold Street At House Street And Harris Street

Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller. 34.76 22.30 + a

Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer). 34.45 22.30 + 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). 34.11 22.30 + a

Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine. 33.71 22.30 + 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). 33.28 22.30 + a

Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc. 31.24 22.30 + a

Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment. 31.24 22.30 + a

As of:

Friday, March 27, 2015

Project: Proposed Intersection Improvements On Griswold Street At House Street And Harris Street

Group 12: Wellpoint Operator. 31.18 22.30 + a

Group 13: Compressor Battery Operator. 30.60 22.30 + a

Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain). 29.46 22.30 + a

Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator. 29.05 22.30 + a

Group 16: Maintenance Engineer/Oiler 28.40 22.30 + a

Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator. 32.71 22.30 + a

Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license). 30.29 22.30 + a

As of:

Friday, March 27, 2015

Project: Proposed Intersection Improvements On Griswold Street At House Street And Harris Street

**NOTE: SEE BELOW

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

20) Lineman, Cable Splicer, Technician	45.43	6.25%+19.20
--	-------	-------------

21) Heavy Equipment Operator	40.89	6.25%+17.18
------------------------------	-------	-------------

22) Equipment Operator, Tractor Trailer Driver, Material Men	38.62	6.25%+16.68
--	-------	-------------

23) Driver Groundmen	24.99	6.25%+10.87
----------------------	-------	-------------

23a) Truck Driver	34.07	6.25%+15.41
-------------------	-------	-------------

As of:

Friday, March 27, 2015

Project: Proposed Intersection Improvements On Griswold Street At House Street And Harris Street

---LINE CONSTRUCTION---

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
--	-------	--------------

Project: Proposed Intersection Improvements On Griswold Street At House Street And Harris Street

Welders: Rate for craft to which welding is incidental.

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

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

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra \$1.00 premium in addition to the hourly wage rate and benefit contributions:

1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)

2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson

3) Cranes (under 100 ton rated capacity)

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

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

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

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

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

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

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

~~Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work ~~

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

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

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

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol.

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

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

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

As of:

Friday, March 27, 2015

Project: Proposed Intersection Improvements On Griswold Street At House Street And Harris Street

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:


Friday, March 27, 2015

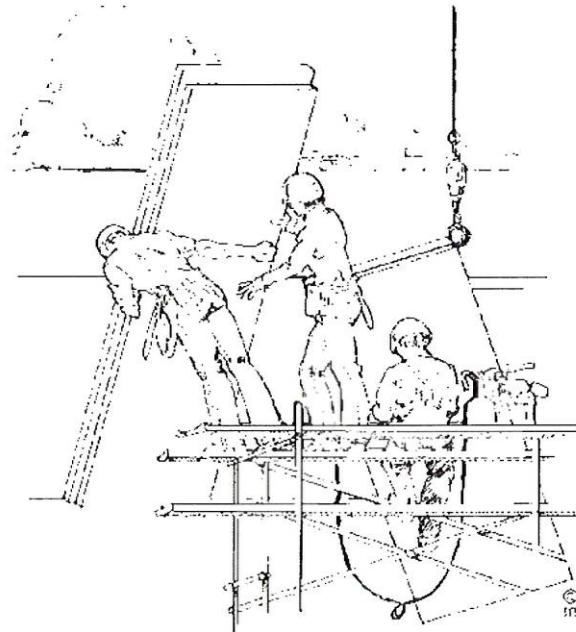
~NOTICE~

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
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: _____

Statute 31-55a

Last Updated: April 22, 2010

You are here: [DOL Web Site](#) » [Wage and Workplace Standards](#) » 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.

←-- [Workplace Laws](#)

Published by the Connecticut Department of Labor, Project Management Office

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.

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.

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, Plasters, Stone Masons
(Building Construction)
(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.

Bricklayer (Residential- Fairfield County)

- a. Paid Holiday: If an employee works on Christmas Eve until noon he shall be paid for 8 hours.

