

TABLE OF CONTENTS OF SPECIAL PROVISIONS

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

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FEBRUARY 13, 2013

STATE PROJECT NO. 173-402

STATE PROJECT NO. 173-404

STATE PROJECT NO. 173-412 (FEDERAL AID PROJECT NO. 000R(772))

INSTALLATION AND REVISION
OF TRAFFIC CONTROL SIGNALS
IN DISTRICTS 3 & 4

Towns of Bridgeport, Derby, East Haven, Fairfield,
Guilford, Madison, New Canaan, New Haven, North Haven, Norwalk,
Shelton, Stamford, Stratford, Trumbull, West Haven & Westport

The State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004, as revised by the Supplemental Specifications dated July 2012 (otherwise referred to collectively as "ConnDOT Form 816") is hereby made part of this contract, as modified by the Special Provisions contained herein. The State of Connecticut Department of Transportation's "Construction Contract Bidding and Award Manual" ("Manual"), May 14, 2010 edition or latest issue, is hereby made part of this contract. If the provisions of this Manual conflict with provisions of other Department documents (not including statutes or regulations), the provisions of the Manual will govern. The Manual is available upon request from the Transportation Manager of Contracts. The Special Provisions relate in particular to the INSTALLATION AND REVISION OF TRAFFIC CONTROL SIGNALS IN DISTRICTS 3 & 4 in the Towns of Bridgeport, Derby, East Haven, Fairfield, Guilford, Madison, New Canaan, New Haven, North Haven, Norwalk, Shelton, Stamford, Stratford, Trumbull, West Haven & Westport.

COMBINED PROJECTS

There will be but one Contract for State Project No. 173-402, State Project No. 173-404 and State Project No. 173-412 (Federal Aid Project No. 000R(772)). The three projects will be considered as a single contract in all respects

CONTRACT TIME AND LIQUIDATED DAMAGES

For State Project No. 173-402, State Project No. 173-404 and State Project No. 173-412 (Federal Aid Project No. 000R(772)) Four Hundred Forty Four (444) calendar days will be allowed for completion of the work and the liquidated damages charge to apply will be Two Thousand One Hundred Dollars (\$2,100.00) per calendar day.

**NOTICE TO CONTRACTOR - COORDINATION WITH RAILROAD
CONTRACTOR/WORK**

The Contractor is hereby alerted that at the same time to the work being done as part of this contract, work will be performed in the vicinity of the railroad/highway at-grade crossing located on Division Street in Ansonia. This crossing is designated as Crossing #503886N.

The Contractor is to coordinate the work involved with this project with the Metro-North Commuter Railroad Company (Railroad) and/or their subcontractors working in the same area.

No claims shall be allowed by the Contractor by reason of delays caused by railroad traffic operations or by the construction being performed by the Railroad as part of the railroad related items depicted on the project plans.

The State of Connecticut will conduct a pre-construction meeting prior to the start of construction to coordinate the work related with this project.

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 Contractors responsibility to coordinate with the utility company to ensure proper placement of the anchor. The Contractor will also reimburse the utility company the full cost for the installation of the anchor and guy.

This project includes countdown pedestrian signals. The countdown display is allowed only during the flashing don't walk time of the pedestrian movement.

The Controller Unit (CU) shall conform to the 2008-2010 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, www.ct.gov/dot/.

Under Maintenance and Protection of Traffic (M&PT) and Temporary Signalization the Contractor is required to keep in operation the following: all vehicle and pedestrian signals including necessary support structures; all vehicle and pedestrian detection; the pre-emption system; and coordination to the master, if in a system.

Existing or new span poles or 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.

Vehicle detection material such as loop detector sawcut, conduit, and lead-in cables that is damaged during construction shall be repaired or replaced within 24 hours unless the Engineer determines otherwise. Loop detector sawcut, cable, and conduit replacements will be paid for under the applicable contract item, as listed below:

- Trenching and Backfilling
- Conduit
- Loop detector Sawcut
- 2 Conductor No. 14 Cable.

A credit will be deducted from monies due the Contractor for all maintenance calls responded to by Department of Transportation personnel.

See standard, "TR-1111_01, Loop Vehicle Detector and Sawcut", sheet. The saw cut installation procedure has changed. When loops are installed in two or more adjacent lanes, the inside lane loops are set back 1 foot (0.3 m) to allow a straight cut from the corner of the curb.

Special provision for Item # 1111451A – LOOP DETECTOR SAW CUT has been revised to reflect the new requirements for loop sealant.

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 Department of Transportation, Traffic Signal Lab in Rocky Hill.

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

The following notes apply to projects which include Optical or Siren Pre-emption:

- Pre-emption is to operate through the internal pre-emption of the signal controller.
- If not present in a controller cabinet the contractor shall install the following items:
 - Pre-emption disconnect switch.
 - Pre-emption termination panel with “D” harness.
 - Pre-emption test pushbuttons.
- Contractor must provide a chart, or print out of the program steps and settings.
- Detector locations are for illustration only. Exact locations shall be determined by the Manufacturer or his designated representative. Detector cables are to be installed continuous between each detector and the auxiliary equipment cabinet.

Mast arm assemblies and foundations have new specifications and are to be designed based on The AASHTO 2009 Standards. Refer to new Specifications and Typical Detail Sheets.

All Mast Arm mounted signs are to be fixed mounted. Method of mounting must be submitted to the Division of Traffic for approval prior to installation unless otherwise noted.

Prior to the start of fabrication of steel mast arm assemblies, the contractor shall, in the field, verify the location of the foundations, and establish and verify all elevations, dimensions, and longitudinal grades. The contractor shall submit a cross section for each mast arm assembly in accordance with the special provisions of Article 1.05.02, prior to the submission of the shop drawings.

The contractor is advised that signal appurtenances (mast arms, span poles, pedestals and controllers) when in or adjacent to sidewalks, shall be field located to provide a free path of not less than 3 ft. (0.9 meters).

S:\traffic\1406\signal specs\specs\NTC-1 (QC+PA+COUNTDOWN)-rev7-10.doc

NOTICE TO CONTRACTOR - TRAFFIC SIGNALS

This project includes Accessible Pedestrian Signals and Detectors (APS&D) at Int. #015-294, James Street at Lyon Terrace in Bridgeport.

- The APS&D shall comply with the special provision for item #1107011A – Accessible Pedestrian Signal and Detector (Type A).
- The speech walk message is allowed only during the walk time of the pedestrian interval.
- The volume of the locator tone is critical.
- The alignment of the tactile push button is critical.
- The left and right arrows on the tactile push buttons are not interchangeable. When ordering, specify the number of left arrows and/or right arrows, as shown on the traffic signal plan.

NOTICE TO CONTRACTOR - STANDARD SHEETS

The Contractor is hereby notified that Traffic Engineering's Standard Sheets pertaining to the installation of signals, maintenance and operations of traffic signal equipment have been revised.

The contractor should note the significant changes on the following sheets:

TR-1001_01 – hot mix asphalt for trenches

TR-1010_01 – cast iron covers bolts to pick holes, added c-channel to Type II handhole cover,
Added handhole extension for Type II handhole in earth areas.

TR-1107_01 – updated countdown pedestrian sign.

TR-1111_01 – revised saw cut home runs

TR-1113_01 – Control Cable (formerly numbered TR-1101_01)
Added detail for Cable Closure for Traffic Signals

TR-1114_01 – Pole Anchor, “Y” Clamp, Sign Hanger (formerly numbered TR-1107_02)
Included pole anchor from TR-1101_01.

NOTICE TO CONTRACTOR - USE OF STATE POLICE OFFICERS

The Department will reimburse services of State Police Officers as a direct payment to the Department of Public Safety. Payment for State Police Officers utilized by the Contractor for its convenience, not approved by the Engineer, is the responsibility of the Contractor. No separate payment item for State Police Officers is included under this contract.

Use of State Police will be in accordance with the Item No. 0971001A – Maintenance and Protection of Traffic.

NOTICE TO CONTRACTOR - VOLUNTARY PARTNERING

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

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

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

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

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

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

NOTICE TO CONTRACTOR - PROCUREMENT OF MATERIALS

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

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

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

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

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

NOTICE TO CONTRACTOR - GORE AREAS

Gore areas will no longer be available for disposal of surplus material.

NOTICE TO CONTRACTOR - VEHICLE EMISSIONS

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

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

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

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

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

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

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

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

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

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

Sections 4.06 and M.04 have been replaced in their entirety with the Special Provisions included as part of this contract. These Special Provisions reflect changes in mix designations for various types of hot-mix asphalt (HMA). The following table is to be used to associate mix designations noted on the plans with that in the contract specifications and related documents. Mix designations on each row are equivalent and refer to a single mix, which shall be subject to the requirements of the Special Provisions replacing Sections 4.06 and M.04.

Mix Designation Equivalency Table

| Official Mix Designation | Equivalent Mix Designation (a) | Equivalent Mix Designation (b) |
|-------------------------------------|---------------------------------------|---------------------------------------|
| (c) | Superpave 1.5 inch | Superpave 37.5 mm |
| HMA S1 | Superpave 1.0 inch | Superpave 25.0 mm |
| HMA S0.5 | Superpave 0.5 inch | Superpave 12.5 mm |
| HMA S0.375 | Superpave 0.375 inch | Superpave 9.5 mm |
| HMA S0.25 | Superpave 0.25 inch | Superpave 6.25 mm |
| (d) | Superpave #4 | Superpave #4 |
| Bituminous Concrete Class 1 | N/A* | N/A* |
| Bituminous Concrete Class 2 | N/A* | N/A* |
| Bituminous Concrete Class 3 | N/A* | N/A* |
| Bituminous Concrete Class 4 | N/A* | N/A* |
| Bituminous Concrete Class 12 | N/A* | N/A* |

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

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

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

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

* N/A = Not applicable; mix designation has not changed.

NOTICE TO CONTRACTOR - 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. The Superpave Design Levels required for this project are listed in Table 1. The required PG binder is indicated for each mix with an “X” in the appropriate box in Table 1.

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

| Mix Designation | PG Binder | Route 1 | | |
|-----------------|-----------|--------------|--------------|--------------|
| | | Design Level | Design Level | Design Level |
| HMA S0.25 | X | - | - | - |
| HMA S0.375 | X | - | - | - |
| HMA S0.5 | X | 3 | - | - |
| HMA S1 | X | 3 | - | - |

NOTICE TO CONTRACTOR - TRAFFIC DRUMS AND TRAFFIC CONES

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

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

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

NOTICE TO CONTRACTOR - NCHRP 350 REQ. FOR WORK ZONE TRAFFIC CONTROL DEVICES

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

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

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

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

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

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

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

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

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

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

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

SECTION 1.02 - PROPOSAL REQUIREMENTS AND CONDITIONS

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

Replace the third sentence of the last paragraph with:

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

SECTION 1.03 - AWARD AND EXECUTION OF CONTRACT

Article 1.03.07 – Insurance:

The first paragraph is revised as follows:

Before the Contract is executed, the Contractor must file with the Commissioner a certificate of insurance, fully executed by an insurance company or companies satisfactory to the Commissioner, on a form **acceptable to** the Department, for the insurance policy or policies required below, which policy or policies shall be in accordance with the terms of said Certificate of Insurance. Continuance of the required insurance during the entire term of the Contract shall be the responsibility of the Contractor and is a condition of the Contract.

Add the following after the second paragraph:

The Contractor shall produce, within five (5) business days, a copy or copies of all applicable insurance policies when requested by the State. In providing said policies, the Contractor may redact provisions of the policy that are proprietary. This provision shall survive the suspension, expiration or termination of this Contract.

Replace the like named paragraph with the following:

4. Owner’s and Contractor’s Protective Liability Insurance for and in the Name of the State:

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, 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.

Delete subsections 8, 9 and 10 and replace them with the following:

8. Compensation:

There shall be no direct compensation allowed the Contractor on account of any premium or other charge necessary to obtain and keep in effect any insurance or bonds in connection with the Project, but the cost thereof shall be considered included in the general cost of the Project work.

9. Protection and Indemnity Insurance for Marine Construction Operations in Navigable Waters:

If a vessel of any kind will be involved in Project work, the Contractor shall obtain the following additional insurance coverage:

A. Protection and Indemnity Coverage of at least \$300,000 per vessel or equal to at least the value of hull and machinery, whichever is greater.

B. If there is any limitation or exclusion with regard to crew and employees under the protection and indemnity form, the Contractor must obtain and keep in effect throughout the Project a workers' compensation policy, including coverage for operations under admiralty jurisdiction, with a limit of liability of at least \$300,000 per accident or a limit equal to at least the value of the hull and machinery, whichever is greater, or for any amount otherwise required by statute.

SECTION 1.04 - SCOPE OF WORK

Article 1.04.05 – Extra Work:

Add the following after the fourth sentence:

Bonding costs shall not be included in the contractor's compensation request. However, if the contractor incurs or will incur increased bonding costs related to the extra work, the contractor shall request separate compensation for such costs. The contractor's request shall be itemized and include a certified statement from the bonding company stating that the value of the work will require an increase in bonding coverage and shall detail the additional costs (within allowable contract amount limitations). If satisfactory substantiation is provided, a new item for increased bonding costs will be incorporated into the contract by means of a construction order.

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 Equipment – State Signals

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 except for those identified below to the Division of Traffic Engineering 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.

Please mail to:

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
(860) 594-2985

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:

lisa.conroy@ct.gov

Traffic Signal Equipment – Intersection #15-294

For Project No. 173-404, Intersection #15-294 catalog cuts **and coating procedures** are to be sent to the City of Bridgeport with one approved copy sent to the Department.

Please mail to:

Mr. Sadi Wadi
Civil Engineer
City of Bridgeport
45 Lyon Terrace
Engineering Department #216
Bridgeport, CT 06604

Traffic Signal Equipment – Intersection #135-259

For Project No. 173-412, Intersection #135-259 catalog cuts and coating procedures are to be sent to the City of Stamford, with one approved copy sent to the Department.

Please mail to:

Veera Karukonda
Signal Systems Engineer
City of Stamford - Traffic Engineering
888 Washington Blvd., 7th Floor
Stamford, CT 06901
203-977-5675 Tel. (x4004 Fax)

Traffic Signal Equipment – Intersection #92-314

For Project No. 173-402, Intersection #92-314 catalog cuts and mast arm assembly coating procedures are to be sent to the City of New Haven, with one approved copy sent to the Department.

Please mail to:

Richard H. Miller, P.E. L.S., City Engineer
200 Orange Street
New Haven, CT 06510
(203) 946-6417 Tel.
(203) 946-8093 Fax#

Mast Arm Assemblies

Refer to Mast Arm Assembly spec for submittal procedure.

SECTION 1.06 - CONTROL OF MATERIALS

Article 1.06.01 - Source of Supply and Quality:

Add the following:

Traffic Signal Equipment

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.

| | |
|----------------------------------|-----------------------------|
| Steel Span Poles | |
| Steel Mast Arm Assembly | |
| Aluminum Pedestals | |
| Traffic Signals | |
| Flasher Cabinet | |
| LED Traffic Signal Lamp Unit | |
| Pedestrian Signals | |
| Pedestrian Pushbuttons and Signs | |
| Controller | Detector Cable (Optical) |
| Solid State Time Switch | Vehicle Detectors |
| Solid State Load Switch | Loop Sawcut Sealant |
| Conflict Monitor | Time Clock |
| Solid State Flasher | Video Detection |
| Pre-Emption Equipment | Camera Assembly |
| Vehicle Emitter | Camera Extension Bracket |
| Phase Selector | Video Detector Processor |
| Detector (Type) | Camera Cable |
| Pre-Emption System Chassis | Communication Cable |
| | Cable Closure |
| | Auxiliary Equipment Cabinet |
| | Internally Illuminated Sign |

The following additional traffic signal items are required for Project 173-404, Intersection #15-294 – James Street at Lyon Terrace in Bridgeport

Fiber Optic Cable
Ethernet Switch
Fiber Optic Cable Splice Enclosure
Advanced Transportation Controller, Model 2070L

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 Span Poles
- 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.

- Steel Span Poles
- Steel Mast Arm Assembly
- Aluminum Pedestals
- Traffic Signals
- Flasher Cabinet
- LED Traffic Signal Lamp Unit
- Pedestrian Signals
- Pedestrian Pushbuttons and Signs
- Controller
 - Solid State Time Switch
 - Solid State Load Switch
 - Conflict Monitor
 - Solid State Flasher

- Pre-Emption Equipment
 - Vehicle Emitter
 - Phase Selector
 - Detector (Type)
 - Pre-Emption System Chassis

- Detector Cable (Optical)
- Vehicle Detectors
- Loop Sawcut Sealant
- Time Clock
- Video Detection
 - Camera Assembly
 - Camera Extension Bracket
 - Video Detector Processor
 - Camera Cable
- Communication Cable
- Cable Closure
- Auxiliary Equipment Cabinet
- Internally Illuminated Sign

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SECTION 1.07 - LEGAL RELATIONS AND RESPONSIBILITIES

Article 1.07.05 - Load Restrictions:

Delete all three paragraphs and replace them with the following:

“(a) Vehicle Weights: This sub article will apply to travel both on existing pavements and pavements under construction. The Contractor shall comply with all legal load restrictions as to vehicle size, the gross weight of vehicles, and the axle weight of vehicles while hauling materials. Throughout the duration of the contract, the Contractor shall take precautions to ensure existing and newly installed roadway structures and appurtenances are not damaged by construction vehicles or operations.

Unless otherwise noted in contract specifications or plans, on and off road equipment of the Contractor, either loaded or unloaded, will not be allowed to travel across any bridge or on any highway when such a vehicle exceeds the statutory limit or posted limit of such bridge or highway. Should such movement of equipment become necessary the Contractor shall apply for a permit from the Department for such travel, as provided in the Connecticut General Statutes (CGS). The movement of any such vehicles within the project limits or detour routes shall be submitted to the Engineer for project record. Such permit or submittal will not excuse the Contractor from liability for damage to the highway caused by its equipment.

The Contractor is subject to fines, assessments and other penalties that may be levied as a result of violations by its employees or agents of the legal restrictions as to vehicle size and weight.

(b) Storage of Construction Materials/Equipment on Structures: Storage is determined to be non-operating equipment or material. The Contractor shall not exceed the statutory limit or posted limit for either an existing or new structure when storing materials and/or construction equipment. When a structure is not posted, then the maximum weight of equipment or material stored in each 12 foot wide travel lane of any given span shall be limited to 750 pounds per linear foot combined with a 20,000 pound concentrated load located anywhere within the subject lane. If anticipated storage of equipment or material exceeds the above provision, then the Contractor shall submit his proposal of storage supported by calculations stamped by a Professional Engineer registered in the State of Connecticut, to the Engineer for approval 14 days prior to the storage operation. Operations related to structural steel demolition or erection shall follow the guidelines under Section 6.03. All other submittals shall include a detailed description of the material/equipment to be stored, the quantity of storage if it is stockpiled materials, the storage location, gross weight with supporting calculations if applicable, anticipated duration of storage, and any environmental safety, or traffic protection that may be required. Storage location on the structure shall be clearly defined in the field. If structures are in a state of staged construction or demolition, additional structural analysis may be required prior to authorization of storage.”

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

Add the following after the only paragraph:

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

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

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

Mr. Gerard McDonald
District 3 Electrical Supervisor
Department of Transportation
Milford, Connecticut
(203) 878-1869
gerard.mcdonald@ct.gov

City of Bridgeport
Mr. Elton Cereni
U.I.
(203) 926-4428
eltoncereni@uinet.com

Town of Derby
Mr. Dave Gerrish
Comcast
(203) 732-0146

Mr. Tom Judge
U.I.
(203) 926-4772
Thomas.Judge@uinet.com

Town of Guilford
Mr. Tony Sarubbi
CL&P
(203) 245-5412
sarubaj@nu.com

Town of Madison
Mr. Neal Sorensen
CL&P
(203) 245-5416
sorenn@nu.com

AT&T Representative
Mr. Michael Brecher
Southern New England Telephone
(203) 238-5201
mb2738@att.com

Town of New Canaan
Mr. Jeff Baxter
CL&P
(203) 845-3469
baxtejd@nu.com

Town of East Haven
Mr. Cliff Cronan
U.I.
(203) 926-4643
cliffcronan@uinet.com

Town of North Haven
Mr. Elton Cereni
U.I.
(203) 926-4428
eltoncereni@uinet.com

Town of Fairfield
Mr. Elton Cereni
U.I.
(203) 926-4428
eltoncereni@uinet.com

City of Norwalk
Mr. Jeff Baxter
CL&P
(203) 845-3469
baxtejd@nu.com

Town of Shelton

Mr. Elton Cereni
U.I.
(203) 926-4428
eltoncereni@uinet.com

Town of New Haven

Mr. Dominic Yacobino
U.I.
(203) 499-5977

Town of Trumbull

Mr. Elton Cereni
U.I.
(203) 926-4428
eltoncereni@uinet.com

Town of West Haven

Mr. Dominic Yacobino
U.I.
(203) 499-5977

Town of Stratford

Mr. Elton Cereni
U.I.
(203) 926-4428
eltoncereni@uinet.com

Mr. Tom Grillo

SBC East
(203) 383-6617

Mr. Anthony Lewis

CSX Transportation
(315) 777-2196

Town of Westport

Mr. Anthony Capodagli
CL&P
(203) 845-3407
capodaj@nu.com

FOR PROJECT 173-412 – CITY OF STAMFORD – INTERSECTION 135-259 – U.S. ROUTE 1 AT ELM STREET

Article 1.07.13 – Contractor’s Responsibility for Adjacent Property and Services is supplemented as follows:

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

Mr. Louis Casolo
Engineering Bureau Chief/City Engineer/PE
City of Stamford
888 Washington Boulevard-7th Floor
Stamford, CT 06901
Phone: 203-977-5796

**Water Pollution Control Authority
(Stamford)**
1 Harbor View Avenue
Stamford, CT 06902
Phone: 203-977-5809

Mr. Paul Spinelli
Cablevision
Cablevision of Southern Connecticut
28 Cross Street
Norwalk, CT 06851
Phone: 203-750-5629

Mr. Karl Petschauer
Engineering & Construction Manager
CL&P
626 Glenbrook Road
Stamford, CT 06906-1441
Phone: 203-352-5474

Mr. Kenneth Sherman
Associate Telecommunication Spec-Conduit
AT&T
Engineering Department
1441 North Colony Road
Floor 1
Meriden, CT 06450
Phone: 203-238-0020

Mr. Richard Aponte
Project Engineer, Construction
Yankee Gas
11 Harbor Avenue
Norwalk, CT 06850-4203
Phone: 203-451-5311

Mr. James Cassin
Conduit Inspector
AT&T
Phone: 203-213-1247

Mr. John Pernsteins
Project Engineer, Construction
Yankee Gas
11 Harbor Avenue
Norwalk, CT 06850-4203
Phone: 203-854-6458

Mr. Carlos Vizcarrondo
Systems Relocation Coordinator
Aquarion Water Company
600 Lindley Street
Bridgeport, CT 06606
Phone: 203-337-595

SECTION 1.08 - PROSECUTION AND PROGRESS

Replace 1.08.01 – “Transfer of Work or Contract” with the following:

1.08.01—Transfer of Work or Contract: The Contractor shall perform with its own organization Contract work with a value under the Contract of at least 50% of the original total Contract value. If the Contractor sublets, sells, transfers, or otherwise disposes of any part of the Contract work without the Commissioner's prior written consent, the Contractor will not be relieved of any Contractual or other legal responsibility in connection therewith. Such an unauthorized act by the Contractor shall constitute a material breach of the Contract, and the Commissioner may, in such a case, terminate the Contract without further compensation to the Contractor.

The Contractor shall include the following alternative dispute resolution clause in all of its Project subcontracts:

"For any dispute arising out of the agreement between the Contractor and a subcontractor, including claims of late payment or non-payment, which cannot be settled within 60 days of the subcontractor submitting a written claim to the Contractor, either party may bring the dispute before an alternative dispute resolution entity for resolution. If the parties do not agree upon a particular dispute resolution entity for that purpose, the dispute shall be resolved under the auspices and construction arbitration rules of the American Arbitration Association, or under the rules of any other alternative dispute resolution entity approved by the Department either generally or for the specific dispute. The Department may not be made a party to formal arbitration regarding such a dispute. These rights and restrictions may not be waived, and if these provisions are not included in the Contractor's subcontracts for the Project, these provisions shall nonetheless be read into them."

The Contractor shall not knowingly enter into any lower tier transaction on a Department project with any person or entity which, under any federal or state law or regulation, or by voluntary agreement, is currently debarred or disqualified from bidding for construction contracts or participating in construction projects in any jurisdiction within the United States, unless after disclosure of such ineligibility, such participation is authorized by appropriate federal and State authorities, including the Commissioner.

The Contractor shall not sublet, sell, transfer, assign, or otherwise dispose of the Contract or any portion thereof, or of the work provided for therein, or of its right, title, or interest therein, to any individual or entity without the prior written consent of the Commissioner. No payment will be made for any part of the work sublet, sold, transferred, assigned, or otherwise disposed of by the Contractor, prior to the authorization date given in the written consent of the Commissioner. Such an unauthorized act by the Contractor shall constitute a material breach of the Contract, and the Commissioner may, in such a case, terminate the Contract without further compensation to the Contractor.

The Contractor shall pay the subcontractor for work performed within thirty (30) days after the Contractor receives payment for the work performed by the subcontractor. Withholding retainage by the Contractor, subcontractor or lower tier subcontractors is not allowed.

Payment for work that has been performed by a subcontractor does not eliminate the Contractor's responsibilities for all the work as defined in Article 1.07.12, "Contractor's Responsibility for Work."

Payment for work that has been performed by a subcontractor also does not release the subcontractor from its responsibility for maintenance and other periods of subcontractor responsibility specified for the subcontractor's items of work. Failure of a subcontractor to meet its maintenance, warranty and/or defective work responsibilities may result in administrative action on future Department contracts.

For any dispute regarding prompt payment, the alternate dispute resolution provisions of this article shall apply.

The above requirements are also applicable to all sub-tier subcontractors and the above provisions shall be made a part of all subcontract agreements.

Failure of the Contractor to comply with the provisions of this section may result in a finding that the Contractor is non-responsible on future projects.

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 (168) 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 the period. 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 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. Calendar days for this phase will run through the winter shutdown (December 1 through March 31 of the following year).

Phase 2 – Construction Phase – (276) Calendar Days

When all apparent conflicts have been identified and resolved, and written commitments have been received from suppliers that all equipment and materials will be received within 30 days, the Contractor may request that the construction phase begin. Once commencement of construction begins, as and when approved by the Engineer, the Contractor will have (XXX) 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.

Phase 2 will not start prior to the conclusion of Phase 1. If Phase 1 is completed during the winter period Phase 2 will begin on the following April 1. The Contractor may begin Phase 2 only with prior written permission from the Engineer to do so, unless all the work allotted for this phase can be completed prior to the winter period. If the project will not be completed in the one construction season, the contractor shall complete all work started at or between intersections, including cleanup, prior to the winter shutdown.

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.

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Article 1.08.04 - Limitation of Operations - Add the following:

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

On the following State observed Legal Holidays:

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

The following restrictions also apply:

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

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

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

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

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

STATE/TOWN ROADS

The Contractor will not be allowed to perform any work that will interfere with the existing number of lanes of traffic, including turning lanes at intersections, on:

Monday through Friday between 6:00 a.m. and 9:00 a.m.
and between 3:00 p.m. and 7:00 p.m.

Ramps and Turning Roadways

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

Route 1 at Intersection No. 102-204

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

All Other Route 1 Intersections

Monday through Friday between 6:00 a.m. and 9:00 a.m. & between 3:00 p.m. and 7:00 p.m.
Saturday and Sunday between 10:00 a.m. and 6:00 p.m.

Additional Lane Closure Restrictions

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

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

SECTION 1.09 - MEASUREMENT AND PAYMENT

Article 1.09.04 – Extra and Cost-Plus Work:

Section 1.09.04 (f) - Add the following after the first sentence:

Increases in bonding costs shall not be compensated within any extra work payment. Payment for such costs, if substantiated as outlined in Article 1.04.05, shall be based on a lump sum for actual costs with no additional mark-ups.

Replace 1.09.06 – “Partial Payments” with the following:

1.09.06—Partial Payments:

A. Monthly and Semi-monthly Estimates.

(1) Once each month, the Engineer will make, in writing, current estimates of the value of work performed in accordance with the Contract, calculated at Contract unit prices, including but not limited to the value of materials complete in place and materials not yet incorporated into the Project, but approved by the Engineer for payment (as provided for elsewhere in this article). Retainage will not be held.

Exceptions may be made as follows:

(a) When not in conflict with the interests of the State, the Contractor may request, and the Engineer may make, semi-monthly estimates for payment.

(b) No estimates for payments will be made when, in the judgment of the Engineer, the Project is not proceeding in accordance with the Contract.

(2) The Engineer may also make payment at Contract unit prices for the number of units that represent the value of the Project work performed to date, if said units are essentially, though not totally, complete.

(3) As soon as possible after the final inspection, the apparent final quantities will be sent to the Contractor. The Contractor shall respond in writing within 21 days of receipt by either signing and thus accepting the final quantities or by disagreeing in writing, citing the pay items involved with documentation and justification of such agreement. Failure to respond within the 21 days will be considered as acceptance of the final quantities and the Department may proceed with final payment.

B. Payment for Stored Materials: Non-perishable materials that meet Contract requirements, that have been produced or purchased specifically for incorporation into the Project, and that have been delivered to the Project site or to such location as the Engineer may have approved, but which have not yet been incorporated into the Project, may be included in current estimates at such fraction of the applicable Contract unit price or lump sum price as the Engineer may deem to represent a fair value for the material, if such materials have been paid for by the

1.09.04 - Date 10/15/12
1.09.06 - Date 01/01/13
1.09.07 - Date 01/01/13

Contractor as shown by receipted bills or, in lieu of such receipted bill(s), a duly-executed Certification of Title executed by the Contractor and the Vendor in the form approved by the Department. When partial payment is made for stored materials, such materials shall become the property of the State; but such payment shall in no way release the Contractor from its responsibility for the condition, protection and, in case of loss, replacement of such materials, or from any liability resulting in any manner from the presence of such materials wherever they may be stored or kept. All materials shall be stored in accordance with Article 1.06.03 and in accordance with the manufacturer's recommendations. Material test approval by the Department shall be required prior to payment for such materials.

Offsite storage may be approved by the Engineer provided that the materials proposed for payment are segregated from other materials, clearly labeled as being owned by the Department for use on the identified Project, otherwise handled in compliance with Article 1.06.03, and stored in accordance with the manufacturer's recommendations. All such materials must be readily-available for inventory and inspection by the Engineer. Storage outside of the State of Connecticut may be considered only when a representative of the Department is able to verify that the above requirements have been satisfied.

For items requiring extended fabrication, manufacturing or assembly time, the Contractor may propose to the Engineer a schedule of values for the related material costs. If the Engineer approves such a schedule of values, it shall become the Basis of Payment for the stored materials, so long as all other pertinent Contract requirements have been satisfied.

Generic materials having a use on many projects will be considered for payment prior to their incorporation into the Project only if stored in unopened packaging or in large lots. Stock and raw materials will not be considered for such advance payment without the Engineer's prior written consent thereto.