Electricians

Fairfield County: West of the Five Mile River in Norwalk

- a. \$2.00 per hour not to exceed \$14.00 per day.

Elevator Constructors: Mechanics

- a. Paid Holidays: New Year’s Day, Memorial Day, Independence Day, Labor 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 workdays 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 workday preceding the holiday or the regular workday 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.

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 Insulator

- Handle, install, apply, fabricate, distribute, prepare, alter, repair, or dismantle heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.

Carpenter

- Assembly and installation of modular furniture/furniture systems.
[New] a. Free-standing furniture is not covered. This includes: 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.
- Applies fire stopping materials on fire resistive joint systems only.
- Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings.
- Installation of curtain/window walls only where attached to wood or metal studs.

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 (Revised)

- 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.

Electrician

- Installation or maintenance of telecommunication, LAN wiring or computer equipment.
- Low voltage wiring.

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

- Installs light metal sash, head sills, and 2-story aluminum storefronts.
- Installation of aluminum window walls and curtain walls is the "joint work" of the Glaziers and Ironworkers classification which requires either a blended rate or equal composite workforce.

Ironworkers

- Handling, sorting, and installation of reinforcing steel (rebar).
- Installation of aluminum window walls and curtain walls is the "joint work" of the Glaziers and Ironworkers classification which requires either a blended rate or equal composite workforce. Insulated metal and insulated composite panels are still installed by the Ironworker.
- Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation.

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.

Lead Paint Removal

- Painter 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 Rate
 1. Removal of lead paint from any surface NOT to be repainted.
 2. Where removal is on a *TOTAL* Demolition project only.

Roofers


- Preparation of surface, tear-off and/or removal of any type of roofing, and/or clean-up of any areas where a roof is to be relaid.

Sheet Metal Worker

- 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.

Truck Drivers

- Truck Drivers delivering asphalt are covered under prevailing wage while on the site and directly involved in the paving operation.
- 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 the Contract Compliance Unit, Wage and Workplace Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd, Wethersfield, CT 06 109 at (860) 263-6543.

**ATTACHMENT C:
DBE CONTRACT PROVISIONS**

SPECIAL PROVISION
DISADVANTAGED BUSINESS ENTERPRISES
AS SUBCONTRACTORS AND MATERIAL SUPPLIERS OR
MANUFACTURERS
FOR FEDERALLY FUNDED PROJECTS

January 2013

I. ABBREVIATIONS AND DEFINITIONS AS USED IN THIS SPECIAL PROVISION

A. *CTDOT* means the Connecticut Department of Transportation.

B. *USDOT* means the U.S. Department of Transportation, including the Office of the Secretary, the Federal Highway Administration ("FHWA"), the Federal Transit Administration ("FTA"), and the Federal Aviation Administration ("FAA").

C. *Broker* means a party acting as an agent for others in negotiating Contracts, Agreements, purchases, sales, etc., in return for a fee or commission.

D. *Contract, Agreement or Subcontract* means a legally binding relationship obligating a seller to furnish supplies or services (including but not limited to, construction and professional services) and the buyer to pay for them. For the purposes of this provision, a lease for equipment or products is also considered to be a Contract.

E. *Contractor* means a consultant, second party or any other entity under Contract to do business with CTDOT or, as the context may require, with another Contractor.

F. *Disadvantaged Business Enterprise ("DBE")* means a for profit small business concern:

1. That is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51 percent of the stock is owned by one or more such individuals; and
2. Whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it; and
3. Certified by CTDOT under Title 49 of the Code of Federal Regulations, Part 26, (Title 49 CFR Part 23 of the Code of Federal Regulations for Participation of Disadvantaged Business Enterprise in Airport Concessions)

G. *USDOT-assisted Contract* means any Contract between CTDOT and a Contractor (at any tier) funded in whole or in part with USDOT financial assistance.