In no case shall material payments exceed the Contract unit price or lump sum price less the actual value of delivery and installation of the materials; if they do exceed such a price, the Engineer reserves the right to reduce any related payment accordingly. Such reductions in payment shall in no way affect the Department's ownership interest in the stored materials.

Replace 1.09.07 – "Final Payment" with the following:

1.09.07—Final Payment: When the Commissioner has accepted the Project, the Engineer will prepare a final payment estimate and a list of final item quantities. The list will include the entire amount of each item of Project work performed, the value thereof, and the amount of all payments made on prior estimates, all such estimated payments being merely partial payments and subject to correction in the calculation of the final payment.

SECTION 4.06 - BITUMINOUS CONCRETE

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

4.06.01—Description

4.06.02—Materials

4.06.03—Construction Methods

4.06.04—Method of Measurement

4.06.05—Basis of Payment

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

4.06.03—Construction Methods:

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

Delivery tickets must include the following information:

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

English

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

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

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

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

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

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

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

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

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

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

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

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

English

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

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

Lighting: For paving operations, which will be performed during hours of darkness, the paving equipment shall be equipped with lighting fixtures as described below, or with approved lighting fixtures of equivalent light output characteristics. A sufficient number of spare lamps shall be available on site as replacements in the event of failures. The Contractor shall provide brackets and hardware for mounting light fixtures and generators to suit the configuration of the rollers and pavers. Mounting brackets and hardware shall provide for secure connection of the fixtures, minimize vibration, and allow for adjustable positioning and aiming of the light fixtures. Lighting shall be aimed to maximize the illumination on each task and minimize glare to passing traffic. The Contractor shall provide generators on rollers and pavers of the type, size, and wattage, to adequately furnish 120 V AC of electric power to operate the specified lighting equipment. A sufficient amount of fuel shall be available on site. There shall be switches to control the lights. Wiring shall be weatherproof and installed to all applicable codes. The minimum lighting requirements are found in tables 4.06-1 and 4.06-2:

Table 4.06-1: Paver Lighting

| Fixture | Quantity | Remarks |
|----------------------------------|-----------------|-----------------------------------|
| Type A | 3 | Mount over screed area |
| Type B (narrow) or Type C (spot) | 2 | Aim to auger and guideline |
| Type B (wide) or Type C (flood) | 2 | Aim 25 feet behind paving machine |

Table 4.06-2: Roller Lighting

| Fixture* | Quantity | Remarks |
|-----------------|-----------------|--|
| Type B (wide) | 2 | Aim 50 feet in front of and behind roller |
| Type B (narrow) | 2 | Aim 100 feet in front of and behind roller |
| OR | | |
| Type C (flood) | 2 | Aim 50 feet in front of and behind roller |
| Type C (spot) | 2 | Aim 100 feet in front of and behind roller |

*All fixtures shall be mounted above the roller.

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

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

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

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

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

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

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

4. Seasonal Requirements: Paving, including placement of temporary pavements, shall be divided into two seasons, In-Season and Extended Season. In-Season paving shall occur from May 1 – October 14, and Extended Season shall occur 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 subbase temperature is below 40°F regardless of the season.
- Should paving operations be scheduled during the Extended Season, the Contractor’s Quality Control Plan for placement described in Section 9. “Contractor Quality Control Plan for Placement” shall include a separate section titled “Extended Season Paving” and address minimum delivered mix temperature, maximum paver speed, enhanced rolling patterns and the method to balance mixture delivery and placement operations. Work covered by the section on Extended Season paving shall not commence until the Engineer’s comments have been incorporated into the section and approved.
- Should placement of the final lift of bituminous concrete be scheduled during the Extended Season, the Contractor is required to submit this plan to the Engineer for review 30 days prior to the paving operation.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

TABLE 4.06-3 Thickness Tolerances

| Mixture Designation | Lift Tolerance |
|---|-----------------------|
| Class 4 and S1 | +/- 3/8 inch |
| Class 1, 2 and 12 and S0.25, S0.375, S0.5 | +/- 1/4 inch |

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

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

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

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

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

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

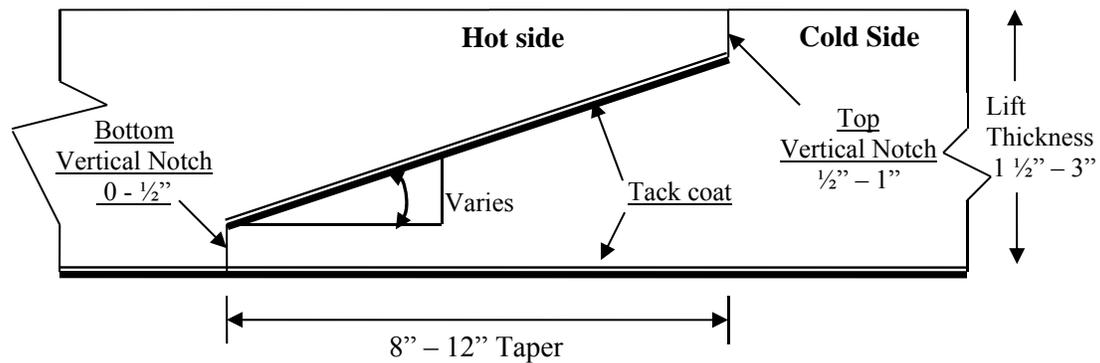
If the Engineer determines that the use of compaction equipment in the dynamic vibratory mode may damage highway components, utilities, or adjacent property, the Contractor shall provide alternate compaction equipment. The Engineer may allow the Contractor to operate rollers in the dynamic mode using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

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

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

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

8. Longitudinal Joint Construction Methods: Unless noted on the plans or the contract documents or directed by the Engineer, the Contractor shall use Method I- Notched Wedge Joint (see figure 4.06-1) when constructing longitudinal joints where lift thicknesses are between $1\frac{1}{2}$ and 3 inches, except for S1 and Class 4 mixes. Method II Butt Joint (see figure 4.06-2) shall be used for lifts less than $1\frac{1}{2}$ inches or greater than 3 inches, and S1 and Class 4 mixes. During placement of multiple lifts of bituminous concrete, the longitudinal joint shall be constructed in such a manner that it is located at least 6 inches from the joint in the lift immediately below. The joint in the final lift shall be at the centerline or at lane lines. Each longitudinal joint shall maintain a consistent offset from the centerline of the roadway along its entire length.

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

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

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

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

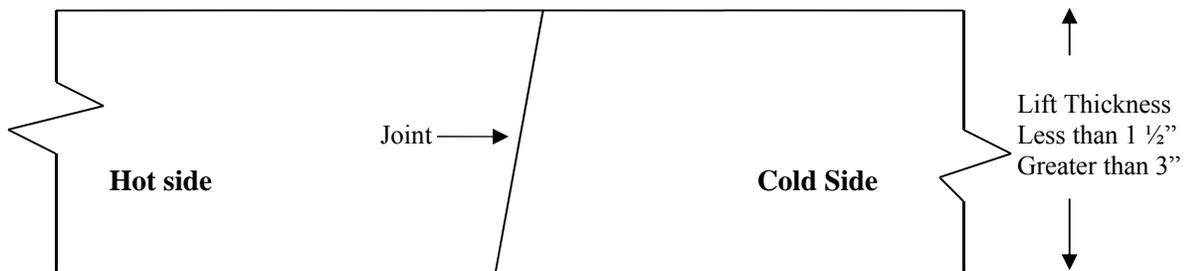
The pavement surface under the wedge joint must have an application of tack coat material. Prior to placing the completing pass (hot side), an application of tack coat must be applied to the exposed surface of the tapered section; regardless of time elapsed between paver passes. The in-place time allowance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

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

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

Method II - Butt Joint:

Figure 4.06-2

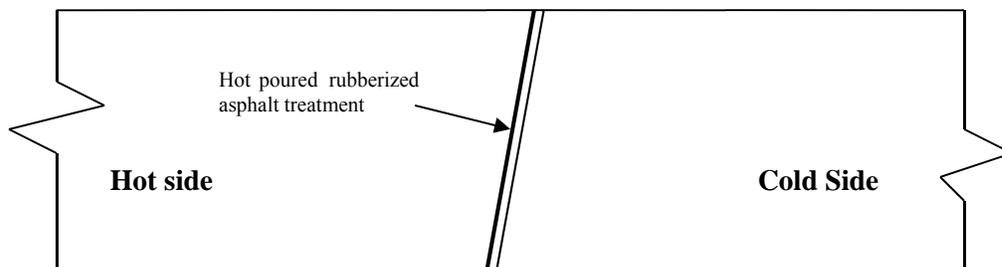


When adjoining passes are placed, the Contractor shall utilize equipment that creates a near vertical edge (refer to figure). The completing pass (hot side) shall have sufficient mixture so that the compacted thickness is not less than the previous pass (cold side). The end gate on the paver should be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

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

Method III- Butt Joint with Hot Poured Rubberized Asphalt Treatment: When required by the contract or allowed by the Engineer, Method III (see figure 4.06-3) may be used.

Figure 4.06-3



English

All of the requirements of Method II must be met with Method III. In addition, the longitudinal vertical edge must be treated with a joint seal material meeting the requirements of Section M.04 prior to placing a completing pass. The joint seal material shall be applied in accordance with the manufacturer's recommendation so as to provide a uniform coverage and avoid excess bleeding onto the newly placed pavement.

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

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

Quality Control Plan: Prior to placement the Contractor shall submit a QCP to the Engineer for approval. The QCP shall be submitted at the pre-construction meeting or a minimum 30 days prior to any production or paving. The QCP shall be in the format provided by the Engineer. Work covered by the QCP shall not commence until the Engineer's comments have been incorporated into the QCP and approved. The QCP shall detail every aspect of the placement process and if required, include a separate section on Extended Season paving as described in Section 4. "Seasonal Requirements". Information provided shall include the organization and procedures which the Contractor shall use to control all project site activity. The QCP must address the actions, inspection, or sampling and testing necessary to keep the production and placement operations in control, to determine when an operation has gone out of control and to respond to correct the situation in a timely fashion. The QCP shall also include details on when and who will communicate with personnel at the bituminous concrete plant to determine when immediate changes to the production or placement processes are needed, and to implement the required changes.

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

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

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

Quality Control Inspection, Sampling and Testing: The Contractor shall perform all quality control sampling and testing, provide inspection, and exercise management control to ensure that

bituminous concrete production and placement conforms to the requirements as outlined in its QCP during all phases of the work.

- a) Control Charts: The Contractor shall develop and maintain density control charts and shall submit them to the Engineer. The control charts shall include the project number, test numbers, test parameter, applicable upper and lower specification limits, and test data. The control charts shall be used as part of the quality control system to document the placement process. The control chart(s) shall be updated each day of production, and a copy shall be submitted prior to the next day's production.
- b) Records of Inspection and Testing: For each day of placement, the Contractor shall document all test results and inspections on forms approved by the Engineer. The document shall be certified by the Quality Control Manager or his representative that the information in the document is accurate, and that all work complies with the requirements of the contract.

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

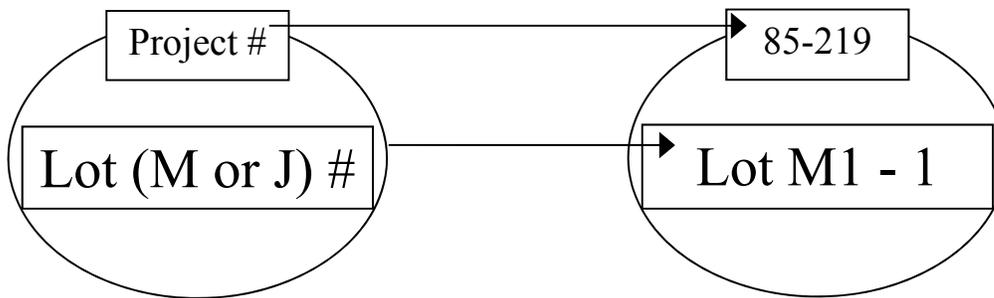
The Contractor may obtain one (1) mat core and one (1) joint core per day for process control, provided this process is detailed in the QCP. The results of these process control cores shall not be used to dispute the Department determinations from the acceptance cores. The Contractor shall submit the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

10. Density Testing of Bituminous Concrete Utilizing Core Samples: This procedure describes the frequency and the method the Contractor shall use to obtain pavement cores for acceptance from the project. Coring shall be performed on each lift specified to a thickness of one and one-half (1 ½) inches or more. Each lift including the longitudinal joints shall be compacted to the degree specified in Tables 4.06-9 and 4.06-10. The density of each core shall be determined using the production lot's average maximum theoretical gravity established from the plant production testing. Bituminous concrete Class 4 and HMA S1 are excluded from the longitudinal joint density requirements.

The Contractor shall extract cores (4 or 6 inch diameter for S0.25, S0.375 and S0.5 mixes, 6 inch diameter for S1.0 mixtures -wet sawed) from sampling locations determined by the Engineer. The Engineer must witness the extraction and labeling of cores, as well as the filling of the core holes. The cores shall be labeled by the Contractor with the project number, lot number, and sub-lot number on the top surface of the core. When labeling the core lot number, include whether the core is from a mat lot or joint lot by using an "M" for a mat core and "J" for a joint core. For example, a core from the first sub-lot of the first mat lot shall be labeled with "Lot M1 - 1". The first number refers to the lot and the second number refers to the sub-lot. Refer to Figure 4.06-4. The side of the cores shall be labeled with the core lot number and date placed. The project inspector shall fill out a MAT-109 containing the same information to accompany

the cores. The Contractor shall deliver the cores and MAT-109 to the Department’s Central Testing Lab in a safe manner to ensure no damage occurs to the cores. The Contractor shall use a container approved by the Engineer. In general the container shall consist of an attached lid container made out of plastic capable of being locked shut and tamper proof. The Contractor shall use foam, bubble wrap, or another suitable material to prevent the cores from being damaged during transportation. Once the cores and MAT-109 are in the container the Engineer will secure the lid using a security seal. The security seal’s identification number must be documented on the MAT-109. The Central Lab will break the security seal and take possession of the cores upon receipt.

Figure 4.06-4



Frequency of sampling is in accordance with the following tables:

TABLE 4.06-4 - TESTING REQUIREMENT FOR BRIDGE DENSITY LOT

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

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

**TABLE 4.06-5A – TESTING REQUIREMENT FOR DENSITY LOTS
≥ 500 TONS**

| Lot Type | No. of Mat Cores | | No. of Joint Cores | | Target Lot Size (Tons) |
|--------------------------------------|------------------|-------------------------------|--------------------|-------------------------------|------------------------|
| Lot Without Bridge ⁽¹⁾ | 4 | | 4 | | 2000 |
| Lot With Bridge(s) ⁽¹⁾⁽²⁾ | 4 plus | 1 per structure (≤ 300') | 4 plus | 1 per structure (≤ 300') | 2000 |
| | | 2 per structure (301' – 500') | | 2 per structure (301' – 500') | |

**TABLE 4.06-5B – TESTING REQUIREMENT FOR DENSITY LOTS
< 500 TONS**

| Lot Type | No. of Mat Cores | No. of Joint Cores | Lot Size (Tons) |
|--------------------------------------|------------------|--------------------|-----------------|
| Lot Without Bridge ⁽¹⁾ | 3 | 3 | 1 per lift |
| Lot With Bridge(s) ⁽¹⁾⁽²⁾ | 3 | 3 | 1 per lift |

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

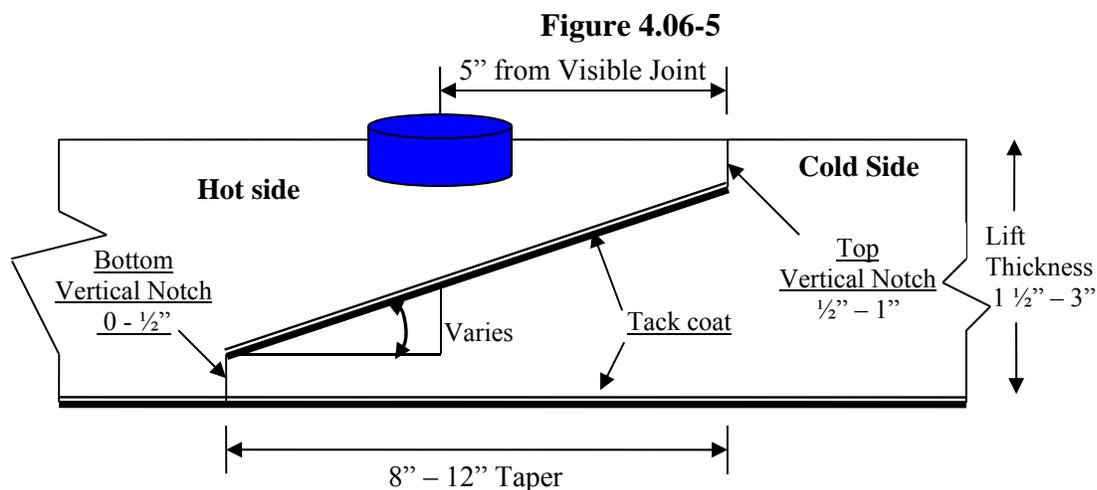
Note (2): If a non-bridge mat or joint core location randomly falls on a structure, the core is to be obtained on the structure in addition to the core(s) required on the structure.

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

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

A mat core shall not be taken any closer than one foot from the edge of a paver pass. If a random number locates a core less than one foot from any edge, locate the core so that the sample is one foot from the edge.

Joint cores must be taken so that the center of the core is 5 inches from the visible joint on the hot mat side. Refer to figure 4.06-5.



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

Core holes shall be filled immediately upon core extraction. Prior to being filled, the hole shall be prepared by removing any free water and applying tack coat using a brush or other means to uniformly cover the cut surface. The core hole shall be filled with a mixture containing the same nominal maximum aggregate size and compacted with a hand compactor or other mechanical means to the maximum compaction possible. The bituminous concrete mixture shall be compacted to $\frac{1}{8}$ inch above the finished pavement prior to opening the roadway to traffic.

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

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

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

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

12. Density Dispute Resolution Process: The Contractor and Engineer will work in partnership to avoid potential conflicts and to resolve any differences that may arise during quality control or acceptance testing for density. Both parties will review their sampling and testing procedures and results and share their findings. If the Contractor disputes the Engineer's test results, the Contractor must submit in writing a request to initiate the Dispute Resolution Process within 10 calendar days of the notification of the test results. No request for dispute resolution will be allowed unless the Contractor provides quality control results within the timeframe described in Sub article 4.06.03-9 supporting its position. Should the dispute not be resolved through evaluation of existing testing data or procedures, the Engineer may authorize the Contractor to obtain a new set of core samples per disputed lot. The core samples must be extracted no later than 30 calendar days from the date of Engineer's authorization. The number and type (mat, joint, or structure) of the cores taken for dispute resolution must reflect the number and type of the cores taken for acceptance. The location of each core shall be 36" from the original

English

acceptance core location forward along a line parallel to the baseline that results in the same type (mat, joint, or structure) of core. All such core samples shall be extracted and filled using the procedure outlined in Article 4.06.03. The results from the dispute resolution cores shall be added to the results from the acceptance cores and averaged for determining the final in-place density value.

13. Corrective Work Procedures: Any portion of the completed pavement that does not meet the requirements of the specification shall be corrected at the expense of the Contractor. Any corrective courses placed as the final wearing surface shall not be less than 1½ inches in thickness after compaction.

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

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

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

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

4.06.04—Method of Measurement:

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

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

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

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

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

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

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

- (1) *Marshall Design*- The tolerances shown in Table 4.06-6 for gradation and binder content will be used to determine whether a mixture adjustment will apply. If the

mixture does not meet the requirements of Section M.04, an adjustment will be computed using the following formula:

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

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

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

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

- (2) *Superpave Design*- The adjustment values in Table 4.06-7 and 4.06-8 shall be calculated for each sub lot based on the Air Void and Liquid Binder Content test results for that sub lot. The total adjustment for each day's production (lot) will be computed using tables and the following formulas:

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

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

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

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

n = number of sub lots based on Table M.04.03-1

**TABLE 4.06-7
ADJUSTMENT VALUES FOR AIR VOIDS (SUPERPAVE)**

| Adjustment Value (AdjAV_i) (%) | S0.25, S0.375, S0.5, S1 Air Voids (AV) |
|--|---|
|--|---|

| | |
|---------------|----------------|
| +2.5 | 3.8 - 4.2 |
| +3.125*(AV-3) | 3.0 - 3.7 |
| -3.125*(AV-5) | 4.3 - 5.0 |
| 20*(AV-3) | 2.3 - 2.9 |
| -20*(AV-5) | 5.1 - 5.7 |
| -20.0 | ≤ 2.2 or ≥ 5.8 |

Percent Adjustment for Liquid Binder = $AdjPB_t = [(AdjPB_1 + AdjPB_2 + AdjPB_i + \dots + AdjPB_n)] / n$

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 4.06-8

| Adjustment Value (AdjAV _i) (%) | S0.25, S0.375, S0.5, S1 Pb (refer to Table M.04.03-5) |
|---|---|
| 0.0 | Equal to or above the min. liquid content |
| - 10.0 | Below the min. liquid content |

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

Tons Adjusted for Density (T_D) = $[\{(PA_M \times .50) + (PA_J \times .50)\} / 100] \times \text{Density Lot Tons}$

Where: T_D = Total tons adjusted for density for each lot
 PA_M = Mat density percent adjustment from Table 4.06-9
 PA_J = Joint density percent adjustment from Table 4.06-10

TABLE 4.06-9
ADJUSTMENT VALUES FOR PAVEMENT MAT DENSITY

| Average Core Result Percent Mat Density | Percent Adjustment (Bridge and Non-Bridge) (1,2) |
|--|---|
| 97.1 - 100 | -1.667*(ACRPD-98.5) |
| 94.5 - 97.0 | +2.5 |

| | |
|--------------|-----------------------------------|
| 93.5 – 94.4 | +2.5*(ACRPD-93.5) |
| 92.0 – 93.4 | 0 |
| 90.0 – 91.9 | -5*(92-ACRPD) |
| 88.0 – 89.9 | -10*(91-ACRPD) |
| 87.0 – 87.9 | -30 |
| 86.9 or less | Remove and Replace (curb to curb) |

**TABLE 4.06-10
ADJUSTMENT VALUES FOR PAVEMENT JOINT DENSITY**

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

(1) ACRPD = Average Core Result Percent Density

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

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

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

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

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

Method of Measurement:

- a. Container Method- Material furnished in a container will be measured to the nearest ½ gallon. The volume will be determined by either measuring the volume in the original container by a method approved by the Engineer or using a separate graduated container capable of measuring the volume to the nearest ½ gallon. The container in which the material is furnished must include the description of material, including lot number or batch number and manufacturer or product source.
 - b. Truck Method- The Engineer will establish a weight per gallon of the bituminous material based on the specific gravity at 60°F for the material furnished. The number of gallons furnished will be determined by weighing the material on scales furnished by and at the expense of the Contractor.
6. Material Transfer Vehicle (MTV) - **The furnishing and use of a MTV will be measured separately for payment based on the actual number of surface course tons delivered to a paver using the MTV.**

4.06.05—Basis of Payment:

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

- All costs associated with providing illumination of the work area are included in the general cost of the work.
- All costs associated with constructing longitudinal joints are included in the general cost of the work.
- All costs associated with obtaining cores for core correlation and dispute resolution are included in the general cost of the work.

2. Bituminous Concrete Adjustment Costs: The adjustment will be calculated using the formulas shown below if all of the measured adjustments in Article 4.06.04 do not equal zero. A payment will be made for a positive adjustment. A deduction from monies due the Contractor will be made for a negative adjustment.

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

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

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

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

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

The estimated cost figure if included in the bid proposal or estimate is not to be altered in any manner by the bidder. If the bidder should alter the amount shown, the altered figure will be disregarded and the original cost figure will be used to determine the amount of the bid for the Contract.

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

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

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

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

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

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

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

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. The following list of utility companies and representatives may be used for the convenience of the contractor.

SNET Representative

Mr. Michael Brecher
Southern New England Telephone
(203) 238-5201
mb2738@att.com

City of Bridgeport

Mr. Elton Cereni
U.I.
(203) 926-4428
eltoncereni@uinet.com

Town of Derby

Mr. Dave Gerrish
Comcast
(203) 732-0146
Mr. Tom Judge
U.I.
(203) 926-4772
Thomas.Judge@uinet.com

Town of Guilford

Mr. Tony Sarubbi
CL&P
(203) 245-5412
sarubaj@nu.com

Town of Madison

Mr. Neal Sorensen
CL&P
(203) 245-5416
sorenn@nu.com

Town of New Canaan

Mr. Jeff Baxter
CL&P
(203) 845-3469
baxtejd@nu.com

Town of East Haven

Mr. Cliff Cronan
U.I.
(203) 926-4643
cliffcronan@uinet.com

Town of North Haven

Mr. Elton Cereni
U.I.
(203) 926-4428
eltoncereni@uinet.com

Town of Fairfield

Mr. Elton Cereni
U.I.
(203) 926-4428
eltoncereni@uinet.com

City of Norwalk

Mr. Jeff Baxter
CL&P
(203) 845-3469
baxtejd@nu.com

Town of Shelton

Mr. Elton Cereni
U.I.
(203) 926-4428
eltoncereni@uinet.com

Town of New Haven

Mr. Dominic Yacobino
U.I.
(203) 499-5977

Town of Trumbull

Mr. Elton Cereni
U.I.
(203) 926-4428
eltoncereni@uinet.com

Town of West Haven

Mr. Dominic Yacobino
U.I.
(203) 499-5977

Town of Stratford

Mr. Elton Cereni
U.I.
(203) 926-4428
eltoncereni@uinet.com

Mr. Tom Grillo
SBC East
(203) 383-6617

Mr. Anthony Lewis
CSX Transportation
(315) 777-2196

Town of Westport

Mr. Anthony Capodagli
CL&P
(203) 845-3407
capodaj@nu.com

All work shall be in conformance with Rules and Regulations of the 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 should coordinate with the appropriate utility company for securing/protecting the site during the installation of traffic signal mast arms, span poles or illumination poles.

SECTION 12.00 - GENERAL CLAUSES FOR HIGHWAY SIGNING

Description:

Work under this item shall conform to the requirements of Section 12.00 supplemented as follows:

12.00.06 – Data Labels:

For the purpose of developing and maintaining a highway sign inventory and for the purpose of sampling and testing reflective sheeting, the Contractor shall affix a Data Label(s) to the back of each sign face-extruded aluminum sign and each sign face-sheet aluminum sign in the vicinity of the lower left hand corner or quadrant. Data Labels shall be 2 (two) separate 5 (five) inch by 3 (three) inch (125mm by 75mm), non-reflective weatherproof films with black copy on a yellow background having a pressure sensitive adhesive backing.

A “Fabrication” Data Label is to include information about the sign fabricator, date of fabrication and the sheeting manufacturer - type. An “Installation” Data Label is to include The State Project Number or Maintenance Permit Number that installed the sign and date of installation.

The cost of the data labels coded and in place on the sign shall be included in the unit cost of the respective sign material. Payment for the respective quantities of each sign face-extruded aluminum sign and each sign face-sheet aluminum sign may be withheld until all Data Label(s) have been installed to the satisfaction of the Engineer.

The Data Label designs, with additional notes relative to design requirements are attached herewith.

DATA LABELS
NON REFLECTIVE, WEATHERPROOF FILM
BLACK COPY, YELLOW BACKGROUND

| CONN DOT SIGN FACE DATA LABEL | | | | | | | | | | | |
|---|----|----|----|----|----|----|----|----|----|----|----|
| Fabricator: (Insert NAME or State) | | | | | | | | | | | |
| Sheeting Manufacturer - Type (Insert NAME - TYPE) | | | | | | | | | | | |
| Date Fabricated - Month / Year | | | | | | | | | | | |
| J | F | M | A | M | J | J | A | S | O | N | D |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |

| CONN DOT SIGN FACE DATA LABEL | | | | | | | | | | | |
|--|----|----|----|----|----|----|----|----|----|----|----|
| Installed By: | | | | | | | | | | | |
| Project No.: (Insert 000-0000 or State) | | | | | | | | | | | |
| Permit No.: (Insert D_-000000) | | | | | | | | | | | |
| Date Installed - Month / Year | | | | | | | | | | | |
| J | F | M | A | M | J | J | A | S | O | N | D |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |

Data Labels To Be 5 Inch By 3 Inch Each (125mm x 75mm) With Face Designs As Shown Above.

All Copy Ink Must Be Durable And Not Fade, Discolor, Or Smudge.

All Variable Legends To Be Included At Label Fabrication.

Only One "Installed By" Permit Or Project Number Should Be Provided.

Sign Fabrication And / Or Installation By State Forces, Insert "State."

The Month And Year Of Fabrication And Installation May Be Punched Or Marked Out

The Back Of The Data Label Must Contain A Pre-coated Pressure-Sensitive Adhesive Covered By A Removable Liner.

At Application, The Liner Must Be removable Without Soaking In Water Or Other Solvents.

The Adhesive Must Form A Durable Bond To Surfaces That Are Smooth, Clean, Corrosion-Free And Weather Resistant.

Completed Data Labels Must Not Discolor, Crack, Craze, Blister, Delaminate, Peel, Chalk, Or Lose Adhesion When Subjected To Temperatures From -30 Degrees to 200 Degrees Fahrenheit.

SECTION 12.08 - SIGN FACE-SHEET ALUMINUM

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

General: Delete all references to parapet mounted sign supports.

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

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

SECTION M.04 BITUMINOUS CONCRETE

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

M.04.01—Bituminous Concrete Materials and Facilities

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

M.04.03—Production Requirements

M.04.01—Bituminous Concrete Materials and Facilities: Each source of material, and facility or plant used to produce and test bituminous concrete must be qualified on an annual basis by the Engineer. Test Procedures and Specifications referenced herein are in accordance with the latest AASHTO and ASTM Standard Test Procedures and Specifications. Such references when noted with an (M) have been modified by the Engineer and are detailed in Table M.04.03-6.

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

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

1. Coarse Aggregate:

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

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

on the #4 sieve when tested according to ASTM D 5821. The amount of aggregate particles of the coarse aggregate blend retained on the #4 sieve that are flat or elongated shall be determined in accordance with ASTM D 4791 and shall not exceed 10% by weight when tested to a 3:1 ratio, as shown in Tables M.04.02-2 thru M.04.02-4.