H. *Good Faith Efforts ("GFE")* means all necessary and reasonable steps to achieve a DBE goal or other requirement which by their scope, intensity, and appropriateness to the objective, can reasonably be expected to fulfill the program requirement.

I. *Small Business Concern* means, with respect to firms seeking to participate as DBEs in USDOT-assisted Contracts, a small business concern as defined pursuant to Section 3 of the Small Business Act and Small Business Administration (“SBA”) regulations implementing it (13 CFR Part 121) that also does not exceed the cap on average annual gross receipts in 49 CFR Part 26, Section 26.65(b).

J. *Socially and Economically Disadvantaged Individual* means any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who is:

1. Any individual who CTDOT finds, on a case-by-case basis, to be a socially and economically disadvantaged individual.
2. Any individuals in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged:
 - “Black Americans”, which includes persons having origins in any of the Black racial groups of Africa;
 - “Hispanic Americans”, which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;
 - “Native Americans”, which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians.
 - “Asian-Pacific Americans”, which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kiribati, Juvalu, Nauru, or Federated States of Micronesia;
 - “Subcontinent Asian Americans”, which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;
 - Women;
 - Any additional groups whose members are designated as socially and economically disadvantaged by the SBA, at such time as the SBA designation becomes effective.

K. *Commercially Useful Function (“CUF”)* means the DBE is responsible for the execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved with its own forces and equipment. The DBE must be responsible for procuring, determining quantity, negotiating price, determining quality and paying for all materials (where applicable) associated with their work. The DBE must also perform at least 30% of the total cost of its contract with its own workforce.

II. ADMINISTRATIVE REQUIREMENTS

A. General Requirements

A DBE goal percentage equaling 10 percent (%) of the Contract value has been established for this Contract. This DBE goal percentage will be applied to the final Contract value to ultimately determine the required DBE goal. If additional work is required, DBE firms should be provided the appropriate opportunities to achieve the required DBE goal.

In order to receive credit toward the Contract DBE goal, the firms utilized as DBE subcontractors or suppliers must be certified as DBEs in the type of work to be counted for credit by CTDOT's Office of Contract Compliance prior to the date of the execution of the subcontract. Neither CTDOT nor the State of Connecticut's Unified Certification Program (UCP) makes any representation as to any DBE's technical or financial ability to perform the work. Prime contractors are solely responsible for performing due diligence in hiring DBE subcontractors.

All DBEs shall perform a CUF for the work that is assigned to them. The Contractor shall monitor and ensure that the DBE is in compliance with this requirement. The Connecticut DBE UPC Directory of certified firms can be found on the CTDOT website <http://www.ct.gov/dot>. The directory lists certified DBE firms with a description of services that they are certified to perform. Only work identified in this listing may be counted towards the project's DBE goal. A DBE firm may request to have services added at any time by contacting CTDOT's Office of Contract Compliance. No credit shall be counted for any DBE firm found not to be performing a CUF.

Once a Contract is awarded, all DBEs that were listed on the pre-award DBE commitment document must be utilized. The Contractor is obligated to provide the value and items of the work originally established in the pre-award documentation to the DBE firms listed in the pre-award documentation. Any modifications to the pre-award commitment must follow the procedure established in Section II-C.

The Contractor shall designate a liaison officer who will administer the Contractor's DBE program. Upon execution of this Contract, the name of the liaison officer shall be furnished in writing to CTDOT's unit administering the Contract, CTDOT's Office of Contract Compliance and CTDOT's Office of Construction ("OOC"). Contact information for the designated liaison officer shall be furnished no later than the scheduled date for the pre-construction meeting.

The Contractor shall submit a bi-monthly report to the appropriate CTDOT unit administering the Contract. This report shall indicate what work has been performed to date, with the dollars paid and percentage of DBE goal completed.

Verified payments made to DBEs shall be included in this bi-monthly report. A sample form is included on the CTDOT website.