2. Fine Aggregate:

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

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

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

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

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

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

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

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

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

3. Mineral Filler:

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

4. Liquid Bituminous Materials:

a. General:

- i. Liquid PG binders shall be uniformly mixed and blended and be free of contaminants such as fuel oils and other solvents. Binders shall be properly heated and stored to prevent damage or separation.
- ii. The blending at mixing plants of PG binder from different suppliers is strictly prohibited. Contractors who blend PG binders will be classified as a supplier and will be required to certify the binder in accordance with AASHTO R-26(M). The binder shall meet the requirements of AASHTO M-320(M) and AASHTO R-29(M). The Contractor shall submit a Certified Test Report and bill of lading representing each delivery in accordance with AASHTO R-26(M). The Certified Test Report must also indicate the binder specific gravity at 77°F; rotational viscosity at 275°F and 329°F and the mixing and compaction viscosity-temperature chart for each shipment.
- iii. The Contractor shall submit the name(s) of personnel responsible for receipt, inspection, and record keeping of PG binder materials. Contractor plant personnel shall document specific storage tank(s) where binder will be transferred and stored until used, and provide binder samples to the Engineer upon request. The person(s) shall assure that each shipment (tanker truck) is accompanied by a statement certifying that the transport vehicle was inspected before loading and was found acceptable for the material shipped and that the binder will be free of contamination from any residual material, along with two (2) copies of the bill of lading.
- iv. Basis of Approval: The request for approval of the source of supply shall list the location where the material will be manufactured, and the handling and storage methods, along with necessary certification in accordance with AASHTO R-26(M). Only suppliers/refineries that have an approved "Quality Control Plan for Performance Graded Binders" formatted in accordance with AASHTO R-26(M) will be allowed to supply PG binders to Department projects.

b. Neat Performance Grade (PG) Binder:

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

c. Modified Performance Grade (PG) Binder

Unless otherwise noted, the asphalt binder shall be Performance Grade PG 76-22 asphalt modified with a Styrene-Butadiene-Styrene (SBS) polymer. The polymer modifier shall be added at either the refinery or terminal and delivered to the bituminous concrete production facility as homogenous blend. The stability of the modified binder shall be verified in accordance with ASTM D7173 using the Dynamic Shear Rheometer (DSR). The DSR $G^*/\sin(\delta)$ results from the top and bottom sections of the ASTM D7173 test shall not differ by more than 10%. The results of ASTM D7173 shall be included on the Certified Test Report. The binder shall meet the requirements of AASHTO M-320(M) and AASHTO R-29(M).

d. Warm Mix Additive or Technology:

- i. The warm mix additive or technology must be listed on the NEAUPG Qualified Warm Mix Asphalt (WMA) Technologies List at the time of bid, which may be accessed online at http://www.neaupg.uconn.edu/wma_info.html.
- ii. The warm mix additive shall be blended with the asphalt binder in accordance with the manufacturer's recommendations.
- iii. The blended binder shall meet the requirements of AASHTO M-320(M) and AASHTO R-29(M) for the specified binder grade. The Contractor shall submit a Certified Test Report showing the results of the testing demonstrating the binder grade. In addition, it must include the grade of the virgin binder, the brand name of the warm mix additive, the manufacturer's suggested rate for the WMA additive, the water injection rate (when applicable) and the WMA Technology manufacturer's recommended mixing and compaction temperature ranges.
- iv. Cut-backs (medium cure type):
 - i. Requirements: The liquid petroleum materials shall be produced by fluxing an asphalt base with appropriate petroleum distillates to produce the grade specified.
 - ii. Basis of Approval: The request for approval of the source of supply shall be submitted at least seven days prior to its use listing the location where the materials will be produced, and manufacturing, processing, handling and storage methods. The Contractor shall submit a Certified Test Report in accordance with Section 1.06 and a Material Safety Data Sheet (MSDS) for the grade to be used on the Project. The liquid asphalt shall be MC-250 conforming to AASHTO M-82.

e. Emulsions

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

5. Reclaimed Asphalt Pavement (RAP):

- a. **Requirements:** RAP shall consist of asphalt pavement constructed with asphalt and aggregate reclaimed by cold milling or other removal techniques approved by the Engineer. For bituminous concrete mixtures containing RAP, the Contractor shall submit a JMF in accordance with Article M.04.02 to the Engineer for review.
- b. **Basis of Approval:** The RAP material will be accepted on the basis of one of the following criteria:
 - i. When the source of all RAP material is from pavements previously constructed on Department projects, the Contractor shall provide a materials certificate listing the detailed locations and lengths of those pavements and that the RAP is only from those locations listed.
 - ii. When the RAP material source or quality is not known, the Contractor shall test the material and provide the following information along with a request for approval to the Engineer at least 30 calendar days prior to the start of the paving operation. The request shall include a material certificate stating that the RAP consists of aggregates that meet the specification requirements of sub articles M.04.01-1 through 3 and that the binder in the RAP is substantially free of solvents, tars and other contaminants. The Contractor is prohibited from using unapproved material on Department projects

and shall take necessary action to prevent contamination of approved RAP stockpiles. Stockpiles of unapproved material shall remain separate from all other RAP materials at all times. The request for approval shall include the following:

1. A 50-pound sample of the RAP to be incorporated into the recycled mixture.
2. A 25-pound sample of the extracted aggregate from the RAP.
3. A statement that RAP material has been crushed to 100% passing the ½ inch sieve and remains free from contaminants such as joint compound, wood, plastic, and metals.

6. Crushed Recycled Container Glass (CRCG):

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

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

7. Joint Seal Material:

Requirements: Joint seal material shall be a hot-poured rubber compound intended for use in sealing joints and cracks in bituminous concrete pavements. Joint seal material must meet the requirements of AASHTO M-324 – Type 2.

8. Plant Requirements:

- a. Mixing Plant and Machinery:

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

- b. Storage Silos:

For all mixes, the Contractor may use silos for short-term storage of Superpave mixtures with prior notification and approval of the Engineer. A silo must have heated cones and an unheated silo cylinder if it does not contain a separate internal heating system. Prior approval must be obtained for storage times greater than those indicated. When multiple

silos are filled, the Contractor shall discharge one silo at a time. Simultaneous discharge of multiple silos is not permitted.

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

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

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

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

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

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

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

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

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

Laboratory is adequately supplied at all times during the course of the project with all necessary testing materials and equipment.

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

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

1. Marshall Method - Class 1, 2, 3, 4, 5, 5A, 5B and 12:

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

The Engineer will test each class of mixture for compliance with the submitted JMF and Table M.04.02-1. The maximum theoretical density (Gmm) will be determined by AASHTO T 209(M). If the mixture does not meet the requirements, the JMF shall be adjusted within the ranges shown in Table M.04.02-1 until an acceptable mixture is produced. All equipment, tests and computations shall conform to the Marshall method in accordance with AASHTO T 245(M).

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

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

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

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

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

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

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

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

| CLASS | 1 | 2 | 3 | 4 | 12 | 5 (e)(j) | 5A (e)(j) | 5B (e)(j) | JMF % Tol. (±) |
|---|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--------------------------------|---------------------------------|---------------------------------|---------------------------------|----------------|
| Grade of PG Binder content % | PG 64-22 5.0 – 6.5 | PG 64-22 5.0 – 8.0 | PG 64-22 6.5 - 9.0 | PG 64-22 4.0 - 6.0 | PG 64-22 7.5 - 10.0 | MC-250 (d) 6.0 - 7.5 | MC-250 (d) 6.0 - 7.5 | MC-250 (d) 6.0 - 7.5 | 0.4 |
| Sieve Size | Percent Passing (%) | | | | | | | | |
| # 200 | 3.0 – 8.0 (g) | 3.0 – 8.0 (g) | 3.0 – 8.0 (g) | 0.0 – 5.0 (g) | 3.0 – 10.0 (g) | 0.0 - 2.5 | 0.0- 2.5 | 0.0 - 2.5 | 2.0 |
| # 50 | 6 – 26 | 8 – 26 | 10 - 30 | 5 - 18 | 10 - 40 | | | | 4 |
| # 30 | 10 - 32 | 16 - 36 | 20 - 40 | | 20 - 60 | 2 - 15 | 2 – 15 | 2 - 15 | 5 |
| # 8 | 28 - 50 | 40 - 64 | 40 - 70 | 20 - 40 | 60 - 95 | 10 - 45 | 10 – 45 | 10 - 45 | 6 |
| # 4 | 40 - 65 | 55 - 80 | 65 - 87 | 30 - 55 | 80 - 95 | 40 - 100 | 40 – 100 | 40 - 100 | 7 |
| 1/4" | | | | | | | | | |
| 3/8 " | 60 - 82 | 90 - 100 | 95 - 100 | 42 - 66 | 98 - 100 | 100 | 100 | 100 | 8 |
| 1/2 " | 70 - 100 | 100 | 100 | | 100 | | | | 8 |
| 3/4" | 90 - 100 | | | 60 - 80 | | | | | 8 |
| 1" | 100 | | | | | | | | |
| 2" | | | | 100 | | | | | |
| Additionally, the fraction of material retained between any two consecutive sieves shall not be less than 4% | | | | | | | | | |
| Mixture Temperature | | | | | | | | | |
| Binder | 325°F maximum | | | | | 140-185° F | | | |
| Aggregate | 280-350° F | | | | | 100-175° F | | | |
| Mixtures | 265-325° F | | | | 275-325°F | 120-175° F | | | 25 °F |
| Mixture Properties | | | | | | | | | |
| VOIDS - % | 3.0 – 6.0 (a) | 2.0 – 5.0 (b) | 0 – 4.0 | | 0 - 5.0 (a) | | | | |
| Stability (f) lbs. min. | 1200 (c) | 1000 | 1000 | | 1000 | | | | |
| FLOW (f) in. | .08 - .15 | .08 - .15 | .08 - .18 | | .08 - .15 | | | | |
| VMA % - min. | 15(h) :16 (i) | | | | | | | | |

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

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

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

1. Aggregate consensus properties for each type & level, as specified in Table M.04.02-3. In addition the G_{sa}, G_{sb}, P_{wa} shall also be provided for each component aggregate.
2. New mixes shall be tested in accordance with AASHTO T 283(M) *Standard Method of Test for Resistance of Compacted Hot-Mix Asphalt (HMA) to Moisture-Induced Damage*, (TSR). The compacted specimens may be fabricated at a bituminous concrete facility and then tested at an AMRL accredited facility.

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

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

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

- i. Superpave Mixture (virgin): For bituminous concrete mixtures that contain no recycled material, the limits prescribed in Tables M.04.02-2 thru Table M.04.02-5 apply. The Contractor shall submit a JMF, on a form provided by the Engineer, with the individual fractions of the aggregate expressed as percentages of the total weight of the mix and the source(s) of all materials to the Engineer for approval. The JMF shall indicate the corrected target binder content and applicable binder correction factor (ignition oven or extractor) for each mix type by total weight of mix. The mineral filler (dust) shall be defined as that portion of blended mix that

passes the #200 sieve by weight when tested in accordance with AASHTO T 30(M). The dust-to-effective asphalt (D/Pbe) ratio shall be between 0.6 and 1.2 by weight. The dry/wet mix times and hot bin proportions (batch plants only) for each type shall be included in the JMF.

The percentage of aggregate passing each sieve shall be plotted on a 0.45 power gradation chart and shall be submitted for all bituminous concrete mixtures. This chart shall delineate the percentage of material passing each test sieve size as defined by the JMF. The percentage of aggregate passing each standard sieve shall fall within the specified control points, but outside the restricted zone limits as shown in Tables M.04.02-2 thru Table M.04.02-5. Mixes with documented performance history which pass through the restricted zone may be permitted for use as long as all other physical and volumetric criteria meets specifications as specified in Tables M.04.02-2 thru Table M.04.02-5 and with prior approval from the Engineer. A change in the JMF requires that a new chart be submitted.

- ii. Superpave Mixtures with RAP: Use of approved RAP may be allowed with the following conditions:
 - RAP amounts up to 15% may be used with no binder grade modification.
 - RAP amounts up to 20% may be used provided a new JMF is approved by the Engineer. The JMF submittal shall include the grade of virgin binder added and test results that show the combined binder (recovered binder from the RAP, virgin binder at the mix design proportions and warm mix asphalt additive if used) meets the requirements of the specified binder grade.

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

- b. Basis of Approval: On an annual basis, the Contractor shall submit to the Engineer any bituminous concrete mix design, and JMF anticipated for use on Department projects. Prior to the start of any paving operations, the mix design and JMF must be approved by the Engineer. Bituminous concrete mixture supplied to the project without an approved mix design and JMF will be rejected. The following information must be included in the mix design submittal:
 - a. Gradation, specific gravities and asphalt content of the RAP,
 - b. Source of RAP and percentage to be used.
 - c. Warm mix Technology and manufacturer's recommended additive rate and tolerances, mixing and compaction temperature ranges for the mix with and without the warm-mix technology incorporated.
 - d. Result of TSR testing, and if applicable Anti-strip manufacturer, and dosage rate.
 - e. Target Temperature at plant discharge.

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

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

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

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

Superpave mixture with CRCG: In addition to subarticles M.04.02 – 3 a through c, for bituminous concrete mixtures that contain CRCG, the Contractor shall submit a materials certificate to the Engineer stating that the CRCG complies with requirements stated in Article M.04.01, as applicable. Additionally, 1% hydrated lime, or other accepted non-stripping agent, shall be added to all mixtures containing CRCG. CRCG material shall not be used with any other recycling option.

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

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

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

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

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

Ratings are defined as:

“A” – Approved:

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

“PPT” – Pre-Production Trial:

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

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

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

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

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

Option B: When the Contractor or their representative performs a “PPT” test without being witnessed by an inspector, the Contractor shall submit the test results and a split sample including 2 gyratory molds, 5,000 grams of boxed bituminous concrete for binder and gradation determination, and 5,000 grams of cooled loose bituminous concrete for Gmm determination for verification testing and approval. Passing verifications will designate the bituminous concrete type to be on an “A” status. Failing verifications will require the contractor to submit additional trials.

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

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

“U” – No Acceptable Mix Design on File:

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

TABLE M.04.02- 2: SUPERPAVE MASTER RANGE FOR BITUMINOUS CONCRETE MIXTURE DESIGN CRITERIA

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

| Sieve | S0.25 | | | | S0.375 | | | | S0.5 | | | | S1 | | | |
|--------------------------|--|---------|-----------------|---------|-------------------------------|---------|-----------------|---------|-------------------------------|---------|-----------------|---------|-------------------------------|---------|-----------------|---------|
| | CONTROL POINTS ⁽³⁾ | | RESTRICTED ZONE | | CONTROL POINTS ⁽³⁾ | | RESTRICTED ZONE | | CONTROL POINTS ⁽³⁾ | | RESTRICTED ZONE | | CONTROL POINTS ⁽³⁾ | | RESTRICTED ZONE | |
| inches | Min (%) | Max (%) | Max (%) | Min (%) | Min (%) | Max (%) | Min (%) | Max (%) | 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 | - | - | - | - | - | - | - | - | 39.5 | 39.5 |
| #8 | 32 | 67 | 47.2 | 47.2 | 32 | 67 | 47.2 | 47.2 | 28 | 58 | 39.1 | 39.1 | 19 | 45 | 26.8 | 30.8 |
| #16 | - | - | 31.6 | 37.6 | - | - | 31.6 | 37.6 | - | - | 25.6 | 31.6 | - | - | 18.1 | 24.1 |
| #30 | - | - | 23.5 | 27.5 | - | - | 23.5 | 27.5 | - | - | 19.1 | 23.1 | - | - | 13.6 | 17.6 |
| #50 | - | - | 18.7 | 18.7 | - | - | 18.7 | 18.7 | - | - | 15.5 | 15.5 | - | - | 11.4 | 11.4 |
| #100 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| #200 | 2.0 | 10.0 | - | - | 2.0 | 10.0 | - | - | 2.0 | 10.0 | - | - | 1.0 | 7.0 | - | - |
| Pb ⁽¹⁾ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| VMA ⁽²⁾ (%) | 16.0 ± 1 | | | | 16.0 ± 1 | | | | 15.0 ± 1 | | | | 13.0 ± 1 | | | |
| VA (%) | 4.0 ± 1 | | | | 4.0 ± 1 | | | | 4.0 ± 1 | | | | 4.0 ± 1 | | | |
| Gse | JMF value | | | | JMF value | | | | JMF value | | | | JMF value | | | |
| Gmm | JMF ± 0.030 | | | | JMF ± 0.030 | | | | JMF ± 0.030 | | | | JMF ± 0.030 | | | |
| Dust/Pbe ⁽⁴⁾ | 0.6 – 1.2 | | | | 0.6 – 1.2 | | | | 0.6 – 1.2 | | | | 0.6 – 1.2 | | | |
| Agg. Temp ⁽⁵⁾ | 280 – 350F | | | | 280 – 350F | | | | 280 – 350F | | | | 280 – 350F | | | |
| Mix Temp ⁽⁶⁾ | 265 – 325 F | | | | 265 – 325 F | | | | 265 – 325 F | | | | 265 – 325 F | | | |
| Design TSR | ≥ 80% | | | | ≥ 80% | | | | ≥ 80% | | | | ≥ 80% | | | |
| T-283 Stripping | Minimal, as determined by the Engineer | | | | | | | | | | | | | | | |

TABLE M.04.02-3

SUPERPAVE MASTER RANGE FOR CONSENSUS PROPERTIES OF COMBINED AGGREGATE STRUCTURES

| Notes: (1) If less than 25 % of a given layer is within 4 inches of the anticipated top surface, the layer may be considered to be below 4 inches for mixture design purposes. | | | | | |
|---|--|---|---|--|---|
| Traffic Level | Design ESALs (80 kN) | Coarse Aggregate Angularity ⁽¹⁾ ASTM D 5821 | Fine Aggregate Angularity ⁽⁷⁾ AASHTO T 304 | Flat or Elongated Particles ASTM D 4791 | Sand Equivalent AASHTO T 176 |
| ----- | (million) | | | > # 4 | ----- |
| 1* | < 0.3 | 55/- - | 40 | 10 | 40 |
| 2 | 0.3 to < 3.0 | 75/- - | 40 | 10 | 40 |
| 3 | ≥ 3.0 | 95/90 | 45 | 10 | 45 |
| | Design ESALs are the anticipated project traffic level expected on the design lane, projected over a 20 year period, regardless of the 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 or elongated particles of materials retained on the #4 sieve, determined at 3:1 ratio. | Criteria presented as minimum values for fine aggregate passing the #8 sieve. |

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

TABLE M.04.02- 4: SUPERPAVE MASTER RANGE FOR TRAFFIC LEVELS AND DESIGN VOLUMETRIC PROPERTIES.

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

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

**TABLE M.04.02– 5: SUPERPAVE MINIMUM BINDER CONTENT
BY MIX TYPE & LEVEL.**

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

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

M.04.03— Production Requirements:

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

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

Control Chart(s) shall be developed and maintained for critical aspect(s) of the production process as determined by the Contractor. The control chart(s) shall identify the material property, applicable upper and lower control limits, and be updated with current test data. The control chart(s) shall be used as part of the quality control system to document variability of the bituminous concrete production process. The control chart(s) shall be submitted to the Engineer upon request.

The QCP shall also include the name and qualifications of a Quality Control Manager. The Quality Control Manager shall be responsible for the administration of the QCP, including compliance with the plan and any plan modifications. All daily QC sampling, inspection and test reports shall be reviewed by the Quality Control Manager and be submitted to the Engineer upon request.

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

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

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

The hauling vehicle from which samples are obtained shall be selected using stratified – random sampling based on the total estimated tons of production in accordance with ASTM D 3665, except that the first test shall be randomly taken from the first 151 tons or as directed by the Engineer.

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

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

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

The Contractor shall submit all acceptance tests results to the Engineer within 24 hours or prior to the next day's production. All acceptance test specimens and supporting documentation must be retained by the Contractor. Verification testing will be performed by the Engineer on the retained specimens in accordance with the Department's QA Program for Materials.

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

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

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

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

Table M.04.03 – 1: Acceptance Testing Frequency per Type/Level/Plant

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

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

Table M.04.03 – 2: Marshall Acceptance Test Procedures

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

- a. Cessation of Supply: Marshall Mix Production shall cease for the Project from any facility that consistently fails to produce mixture that meets the JMF and volumetric properties. The criteria for ceasing the supply of a class of mixture from any plant are as follows:
- i. Off-Test Status: The results of AASHTO T 164 or AASHTO T 308(M) and T 30(M) will be used to determine if the mixture is within the tolerances shown in Table M.04.02-1. The Contractor will be notified that a plant is "off test" for a class of mixture when the test results indicate that any single value for bitumen content or gradation are not within the tolerances shown in Table M.04.02-1 for that class of mixture.
 - ii. When multiple plants and silos are located at one site, mixture supplied to one project is considered as coming from one source for the purpose of applying the "off test" adjusted payment.
 - iii. If a test indicates that the bitumen content or gradation are outside the tolerances, the Contractor may make a single JMF change on classes 1, 2, 3, 4 and 12 as allowed by the Engineer prior to any additional testing. A JMF change shall

include the date and name of the Engineer that allowed it. Consecutive test results outside the requirements of Table M.04.02-1 JMF tolerances may result in rejection of the mixture.

- iv. The Engineer may cease supply of mixture from the plant when the test results from three non-consecutive samples of a class of mixture are not within the JMF tolerances or the test results from two non-consecutive samples not within the master range indicated in Table M.04.02-1 during any one production period, due to inconsistent production.
 - v. Any modification to the JMF shall not exceed 50% of the JMF tolerances indicated in Table M.04.02-1 for any given component of the mixture without approval of the Engineer. When such an adjustment is made to the bitumen, the corresponding production percentage of bitumen shall be revised accordingly.
- b. Adjustments for Off Test Mixture under Cessation of Supply: The bituminous concrete plant shall cease supplying to the project:
- i. When the test results from three consecutive samples are “off test” and not within the JMF tolerances or,
 - ii. The test results from two consecutive samples are “off test” and not within the ranges indicated in Table M.04.02 – 1 or,
 - iii. When the percent of material passing the minus #200 sieve material exceeds the percent of extracted bitumen content for three consecutive samples during any production period of the values stated in Table M.04.02-1:
 - a. The quantity of mixtures shipped to the project determined to be “off test” and outside the tolerances will be tabulated by the Engineer and will be adjusted in accordance with Section 4.06.
 - b. Following cessation, a trial production period will be required at the plant for that class of mixture. Use of that class of mixture from that plant will be prohibited on the Project until the plant has demonstrated the ability to consistently produce acceptable mixture.
 - c. When the Engineer has accepted the mixtures from the trial production period, the use of that mixture on the Project may resume.

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

Table M.04.03– 3: Superpave Acceptance Testing Procedures

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

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

If any material source changes from the previous year, or during the production season, a mix design TSR as well as a production TSR is required for the new mixture. The AASHTO T 283(M) test shall be performed at an AASHTO Materials Reference Laboratory (AMRL) by NETTCP Certified Technicians. The test results and specimens shall be submitted to the Engineer for review. This shall be completed within 30 days from the start of production. Superpave mixtures that require anti-strip additives (either liquid or mineral) shall continue to meet all requirements specified herein for binder and bituminous concrete. The Contractor shall submit the name, manufacturer, percent used, and MSDS sheet for the anti-strip additive (if applicable) to the Engineer. In addition, compaction of samples shall be accomplished utilizing an accepted

Superpave Gyrotory Compactor (SGC), supplied by the Contractor. The SGC shall be located at the facility supplying mixture to the project.

a. Determination of Off-Test Status:

i. Off Test Status: Superpave mixes shall be considered “*off test*” when any Control Point Sieve, VA, VMA, and Gmm values are outside of the limits specified in Table M.04.03-3 and the computed binder content (Pb) established by AASHTO T308(M) or as documented on the vehicle delivery ticket is below the minimum binder content stated in sub article M.04.03-5. Note that further testing of samples or portions of samples not initially tested for this purpose cannot be used to change the status.

ii. Any time the bituminous concrete mixture is considered Off-test:

1. The Contractor shall notify the Engineer (and project staff) when the plant is “*off test*” for a type of mixture. When multiple plants and silos are located at one site, mixture supplied to one project is considered as coming from one source for the purpose of applying the “*off test*” determination.
2. The Contractor must take immediate actions to correct the deficiency, minimize “*off test*” production to the project, and obtain an additional Process Control (PC) test after any corrective action to verify production is in conformance to the specifications. A PC test will not be used for acceptance and is solely for the use of the Contractor in its quality control process.

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

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

1. Bituminous concrete mixture is “off test” on three (3) consecutive tests for VMA or Gmm, regardless of date of production due to inconsistency (i.e., small production requires 1 test per day for multiple days).

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

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

c. Cessation of Supply for Superpave Mixtures with Payment Adjustment:

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

A Contractor shall cease to supply mixture from a plant when the binder content (Pb) is below the requirements of Table M.04.03-5 on the ignition oven test result after two (2) consecutive tests, regardless of the date of production.

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

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

JMF changes to the G_{mm} or mix Absorption Correction Factor (A_{cf}) are only permitted prior to or after a production shift for all bituminous-concrete types of mixtures and only when they:

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

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

| <i>Notes:</i> (1) 300°F minimum after October 15. (2) Minimum Pb as specified in Table M.04.03-5 (3) Control point range is also defined as the master range for that mix. (4) JMF tolerances shall be defined as the limits for production compliance. VA & Pb payment is subject to adjustments, as defined in sub-article 4.06.04 - 2. (5) For WMA, lower minimum aggregate temperature will require Engineer's approval. (6) For WMA and/or polymer modified asphalt, the mix temperature shall meet manufacturer's recommendations. In addition, for WMA, the maximum mix temperature shall not exceed 325°F once the WMA technology is incorporated. | | | | | | | | | |
|--|-------------------------------|--------|-------------------------------|--------|---------------------------------------|--------|-------------------------------|--------|----------------------------------|
| | S0.25 | | S0.375 | | S0.5 | | S1 | | Tolerances |
| Sieve | CONTROL POINTS ⁽⁴⁾ | | CONTROL POINTS ⁽⁴⁾ | | CONTROL POINTS ⁽⁴⁾ | | CONTROL POINTS ⁽⁴⁾ | | JMF Limits ⁽⁴⁾ |
| inches | Min(%) | Max(%) | Min(%) | Max(%) | Min(%) | Max(%) | Min(%) | Max(%) | ± Tol |
| 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 | - | - | - | - | - | - | - | - | |
| #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– 4: SUPERPAVE MASTER RANGE FOR TRAFFIC LEVELS AND DESIGN VOLUMETRIC PROPERTIES.

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

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

TABLE M.04.03– 5: SUPERPAVE MINIMUM BINDER CONTENT BY MIX TYPE & LEVEL.

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

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

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

| AASHTO Standard Specification | |
|--|--|
| Reference | Modification |
| M 320 | <p>1. Mass change for PG 64-22 shall be a maximum loss of 0.5% when tested in accordance with AASHTO T 240.</p> <p>2. The two bottles used for the mass change determination may be re-heated and used for further testing.</p> |
| AASHTO Standard Methods of Test | |
| Reference | Modification |
| T 27 | Section 7.7 Samples are not washed |
| T 30 | Section 6.2 thru 6.5 Samples are not routinely washed |
| T 168 | <p>Samples are taken at one point in the pile. All types of bituminous concrete except Class 4 are scooped from the sample container instead of remixing and quartering. (Method verified by laboratory study).</p> <p>Samples from a hauling vehicle are taken from only one point instead of three as specified.</p> <p>Selection of Samples: Sampling is equally important as the testing, and the sampler shall use every precaution to obtain samples that are truly representative of the bituminous mixture.</p> <p>Box Samples: In order to enhance the rate of processing samples taken in the field by construction or maintenance personnel the samples will be tested in the order received and data processed to be determine conformance to material specifications and to prioritize inspections by laboratory personnel.</p> |
| T 195 | Section 4.3 only one truck load of mixture is sampled. Samples are taken from opposite sides of the load. |
| T 209 | <p>Article 9.5.1 Bowl is suspended 2 minutes prior to reading rather than 10 minutes. This makes no significant difference in results.</p> <p>Section 7.2 The average of two bowls is used proportionally in order to satisfy minimum mass requirements.</p> <p>8.3 Omit Pycnometer method.</p> |
| T 245 | <p>Article 3.3.2 A compacting temperature of 140 to 146°C (284 to 295°F) is used</p> <p>Article 3.5.2 Seventy-five (75) blows per side are used on Classes 1 and 12, per ConnDOT design requirements</p> <p>Section 3.1 for production testing: one specimen is molded for each extraction test for production over 275 metric tons/day (300 tons/day). Other mixtures: two specimens per extraction test.</p> |
| T 283 | When foaming technology is used, the material used for the fabrication of the specimens shall be cooled to room temperature, and then reheated to the manufactures recommended compaction temperature prior to fabrication of the |

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| | specimens. |
| T 308 | <p>In addition to the standard testing procedure, the Department has adopted a procedure that addresses a correction factor that is calculated using the composite aggregate percentages (Composite Aggregate Correction Factor Method (CACF)).</p> <p>The aggregate is burned in compliance with the standard AASHTO procedure Method A exclusively. All modifications are listed for this method only.</p> <p>A2.2 and A2.3 Omit</p> <p>A2.4 Omit. Replace with: Determine an aggregate gradation for each aggregate component “blank” in accordance with T30.</p> <p>A2.5 Omit. Replace with: The individual aggregate samples are to be dried in an oven at a maximum temperature of $148 \pm 5^{\circ}\text{C}$ ($300 \pm 9^{\circ}\text{F}$) to a constant weight. RAP samples are to be oven dried at a maximum temperature of $110 \pm 5^{\circ}\text{C}$ ($230 \pm 9^{\circ}\text{F}$) to a constant weight. RAP samples will be burned for total binder content only and not to arrive at a correction factor for a mixture.</p> <p>A2.6 and A2.7 and A2.8 Omit.</p> <p>A2.8.1 Omit Note 2</p> <p>A2.9 Omit. Replace with: Perform a gradation analysis on the residual aggregate in accordance with T30 and compare it to the gradation performed prior to burning.</p> <p>A2.9.1 and A2.9.2 Omit</p> <p>The correction factors for each size aggregate are provided by the Contractor to the Engineer prior to the Annual Plant Inspection. The Engineer may verify the correction factors. The Composite Aggregate Correction Factor (CACF) for any mixture may be calculated by summing the result of the correction factor for each individual aggregate multiplied by the percentage of that aggregate in the overall mixture.</p> <p>(Note: All correction factors must be re-calculated every time the percentage of any aggregate changes within the mixture.)</p> <p>If the average corrected Pb content from the ignition oven differs by 0.3% or more from the average bituminous concrete facility production weigh ticket in five (5) consecutive tests regardless of the production date (moving average), the Contractor shall immediately investigate, determine an assignable cause and correct the issue. When two consecutive moving average differences are 0.3% or more, the Engineer may require a new correction factor calculation for all the aggregate components in the mix.</p> <p>In addition to the standard testing procedure, the Department has adopted a procedure that addresses the time involved between sampling the hot-mix asphalt specimen and the beginning of the test.</p> <p>6.3 Omit. Replace with: The test specimen must be ready to be placed in an approved ignition furnace for testing within ten minutes of being obtained from the hauling vehicle and the test shall start immediately after.</p> |

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

| | |
|--------------------|--|
| | <p>mix design D_f (derived from formula XI.2 APPENDIX XI of AASHTO R 35) for each class of material, in accordance with <i>Formula 5.16.1B</i>.</p> <p><i>Formula 5.16.1B.</i> Determining the Density Factor (D_f) of mix design bituminous concrete:</p> $D_f = \left(\frac{G_{se} - G_{sb}}{G_{sa} - G_{sb}} \right)$ <p>Where: D_f = Density Factor or multiplier determined by AASHTO R-35(M) G_{se} = Effective Specific Gravity determined by AASHTO M-323 at plant G_{sa} = Apparent Specific Gravity determined by AASHTO T 84/85 of mix design G_{sb} = Bulk Specific Gravity determined by AASHTO T 84/85 of mix design</p> |
| <p>R 26</p> | <p>Quality Control Plans must be formatted in accordance with AASHTO R 26, certifying suppliers of performance-graded asphalt binders, Section 9.0, Suppliers Quality Control Plan, and “NEAUPG Model PGAB QC Plan.”</p> <ol style="list-style-type: none"> 1. The Department requires that all laboratory technician(s) responsible for testing PG-binders be certified or Interim Qualified by the New England Transportation Technician Certification Program (NETTCP) as a PG Asphalt Binder Lab Technician. 2. Sampling of asphalt binders should be done under the supervision of qualified technician. NETCP “Manual of Practice,” Chapter 2 Page 2-4 (Key Issues 1-8). 3. A copy of the Manual of Practice for testing asphalt binders in accordance with the Superpave PG Grading system shall be in the testing laboratory. 4. All laboratories testing binders for the Department are required to be accredited by the AASHTO Materials Reference Laboratory (AMRL). 5. Sources interested in being approved to supply PG-binders to the Department by use of an “in-line blending system,” must record properties of blended material, and additives used. 6. Each source of supply of PG-binder must indicate that the binders contain no additives used to modify or enhance their performance properties. Binders that are manufactured using additives, modifiers, extenders etc., shall disclose the type of additive, percentage and any handling specifications/limitations required. <p>Suppliers shall provide AASHTO M-320 Table 2 testing at a minimum of once per month on one sample of material. Each supplier shall rotate the PG grade each month (including polymer-modified asphalt (PMA)), so that data can be collected for all the grades produced.</p> |

ON-THE-JOB TRAINING (OJT) WORKFORCE DEVELOPMENT PILOT

Description

To provide construction industry related job opportunities to minorities, women and economically disadvantaged individuals; and to increase the likelihood of a diverse and inclusive workforce on Connecticut Department of Transportation (ConnDOT) projects.