In addition, the report shall include:

1. A projected time frame of when the remaining work is to be completed for each DBE.
2. A statement by the Contractor either confirming that the approved DBEs are on schedule to meet the Contract goal, or that the Contractor is actively pursuing a GFE.
3. If retainage is specified in the Contract specifications, then a statement of certification that the subcontractors' retainage is being released in accordance with 1.08.01 (Revised or supplemented).

Failure by the Contractor to provide the required reports may result in CTDOT withholding an amount equal to one percent (1%) of the monthly estimate until the required documentation is received.

The Contractor shall receive DBE credit when a DBE, or any combination of DBEs, perform work under the Contract in accordance with this specification.

Only work actually performed by and/or services provided by DBEs which are certified for such work and/or services, as verified by CTDOT, can be counted toward the DBE goal. Supplies and equipment a DBE purchases or leases from the Contractor or its affiliate cannot be counted toward the goal.

Monitoring of the CUF will occur by CTDOT throughout the life of the project. If it is unclear that the DBE is performing the work specified in its subcontract with the prime Contractor, further review may be required. If it is determined that the DBE is not performing a CUF, then the work performed by that DBE will not be counted towards the DBE goal percentage.

B. Subcontract Requirements

The Contractor shall submit to CTDOT's OOC all requests for subcontractor approvals on the standard CLA-12 forms provided by CTDOT. The dollar amount and items of work identified on the CLA-12 form must, at minimum, equal the dollar value submitted in the pre-award commitment. CLA-12 forms can be found at <http://www.ct.gov/dot/construction> under the "Subcontractor Approval" section. All DBE subcontractors must be identified on the CLA-12 form, regardless of whether they are being utilized to meet a Contract goal percentage. A copy of the legal Contract between the Contractor and the DBE subcontractor/supplier, a copy of the Title VI Contractor Assurances and a copy of the Required Contract Provision for Federal Aid Construction Contracts (Form FHWA-1273) (Federal Highway Administration projects only) must be submitted along with a request for subcontractor approval. These attachments cannot be substituted by reference.

If retainage is specified in the Contract specifications, then the subcontract agreement must contain a prompt payment mechanism that acts in accordance with Article 1.08.01 (Revised or supplemented).

If the Contract specifications do not contain a retainage clause, the Contractor shall not include a retainage clause in any subcontract agreement, and in this case, if a Contractor does include a retainage clause, it shall be deemed unenforceable.

In addition, the following documents are to be included with the CLA-12, if applicable:

- An explanation indicating who will purchase material.
- A statement explaining any method or arrangement for utilization of the Contractor's equipment.

The subcontract must show items of work to be performed, unit prices and, if a partial item, the work involved by all parties. If the subcontract items of work or unit prices are modified, the procedure established in Section II-C must be followed.

Should a DBE subcontractor further sublet items of work assigned to it, only lower tier subcontractors who are certified as a DBE firm will be counted toward the DBE goal. If the lower tier subcontractor is a non-DBE firm, the value of the work performed by that firm will not be counted as credit toward the DBE goal.

The use of joint checks between a DBE firm and the Contractor is acceptable, provided that written approval is received from the OOC prior to the issuance of any joint check. Should it

become necessary to issue a joint check between the DBE firm and the Contractor to purchase materials, the DBE firm must be responsible for negotiating the cost, determining the quality and quantity, ordering the material and installing (where applicable), and administering the payment to the supplier. The Contractor should not make payment directly to suppliers.

Each subcontract the Contractor signs with a subcontractor must contain the following assurance:

“The subcontractor/supplier/manufacturer shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor/subcontractor/supplier/manufacturer to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.”

C. Modification to Pre-Award Commitment

Contractors may not terminate for convenience any DBE subcontractor or supplier that was listed on the pre-award DBE commitment without prior written approval of the OOC. This includes, but is not limited to, instances in which a Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm. Prior to approval, the Contractor must demonstrate to the satisfaction of the OOC, that it has good cause, as found in 49CFR Part 26.53 (f)(3), for termination of the DBE firm.