All contractors (existing and newcomers) will be automatically placed in the Workforce Development Pilot. Standard OJT requirements typically associated with individual projects will no longer be applied at the project level for new projects. Instead, these requirements will be applicable on an annual basis for each contractor performing work on ConnDOT projects.

The OJT Workforce Development Pilot will allow a contractor to train employees on Federal, State and privately funded projects located in Connecticut. However, contractors should give priority to training employees on ConnDOT Federal-Aid funded projects.

Funding

The Department will establish an OJT fund annually from which contractors may bill the Department directly for eligible trainee hours. The funds for payment of trainee hours on federal-aid projects will be allocated from the ½ of 1% provided for OJT funding, and will be based on hours trained, not to exceed a maximum of \$25,000.00 per year; per contractor.

Minorities and Women

Developing, training and upgrading of minorities, women and economically disadvantaged individuals toward journeyman level status is the primary objective of this special training provision. Accordingly, the Contractor shall make every effort to enroll minority, women and economically disadvantaged individuals as trainees to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training whether a member of a minority group or not.

Assigning Training Goals

The Department, through the OJT Program Coordinator, will assign training goals for a calendar year based on the contractor's past two year's activities and the contractor's anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time, the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from one (1) to six (6) per

contractor per calendar year. Each January, a summary of the trainees required and the OJT Workforce Development Pilot package will be sent to participating contractors. The number of trainees assigned to each contractor in the summary will increase proportionately not to exceed 6, as shown in the following table. This package will also be provided to contractors as they become newly eligible for the OJT Workforce Development Pilot throughout the remainder of the year. Projects awarded after September 30 will be included in the following year's Program.

The dollar thresholds for training assignments are as follows:

| | |
|--------------------|------------|
| \$4.5 – 8 million= | 1 trainee |
| \$ 9 – 15 million= | 2 trainees |
| \$16 – 23 million= | 3 trainees |
| \$24 – 30 million= | 4 trainees |
| \$31 – 40 million= | 5 trainees |
| \$41 – and above= | 6 trainees |

Training Classifications

Preference shall be given to providing training in the following skilled work classifications. However, the classifications established are not all-inclusive:

| | |
|---------------------|----------------------------------|
| Equipment Operators | Electricians |
| Laborers | Painters |
| Carpenters | Iron / Reinforcing Steel Workers |
| Concrete Finishers | Mechanics |
| Pipe Layers | Welders |

The Department has on file common training classifications and their respective training requirements; that may be used by the contractors. Contractors shall submit new classifications for specific job functions that their employees are performing. The Department will review and recommend for acceptance the new classifications proposed by contractors, if applicable. New classifications shall meet the following requirements:

Proposed training classifications are reasonable and realistic based on the job skill classification needs, and the number of training hours specified in the training classification is consistent with common practices and provides enough time for the trainee to obtain journeyman level status.

Where feasible, 25% percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman level status or in which they have been employed as a journeyman.

Records and Reports

The Contractor shall maintain enrollment in the program and submit all required reports documenting company compliance under these contract requirements. These documents and any other information shall be submitted to the OJT Program Coordinator as requested.

Upon the trainee's completion and graduation from the program, the Contractor shall provide each trainee with a certification Certificate showing the type and length of training satisfactorily completed.

Trainee Interviews

In order to determine the continued effectiveness of the OJT Program in Connecticut, the department will periodically conduct personal interviews with current trainees and may survey recent graduates of the program. This enables the OJT Program Coordinator to modify and improve the program as necessary. Trainee interviews are generally conducted at the job site to ensure that the trainees' work and training is consistent with the approved training program.

Trainee Wages

Contractors shall compensate trainees on a graduating pay scale based upon a percentage of the prevailing minimum journeyman wages (Davis-Bacon Act). Minimum pay shall be as follows:

| | |
|------------|---|
| 60 percent | of the journeyman wage for the first half of the training period |
| 75 percent | of the journeyman wage for the third quarter of the training period |
| 90 percent | of the journeyman wage for the last quarter of the training period |

In no case, will the trainee be paid less than the prevailing rate for general laborer as shown in the contract wage decision (must be approved by the Department of Labor).

Achieving or Failing to Meet Training Goals

The Contractor will be credited for each trainee currently enrolled or who becomes enrolled in the approved training program and providing they receive the required training under the specific training program. Trainees will be allowed to be transferred between projects if required by the Contractor's schedule and workload. The OJT Program Coordinator must be notified of transfers within five (5) days of the transfer or reassignments by e-mail (Phylisha.Coles@ct.gov).

Where a contractor does not or cannot achieve its annual training goal with female or minority trainees, they must produce adequate Good Faith Efforts documentation. Good Faith Efforts are those designed to achieve equal opportunity through positive, aggressive, and continuous result-oriented measures. 23 CFR § 230.409(g) (4). Contractors should request minorities and females from unions when minorities and females are under-represented in the contractor's workforce.

Whenever a contractor requests ConnDOT approval of someone other than a minority or female, the contractor must submit documented evidence of its Good Faith Efforts to fill that position with a minority or female. When a non-minority male is accepted, a contractor must continue to attempt to meet its remaining annual training goals with females and minorities.

Where a contractor has neither attained its goal nor submitted adequate Good Faith Efforts documentation, ConnDOT will issue a letter of non-compliance. Within thirty (30) days of receiving the letter of non-compliance, the contractor must submit a written Corrective Action Plan (CAP) outlining the steps that it will take to remedy the non-compliance. The CAP must be approved by ConnDOT. Failure to comply with the CAP may result in your firm being found non-responsive for future projects.

Measurement and Payment

Optional reimbursement will be made to the contractor for providing the required training under this special provision on ConnDOT Federal-Aid funded projects only.

Contractor will be reimbursed at \$0.80 for each hour of training given to an employee in accordance with an approved training or apprenticeship program. This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the contractor from receiving other reimbursement.

Reimbursement for training is made annually or upon the trainees completion and not on a monthly basis. No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the Contractor.

Program reimbursements will be made directly to the prime contractor on an annual basis. To request reimbursement, prime contractors must complete the Voucher for OJT Workforce Development Pilot Hourly Reimbursement for each trainee in the OJT Program. This form is included in the OJT Workforce Development Pilot package and is available on the Department's web site at:

www.ct.gov/dot

The completed form must be submitted to the Office of Contract Compliance for approval. The form is due on the 15th day of January for each trainee currently enrolled and for hours worked on ConnDOT Federal-Aid funded projects only.

D.B.E. SUBCONTRACTORS AND MATERIAL SUPPLIERS OR MANUFACTURERS

January 2013

I. ABBREVIATIONS AND DEFINITIONS AS USED IN THIS SPECIAL PROVISION

A. *CTDOT* means the Connecticut Department of Transportation.

B. *USDOT* means the U.S. Department of Transportation, including the Office of the Secretary, the Federal Highway Administration (“FHWA”), the Federal Transit Administration (“FTA”), and the Federal Aviation Administration (“FAA”).

C. *Broker* means a party acting as an agent for others in negotiating Contracts, Agreements, purchases, sales, etc., in return for a fee or commission.

D. *Contract, Agreement or Subcontract* means a legally binding relationship obligating a seller to furnish supplies or services (including but not limited to, construction and professional services) and the buyer to pay for them. For the purposes of this provision, a lease for equipment or products is also considered to be a Contract.

E. *Contractor* means a consultant, second party or any other entity under Contract to do business with CTDOT or, as the context may require, with another Contractor.

F. *Disadvantaged Business Enterprise (“DBE”)* means a for profit small business concern:

1. That is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51 percent of the stock is owned by one or more such individuals; and
2. Whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it; and
3. Certified by CTDOT under Title 49 of the Code of Federal Regulations, Part 26, (Title 49 CFR Part 23 of the Code of Federal Regulations for Participation of Disadvantaged Business Enterprise in Airport Concessions)

G. *USDOT-assisted Contract* means any Contract between CTDOT and a Contractor (at any tier) funded in whole or in part with USDOT financial assistance.

H. *Good Faith Efforts (“GFE”)* means all necessary and reasonable steps to achieve a DBE goal or other requirement which by their scope, intensity, and appropriateness to the objective, can reasonably be expected to fulfill the program requirement.

I. *Small Business Concern* means, with respect to firms seeking to participate as DBEs in USDOT-assisted Contracts, a small business concern as defined pursuant to Section 3 of the Small Business Act and Small Business Administration (“SBA”) regulations implementing it (13 CFR Part 121) that also does not exceed the cap on average annual gross receipts in 49 CFR Part 26, Section 26.65(b).

J. *Socially and Economically Disadvantaged Individual* means any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who is:

1. Any individual who CTDOT finds, on a case-by-case basis, to be a socially and economically disadvantaged individual.
2. Any individuals in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged:
 - “Black Americans”, which includes persons having origins in any of the Black racial groups of Africa;
 - “Hispanic Americans”, which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;
 - “Native Americans”, which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians.
 - “Asian-Pacific Americans”, which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kiribati, Juvalu, Nauru, or Federated States of Micronesia;
 - “Subcontinent Asian Americans”, which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;
 - Women;
 - Any additional groups whose members are designated as socially and economically disadvantaged by the SBA, at such time as the SBA designation becomes effective.

K. *Commercially Useful Function (“CUF”)* means the DBE is responsible for the execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved with its own forces and equipment. The DBE must be responsible for procuring, determining quantity, negotiating price, determining quality and paying for all materials (where applicable) associated with their work. The DBE must also perform at least 30% of the total cost of its contract with its own workforce.

II. ADMINISTRATIVE REQUIREMENTS

A. General Requirements

A DBE goal percentage equaling 9 percent (%) of the Contract value has been established for this Contract. This DBE goal percentage will be applied to the final Contract value to ultimately determine the required DBE goal. If additional work is required, DBE firms should be provided the appropriate opportunities to achieve the required DBE goal.

In order to receive credit toward the Contract DBE goal, the firms utilized as DBE subcontractors or suppliers must be certified as DBEs in the type of work to be counted for credit by CTDOT’s Office of Contract Compliance prior to the date of the execution of the subcontract. Neither CTDOT nor the State of Connecticut’s Unified Certification Program (UCP) makes any representation as to any DBE’s

technical or financial ability to perform the work. Prime contractors are solely responsible for performing due diligence in hiring DBE subcontractors.

All DBEs shall perform a CUF for the work that is assigned to them. The Contractor shall monitor and ensure that the DBE is in compliance with this requirement. The Connecticut DBE UPC Directory of certified firms can be found on the CTDOT website <http://www.ct.gov/dot>. The directory lists certified DBE firms with a description of services that they are certified to perform. Only work identified in this listing may be counted towards the project's DBE goal. A DBE firm may request to have services added at any time by contacting CTDOT's Office of Contract Compliance. No credit shall be counted for any DBE firm found not to be performing a CUF.

Once a Contract is awarded, all DBEs that were listed on the pre-award DBE commitment document must be utilized. The Contractor is obligated to provide the value and items of the work originally established in the pre-award documentation to the DBE firms listed in the pre-award documentation. Any modifications to the pre-award commitment must follow the procedure established in Section II-C.

The Contractor shall designate a liaison officer who will administer the Contractor's DBE program. Upon execution of this Contract, the name of the liaison officer shall be furnished in writing to CTDOT's unit administering the Contract, CTDOT's Office of Contract Compliance and CTDOT's Office of Construction ("OOC"). Contact information for the designated liaison officer shall be furnished no later than the scheduled date for the pre-construction meeting.

The Contractor shall submit a bi-monthly report to the appropriate CTDOT unit administering the Contract. This report shall indicate what work has been performed to date, with the dollars paid and percentage of DBE goal completed.

Verified payments made to DBEs shall be included in this bi-monthly report. A sample form is included on the CTDOT website.

In addition, the report shall include:

1. A projected time frame of when the remaining work is to be completed for each DBE.
2. A statement by the Contractor either confirming that the approved DBEs are on schedule to meet the Contract goal, or that the Contractor is actively pursuing a GFE.
3. If retainage is specified in the Contract specifications, then a statement of certification that the subcontractors' retainage is being released in accordance with 1.08.01 (Revised or supplemented).

Failure by the Contractor to provide the required reports may result in CTDOT withholding an amount equal to one percent (1%) of the monthly estimate until the required documentation is received.

The Contractor shall receive DBE credit when a DBE, or any combination of DBEs, perform work under the Contract in accordance with this specification.

Only work actually performed by and/or services provided by DBEs which are certified for such work and/or services, as verified by CTDOT, can be counted toward the DBE goal. Supplies and equipment a DBE purchases or leases from the Contractor or its affiliate cannot be counted toward the goal.

Monitoring of the CUF will occur by CTDOT throughout the life of the project. If it is unclear that the DBE is performing the work specified in its subcontract with the prime Contractor, further review may be required. If it is determined that the DBE is not performing a CUF, then the work performed by that DBE will not be counted towards the DBE goal percentage.

B. Subcontract Requirements

The Contractor shall submit to CTDOT's OOC all requests for subcontractor approvals on the standard CLA-12 forms provided by CTDOT. The dollar amount and items of work identified on the CLA-12 form must, at minimum, equal the dollar value submitted in the pre-award commitment. CLA-12 forms can be found at <http://www.ct.gov/dot/construction> under the "Subcontractor Approval" section. All DBE subcontractors must be identified on the CLA-12 form, regardless of whether they are being utilized to meet a Contract goal percentage. A copy of the legal Contract between the Contractor and the DBE subcontractor/supplier, a copy of the Title VI Contractor Assurances and a copy of the Required Contract Provision for Federal Aid Construction Contracts (Form FHWA-1273) (Federal Highway Administration projects only) must be submitted along with a request for subcontractor approval. These attachments cannot be substituted by reference.

If retainage is specified in the Contract specifications, then the subcontract agreement must contain a prompt payment mechanism that acts in accordance with Article 1.08.01 (Revised or supplemented).

If the Contract specifications do not contain a retainage clause, the Contractor shall not include a retainage clause in any subcontract agreement, and in this case, if a Contractor does include a retainage clause, it shall be deemed unenforceable.

In addition, the following documents are to be included with the CLA-12, if applicable:

- An explanation indicating who will purchase material.
- A statement explaining any method or arrangement for utilization of the Contractor's equipment.