Before transmitting its request for approval to terminate pre-award DBE firms to the OOC, the Contractor must give written notice to the DBE subcontractor and include a copy to the OOC of its notice to terminate and/or substitute, and the reason for the notice.

The Contractor must provide five (5) days for the affected DBE firm to respond. This affords the DBE firm the opportunity to advise the OOC and the Contractor of any reasons why it objects to the termination of its subcontract and why the OOC should not approve the Contractor's action.

Once the Contract is awarded, should there be any amendments or modifications of the approved pre-award DBE submission other than termination of a DBE firm, the Contractor shall follow the procedure below that best meets the criteria associated with the reason for modification:

1. If the change is due to a scope of work revision or non-routine quantity revision by CTDOT, the Contractor must notify CTDOT's OOC in writing or via electronic mail that their DBE participation on the project may be impacted as soon as they are aware of the change. In this case, a release of work from the DBE firm may not be required; however the Contractor must concurrently notify the DBE firm in writing, and copy the OOC for inclusion in the project DBE file. This does not relieve the Contractor of its obligation to meet the Contract specified DBE goal, or of any other responsibility found in this specification.
2. If the change is due to a factor other than a CTDOT directive, a request for approval in writing or via electronic mail of the modification from the OOC must be submitted, along with an explanation of the change(s), prior to the commencement of work. The Contractor must also obtain a letter of release from the originally named DBE indicating their concurrence with the change, and the reason(s) for their inability to perform the work. In the event a release cannot be obtained, the Contractor must document all efforts made to obtain it.

3. In the event a DBE firm that was listed in the pre-award documents is **unable or unwilling** to perform the work assigned, the Contractor shall:
 - Notify the OOC Division Chief immediately and make efforts to obtain a release of work from the firm.
 - Submit documentation that will provide a basis for the change to the OOC for review and approval prior to the implementation of the change.
 - Use the DBE Directory to identify and contact firms certified to perform the type of work that was assigned to the unable or unwilling DBE firm. The Contractor should also contact CTDOT's Office of Contract Compliance for assistance in locating additional DBE firms to the extent needed to meet the contract goal.

Should a DBE subcontractor be terminated or fail to complete work on the Contract for any reason, the Contractor must make a GFE to find another DBE subcontractor to substitute for the original DBE. The DBE replacement shall be given every opportunity to perform at least the same amount of work under the Contract as the original DBE subcontractor.

If the Contractor is unable to find a DBE replacement:

- The Contractor should identify other contracting opportunities and solicit DBE firms in an effort to meet the Contract DBE goal requirement, if necessary, and provide documentation to support a GFE. (Refer to GFE in Section III.)
- The Contractor must demonstrate that the originally named DBE, who is unable or unwilling to perform the work assigned, is in default of its subcontract, or identify other issues that affected the DBE firm's ability to perform the assigned work. **The Contractor's ability to negotiate a more advantageous agreement with another subcontractor is not a valid basis for change.**

III. GOOD FAITH EFFORTS

The DBE goal is **NOT** reduced or waived for projects where the Contractor receives a Pre-Award GFE determination from the Office of Contract Compliance prior to the award of the Contract. It remains the responsibility of the Contractor to make a continuing GFE to achieve the specified Contract DBE goal. The Contractor shall pursue every available opportunity to obtain additional DBE firms and document all efforts made in such attempts.

At the completion of all Contract work, the Contractor shall submit a final report to CTDOT's unit administering the Contract indicating the work done by and the dollars paid to DBEs. Only verified payments made to DBEs performing a CUF will be counted towards the Contract goal.

Goal attainment is based on the total Contract value, which includes all construction orders created during the Contract. If the Contractor does not achieve the specified Contract goal for DBE participation or has not provided the value of work to the DBE firms originally committed to in the pre-award submission, the Contractor shall submit documentation to CTDOT's unit administering the Contract detailing the GFE made during the performance of the Contract to satisfy the goal.

A GFE should consist of the following, where applicable (CTDOT reserves the right to request additional information):

1. A detailed statement of the efforts made to replace an unable or unwilling DBE firm, and a description of any additional subcontracting opportunities that were identified and offered to DBE firms in order to increase the likelihood of achieving the stated goal.
2. A detailed statement, including documentation of the efforts made to contact and solicit bids from certified DBEs, including the names, addresses, and telephone numbers of each DBE firm contacted; the date of contact and a description of the information provided to each DBE regarding the scope of services and anticipated time schedule of work items proposed to be subcontracted and the response from firms contacted.
3. Provide a detailed explanation for each DBE that submitted a subcontract proposal which the Contractor considered to be unacceptable stating the reason(s) for this conclusion.
4. Provide documentation, if any, to support contacts made with CTDOT requesting assistance in satisfying the specified Contract goal.
5. Provide documentation of all other efforts undertaken by the Contractor to meet the defined goal. Additional documentation of efforts made to obtain DBE firms may include but will not be limited to:
 - Negotiations held in good faith with interested DBE firms, not rejecting them without sound reasons.
 - Written notice provided to a reasonable number of specific DBE firms in sufficient time to allow effective participation.
 - Those portions of work that could be performed by readily available DBE firms.

In instances where the Contractor can adequately document or substantiate its GFE and compliance with other DBE Program requirements, the Contractor will have satisfied the DBE requirement and no administrative remedies will be imposed.

IV. PROJECT COMPLETION

At the completion of all Contract work, the Contractor shall:

1. Submit a final report to CTDOT's unit administering the Contract indicating the work done by, and the dollars paid to DBEs.
2. Submit verified payments made to all DBE subcontractors for the work that was completed.
3. Submit documentation detailing any changes to the DBE pre-award subcontractors that have not met the original DBE pre-award commitment, including copies of the Department's approvals of those changes.

4. Retain all records for a period of three (3) years following acceptance by CTDOT of the Contract and those records shall be available at reasonable times and places for inspection by authorized representatives of CTDOT and Federal agencies. If any litigation, claim, or audit is started before the expiration of the three (3) year period, the records shall be retained until all litigation, claims, or audit findings involving the records are resolved.

If the Contractor does not achieve the specified Contract goal for DBE participation in addition to meeting the dollar value committed to the DBE subcontractors identified in the pre-award commitment, the Contractor shall submit documentation to CTDOT's unit administering the Contract detailing the GFE made during the performance of the Contract to satisfy the goal.

V. SHORTFALLS

A. Failure to meet DBE goals

As specified in (II-A) above, attainment of the Contract DBE goal is based on the final Contract value. The Contractor is expected to achieve the amount of DBE participation originally committed to at the time of award; however, additional efforts must be made to provide opportunities to DBE firms in the event a Contract's original value is increased during the life of the Contract.

The Contractor is expected to utilize the DBE subcontractors originally committed in the DBE pre-award documentation for the work and dollar value that was originally assigned.

If a DBE is terminated or is unable or unwilling to complete its work on a Contract, the Contractor shall make a GFE to replace that DBE with another certified DBE to meet the Contract goal.

The Contractor shall immediately notify the OOC of the DBE's inability or unwillingness to perform, and provide reasonable documentation and make efforts to obtain a release of work from the firm.

If the Contractor is unable to find a DBE replacement, then the Contractor should identify other contracting opportunities and solicit DBE firms in an effort to meet the Contract DBE goal requirement, if necessary, and provide documentation to support a GFE.

When a DBE is unable or unwilling to perform, or is terminated for just cause, the Contractor shall make a GFE to find other DBE opportunities to increase DBE participation to the extent necessary to at least satisfy the Contract goal.

For any DBE pre-award subcontractor that has been released appropriately from the project, no remedy will be assessed, provided that the Contractor has met the criteria described in Section II-C.

B. Administrative Remedies for Non-Compliance:

In cases where the Contractor has failed to meet the Contract specified DBE goal or the DBE pre-award commitment, and where no GFE has been demonstrated, then one or more of the following administrative remedies will be applied:

1. A reduction in Contract payments to the Contractor as determined by CTDOT, not to exceed the shortfall amount of the **DBE goal**. The maximum shortfall will be calculated by multiplying the Contract DBE goal (adjusted by any applicable GFE) by the final Contract value, and subtracting any verified final payments made to DBE firms by the Contractor.
2. A reduction in Contract payments to the Contractor determined by CTDOT, not to exceed the shortfall amount of the **pre-award commitment**. The maximum shortfall will be calculated by subtracting any verified final payments made by the Contractor to each DBE subcontractor from the amount originally committed to that subcontractor in the pre-award commitment.
3. A reduction in Contract payments to the Contractor determined by CTDOT for any pre-award DBE subcontractor who has not obtained the dollar value of work identified in the DBE pre-award commitment and has not followed the requirements of Section II-C or for any DBE firm submitted for DBE credit that has not performed a CUF.
4. The Contractor being required to submit a written DBE Program Corrective Action Plan to CTDOT for review and approval, which is aimed at ensuring compliance on future projects.
5. The Contractor being required to attend a Non-Responsibility Meeting on the next contract where it is the apparent low bidder.
6. The Contractor being suspended from bidding on contracts for a period not to exceed six (6) months.

VI. CLASSIFICATIONS OTHER THAN SUBCONTRACTORS

A. Material Manufacturers

Credit for DBE manufacturers is 100% of the value of the manufactured product. A manufacturer is a firm that operates or maintains a factory or establishment that produces on the premises the materials or supplies obtained by the Contractor.

If the Contractor elects to utilize a DBE manufacturer to satisfy a portion of, or the entire specified DBE goal, the Contractor must provide the OOC with:

- Subcontractor Approval Form (CLA-12) indicating the firm designation,
- An executed "Affidavit for the Utilization of Material Suppliers or Manufacturers" (sample attached), and
- Substantiation of payments made to the supplier or manufacturer for materials used on the project.

B. Material Suppliers (Dealers)

Credit for DBE dealers/suppliers is limited to 60% of the value of the material to be supplied, provided such material is obtained from an approved DBE dealer/supplier.

In order for a firm to be considered a regular dealer, the firm must own, operate, or maintain a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. At least one of the following criteria must apply:

- To be a regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question.
- A person may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating or maintaining a place of business if the person both owns and operates distribution equipment for the products. Any supplementing of the regular dealers' own distribution equipment shall be by long term lease agreement, and not on an ad hoc or contract to contract basis.
- Packers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not regular dealers within the meaning of this paragraph.

If the Contractor elects to utilize a DBE supplier to satisfy a portion or the entire specified DBE goal, the Contractor must provide the OOC with:

- Subcontractor Approval Form (CLA-12) indicating the firm designation,
- An executed "Affidavit for the Utilization of Material Suppliers or Manufacturers" (sample attached), and
- Substantiation of payments made to the supplier or manufacturer for materials used on the project.

C. Brokering

- Brokering of work for DBE firms who have been listed by the Department as certified brokers is allowed. Credit for those firms shall be applied following the procedures in Section VI-D.
- Brokering of work by DBEs who have been approved to perform subcontract work with their own workforce and equipment is not allowed, and is a Contract violation.
- Firms involved in the brokering of work, whether they are DBEs and/or majority firms who engage in willful falsification, distortion or misrepresentation with respect to any facts related to the project shall be referred to the U.S. DOT, Office of the Inspector General for prosecution under Title 18, U.S. Code, Part I, Chapter 47, Section 1020.

D. Non-Manufacturing or Non-Supplier DBE Credit

Contractors may count towards their DBE goals the following expenditures with DBEs that are not manufacturers or suppliers:

- Reasonable fees or commissions charged for providing a bona fide service such as professional, technical, consultant or managerial services and assistance in the procurement of essential personnel, facilities, equipment materials or supplies necessary for the

performance of the Contract, provided that the fee or commission is determined by the OOC to be reasonable and consistent with fees customarily allowed for similar services.

- The fees charged only for delivery of materials and supplies required on a job site when the hauler, trucker, or delivery service is a DBE, and not the manufacturer, or regular dealer of the materials and supplies, and provided that the fees are determined by the OOC to be reasonable and not excessive as compared with fees customarily allowed for similar services.
- The fees or commissions charged for providing bonds or insurance specifically required for the performance of the Contract, provided that the fees or commissions are determined by CTDOT to be reasonable and not excessive as compared with fees customarily allowed for similar services.

E. Trucking

While technically still considered a subcontractor, the rules for counting credit for DBE trucking firms are as follows:

- The DBE must own and operate at least one fully licensed, insured, and operational truck used on the Contract.
- The DBE receives credit for the total value of the transportation services it provides on the Contract using trucks it owns, insures and operates using drivers it employs.
- The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the Contract.
- The DBE may lease trucks from a non-DBE firm; however the DBE may only receive credit for any fees or commissions received for arranging transportation services provided by the non-DBE firms. Additionally, the DBE firm must demonstrate that they are in full control of the trucking operation for which they are seeking credit.

VII. Suspected DBE Fraud

In appropriate cases, CTDOT will bring to the attention of the USDOT any appearance of false, fraudulent, or dishonest conduct in connection with the DBE program, so that USDOT can take the steps, e.g. referral to the Department of Justice for criminal prosecution, referral to USDOT Inspector General, action under suspension and debarment or Program Fraud and Civil Penalties rules provided in 49 CFR Part 31.

**CONNECTICUT DEPARTMENT OF TRANSPORTATION
(OFFICE OF CONSTRUCTION)
BUREAU OF ENGINEERING AND CONSTRUCTION**

This affidavit must be completed by the State Contractor's DBE notarized and attached to the contractor's request to utilize a DBE supplier or manufacturer as a credit towards its DBE contract requirements; failure to do so will result in not receiving credit towards the contract DBE requirement.

State Contract No. _____

Federal Aid Project No. _____

Description of Project _____

I, _____, acting in behalf of _____,
(Name of person signing Affidavit) (DBE person, firm, association or corporation)

of which I am the _____ certify and affirm that _____
(Title of Person) (DBE person, firm, association or corporation)

is a certified Connecticut Department of Transportation DBE. I further certify and affirm that I have read and understand 49 CFR, Sec. 26.55(e)(2), as the same may be revised.

I further certify and affirm that _____ will assume the actual and
(DBE person, firm, association or Corporation)
for the provision of the materials and/or supplies sought by _____.

If a manufacturer, I operate or maintain a factory or establishment that produces, on the premises, the materials, supplies, articles or equipment required under the contract an of the general character described by the specifications.

If a supplier, I perform a commercially useful function in the supply process. As a regular dealer, I, at a minimum, own and operate the distribution equipment for bulk items. Any supplementing of my distribution equipment shall be by long-term lease agreement, and not on an ad hoc or contract-by-contract basis.

I understand that false statements made herein are punishable by Law (Sec. 53a-157), CGS, as revised).

(Name of Corporation or Firm) _____

(Signature & Title of Official making the Affidavit) _____

Subscribed and sworn to before me, this ____ day of _____ 20 ____.

Notary Public (Commissioner of the Superior Court)

My Commission Expires _____

CERTIFICATE OF CORPORATION

I, _____, certify that I am the _____
(Official) (President)

of the Corporation named in the foregoing instrument; that I have been duly authorized to affix the seal of the Corporation to such papers as require the seal; that _____, who signed said instrument on behalf of the Corporation, was then of said corporation; that said instrument was duly signed for and in behalf of said Corporation by authority of its governing body and is within the scope of its corporation powers.

(Signature of Person Certifying)

(Date)

**ATTACHMENT D:
CONSTRUCTION PLANS**