The subcontract must show items of work to be performed, unit prices and, if a partial item, the work involved by all parties. If the subcontract items of work or unit prices are modified, the procedure established in Section II-C must be followed.

Should a DBE subcontractor further sublet items of work assigned to it, only lower tier subcontractors who are certified as a DBE firm will be counted toward the DBE goal. If the lower tier subcontractor is a non-DBE firm, the value of the work performed by that firm will not be counted as credit toward the DBE goal.

The use of joint checks between a DBE firm and the Contractor is acceptable, provided that written approval is received from the OOC prior to the issuance of any joint check. Should it become necessary to issue a joint check between the DBE firm and the Contractor to purchase materials, the DBE firm must be responsible for negotiating the cost, determining the quality and quantity, ordering the material and installing (where applicable), and administering the payment to the supplier. The Contractor should not make payment directly to suppliers.

Each subcontract the Contractor signs with a subcontractor must contain the following assurance:

“The subcontractor/supplier/manufacture shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor/subcontractor/supplier/manufacture to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.”

C. Modification to Pre-Award Commitment

Contractors may not terminate for convenience any DBE subcontractor or supplier that was listed on the pre-award DBE commitment without prior written approval of the OOC. This includes, but is not limited to, instances in which a Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm. Prior to approval, the Contractor must demonstrate to the satisfaction of the OOC, that it has good cause, as found in 49CFR Part 26.53 (f)(3), for termination of the DBE firm.

Before transmitting its request for approval to terminate pre-award DBE firms to the OOC, the Contractor must give written notice to the DBE subcontractor and include a copy to the OOC of its notice to terminate and/or substitute, and the reason for the notice.

The Contractor must provide five (5) days for the affected DBE firm to respond. This affords the DBE firm the opportunity to advise the OOC and the Contractor of any reasons why it objects to the termination of its subcontract and why the OOC should not approve the Contractor’s action.

Once the Contract is awarded, should there be any amendments or modifications of the approved pre-award DBE submission other than termination of a DBE firm, the Contractor shall follow the procedure below that best meets the criteria associated with the reason for modification:

1. If the change is due to a scope of work revision or non-routine quantity revision by CTDOT, the Contractor must notify CTDOT’s OOC in writing or via electronic mail that their DBE participation on the project may be impacted as soon as they are aware of the change. In this case, a release of work from the DBE firm may not be required; however the Contractor must concurrently notify the DBE firm in writing, and copy the OOC for inclusion in the project DBE file. This does not relieve the Contractor of its obligation to meet the Contract specified DBE goal, or of any other responsibility found in this specification.
2. If the change is due to a factor other than a CTDOT directive, a request for approval in writing or via electronic mail of the modification from the OOC must be submitted, along with an explanation of the change(s), prior to the commencement of work. The Contractor must also obtain a letter of release from the originally named DBE indicating their concurrence with the change, and the reason(s) for their inability to perform the work. In the event a release cannot be obtained, the Contractor must document all efforts made to obtain it.
3. In the event a DBE firm that was listed in the pre-award documents is **unable** or **unwilling** to perform the work assigned, the Contractor shall:

- Notify the OOC Division Chief immediately and make efforts to obtain a release of work from the firm.
- Submit documentation that will provide a basis for the change to the OOC for review and approval prior to the implementation of the change.
- Use the DBE Directory to identify and contact firms certified to perform the type of work that was assigned to the unable or unwilling DBE firm. The Contractor should also contact CTDOT's Office of Contract Compliance for assistance in locating additional DBE firms to the extent needed to meet the contract goal.

Should a DBE subcontractor be terminated or fail to complete work on the Contract for any reason, the Contractor must make a GFE to find another DBE subcontractor to substitute for the original DBE. The DBE replacement shall be given every opportunity to perform at least the same amount of work under the Contract as the original DBE subcontractor.

If the Contractor is unable to find a DBE replacement:

- The Contractor should identify other contracting opportunities and solicit DBE firms in an effort to meet the Contract DBE goal requirement, if necessary, and provide documentation to support a GFE. (Refer to GFE in Section III.)
- The Contractor must demonstrate that the originally named DBE, who is unable or unwilling to perform the work assigned, is in default of its subcontract, or identify other issues that affected the DBE firm's ability to perform the assigned work. **The Contractor's ability to negotiate a more advantageous agreement with another subcontractor is not a valid basis for change.**

III. GOOD FAITH EFFORTS

The DBE goal is **NOT** reduced or waived for projects where the Contractor receives a Pre-Award GFE determination from the Office of Contract Compliance prior to the award of the Contract. It remains the responsibility of the Contractor to make a continuing GFE to achieve the specified Contract DBE goal. The Contractor shall pursue every available opportunity to obtain additional DBE firms and document all efforts made in such attempts.

At the completion of all Contract work, the Contractor shall submit a final report to CTDOT's unit administering the Contract indicating the work done by and the dollars paid to DBEs. Only verified payments made to DBEs performing a CUF will be counted towards the Contract goal.

Goal attainment is based on the total Contract value, which includes all construction orders created during the Contract. If the Contractor does not achieve the specified Contract goal for DBE participation or has not provided the value of work to the DBE firms originally committed to in the pre-award submission, the Contractor shall submit documentation to CTDOT's unit administering the Contract detailing the GFE made during the performance of the Contract to satisfy the goal.

A GFE should consist of the following, where applicable (CTDOT reserves the right to request additional information):

1. A detailed statement of the efforts made to replace an unable or unwilling DBE firm, and a description of any additional subcontracting opportunities that were identified and offered to DBE firms in order to increase the likelihood of achieving the stated goal.
2. A detailed statement, including documentation of the efforts made to contact and solicit bids from certified DBEs, including the names, addresses, and telephone numbers of each DBE firm contacted; the date of contact and a description of the information provided to each DBE regarding the scope of services and anticipated time schedule of work items proposed to be subcontracted and the response from firms contacted.
3. Provide a detailed explanation for each DBE that submitted a subcontract proposal which the Contractor considered to be unacceptable stating the reason(s) for this conclusion.
4. Provide documentation, if any, to support contacts made with CTDOT requesting assistance in satisfying the specified Contract goal.
5. Provide documentation of all other efforts undertaken by the Contractor to meet the defined goal. Additional documentation of efforts made to obtain DBE firms may include but will not be limited to:
 - Negotiations held in good faith with interested DBE firms, not rejecting them without sound reasons.
 - Written notice provided to a reasonable number of specific DBE firms in sufficient time to allow effective participation.
 - Those portions of work that could be performed by readily available DBE firms.

In instances where the Contractor can adequately document or substantiate its GFE and compliance with other DBE Program requirements, the Contractor will have satisfied the DBE requirement and no administrative remedies will be imposed.

IV. PROJECT COMPLETION

At the completion of all Contract work, the Contractor shall:

1. Submit a final report to CTDOT's unit administering the Contract indicating the work done by, and the dollars paid to DBEs.
2. Submit verified payments made to all DBE subcontractors for the work that was completed.
3. Submit documentation detailing any changes to the DBE pre-award subcontractors that have not met the original DBE pre-award commitment, including copies of the Department's approvals of those changes.
4. Retain all records for a period of three (3) years following acceptance by CTDOT of the Contract and those records shall be available at reasonable times and places for inspection by authorized representatives of CTDOT and Federal agencies. If any litigation, claim, or audit is started before

the expiration of the three (3) year period, the records shall be retained until all litigation, claims, or audit findings involving the records are resolved.

If the Contractor does not achieve the specified Contract goal for DBE participation in addition to meeting the dollar value committed to the DBE subcontractors identified in the pre-award commitment, the Contractor shall submit documentation to CTDOT's unit administering the Contract detailing the GFE made during the performance of the Contract to satisfy the goal.

V. SHORTFALLS

A. Failure to meet DBE goals

As specified in (II-A) above, attainment of the Contract DBE goal is based on the final Contract value. The Contractor is expected to achieve the amount of DBE participation originally committed to at the time of award; however, additional efforts must be made to provide opportunities to DBE firms in the event a Contract's original value is increased during the life of the Contract.

The Contractor is expected to utilize the DBE subcontractors originally committed in the DBE pre-award documentation for the work and dollar value that was originally assigned.

If a DBE is terminated or is unable or unwilling to complete its work on a Contract, the Contractor shall make a GFE to replace that DBE with another certified DBE to meet the Contract goal.

The Contractor shall immediately notify the OOC of the DBE's inability or unwillingness to perform, and provide reasonable documentation and make efforts to obtain a release of work from the firm.

If the Contractor is unable to find a DBE replacement, then the Contractor should identify other contracting opportunities and solicit DBE firms in an effort to meet the Contract DBE goal requirement, if necessary, and provide documentation to support a GFE.

When a DBE is unable or unwilling to perform, or is terminated for just cause, the Contractor shall make a GFE to find other DBE opportunities to increase DBE participation to the extent necessary to at least satisfy the Contract goal.

For any DBE pre-award subcontractor that has been released appropriately from the project, no remedy will be assessed, provided that the Contractor has met the criteria described in Section II-C.

B. Administrative Remedies for Non-Compliance:

In cases where the Contractor has failed to meet the Contract specified DBE goal or the DBE pre-award commitment, and where no GFE has been demonstrated, then one or more of the following administrative remedies will be applied:

1. A reduction in Contract payments to the Contractor as determined by CTDOT, not to exceed the shortfall amount of the **DBE goal**. The maximum shortfall will be calculated by multiplying the

Contract DBE goal (adjusted by any applicable GFE) by the final Contract value, and subtracting any verified final payments made to DBE firms by the Contractor.

2. A reduction in Contract payments to the Contractor determined by CTDOT, not to exceed the shortfall amount of the **pre-award commitment**. The maximum shortfall will be calculated by subtracting any verified final payments made by the Contractor to each DBE subcontractor from the amount originally committed to that subcontractor in the pre-award commitment.
3. A reduction in Contract payments to the Contractor determined by CTDOT for any pre-award DBE subcontractor who has not obtained the dollar value of work identified in the DBE pre-award commitment and has not followed the requirements of Section II-C or for any DBE firm submitted for DBE credit that has not performed a CUF.
4. The Contractor being required to submit a written DBE Program Corrective Action Plan to CTDOT for review and approval, which is aimed at ensuring compliance on future projects.
5. The Contractor being required to attend a Non-Responsibility Meeting on the next contract where it is the apparent low bidder.
6. The Contractor being suspended from bidding on contracts for a period not to exceed six (6) months.

VI. CLASSIFICATIONS OTHER THAN SUBCONTRACTORS

A. Material Manufacturers

Credit for DBE manufacturers is 100% of the value of the manufactured product. A manufacturer is a firm that operates or maintains a factory or establishment that produces on the premises the materials or supplies obtained by the Contractor.

If the Contractor elects to utilize a DBE manufacturer to satisfy a portion of, or the entire specified DBE goal, the Contractor must provide the OOC with:

- Subcontractor Approval Form (CLA-12) indicating the firm designation,
- An executed "Affidavit for the Utilization of Material Suppliers or Manufacturers" (sample attached), and
- Substantiation of payments made to the supplier or manufacturer for materials used on the project.

B. Material Suppliers (Dealers)

Credit for DBE dealers/suppliers is limited to 60% of the value of the material to be supplied, provided such material is obtained from an approved DBE dealer/supplier.

In order for a firm to be considered a regular dealer, the firm must own, operate, or maintain a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. At least one of the following criteria

must apply:

- To be a regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question.
- A person may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating or maintaining a place of business if the person both owns and operates distribution equipment for the products. Any supplementing of the regular dealers' own distribution equipment shall be by long term lease agreement, and not on an ad hoc or contract to contract basis.
- Packers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not regular dealers within the meaning of this paragraph.

If the Contractor elects to utilize a DBE supplier to satisfy a portion or the entire specified DBE goal, the Contractor must provide the OOC with:

- Subcontractor Approval Form (CLA-12) indicating the firm designation,
- An executed "Affidavit for the Utilization of Material Suppliers or Manufacturers" (sample attached), and
- Substantiation of payments made to the supplier or manufacturer for materials used on the project.

C. Brokering

- Brokering of work for DBE firms who have been listed by the Department as certified brokers is allowed. Credit for those firms shall be applied following the procedures in Section VI-D.
- Brokering of work by DBEs who have been approved to perform subcontract work with their own workforce and equipment is not allowed, and is a Contract violation.
- Firms involved in the brokering of work, whether they are DBEs and/or majority firms who engage in willful falsification, distortion or misrepresentation with respect to any facts related to the project shall be referred to the U.S. DOT, Office of the Inspector General for prosecution under Title 18, U.S. Code, Part I, Chapter 47, Section 1020.

D. Non-Manufacturing or Non-Supplier DBE Credit

Contractors may count towards their DBE goals the following expenditures with DBEs that are not manufacturers or suppliers:

- Reasonable fees or commissions charged for providing a bona fide service such as professional, technical, consultant or managerial services and assistance in the procurement of essential personnel, facilities, equipment materials or supplies necessary for the performance of the Contract, provided that the fee or commission is determined by the OOC to be reasonable and consistent with fees customarily allowed for similar services.
- The fees charged only for delivery of materials and supplies required on a job site when the hauler, trucker, or delivery service is a DBE, and not the manufacturer, or regular dealer of the materials and

supplies, and provided that the fees are determined by the OOC to be reasonable and not excessive as compared with fees customarily allowed for similar services.

- The fees or commissions charged for providing bonds or insurance specifically required for the performance of the Contract, provided that the fees or commissions are determined by CTDOT to be reasonable and not excessive as compared with fees customarily allowed for similar services.

E. Trucking

While technically still considered a subcontractor, the rules for counting credit for DBE trucking firms are as follows:

- The DBE must own and operate at least one fully licensed, insured, and operational truck used on the Contract.
- The DBE receives credit for the total value of the transportation services it provides on the Contract using trucks it owns, insures and operates using drivers it employs.
- The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the Contract.
- The DBE may lease trucks from a non-DBE firm; however the DBE may only receive credit for any fees or commissions received for arranging transportation services provided by the non-DBE firms. Additionally, the DBE firm must demonstrate that they are in full control of the trucking operation for which they are seeking credit.

VII. Suspected DBE Fraud

In appropriate cases, CTDOT will bring to the attention of the USDOT any appearance of false, fraudulent, or dishonest conduct in connection with the DBE program, so that USDOT can take the steps, e.g. referral to the Department of Justice for criminal prosecution, referral to USDOT Inspector General, action under suspension and debarment or Program Fraud and Civil Penalties rules provided in 49 CFR Part 31.

**CONNECTICUT DEPARTMENT OF TRANSPORTATION
(OFFICE OF CONSTRUCTION)
BUREAU OF ENGINEERING AND CONSTRUCTION**

This affidavit must be completed by the State Contractor's DBE notarized and attached to the contractor's request to utilize a DBE supplier or manufacturer as a credit towards its DBE contract requirements; failure to do so will result in not receiving credit towards the contract DBE requirement.

State Contract No.

Federal Aid Project No.

Description of Project

I, _____, acting in behalf of _____,
(Name of person signing Affidavit) (DBE person, firm, association or corporation)

of which I am the _____ certify and affirm that _____
(Title of Person) (DBE person, firm, association or corporation)

is a certified Connecticut Department of Transportation DBE. I further certify and affirm that I have read and understand 49 CFR, Sec. 26.55(e)(2), as the same may be revised.

I further certify and affirm that _____ will assume the actual and
(DBE person, firm, association or Corporation)
for the provision of the materials and/or supplies sought by _____.

If a manufacturer, I operate or maintain a factory or establishment that produces, on the premises, the materials, supplies, articles or equipment required under the contract an of the general character described by the specifications.

If a supplier, I perform a commercially useful function in the supply process. As a regular dealer, I, at a minimum, own and operate the distribution equipment for bulk items. Any supplementing of my distribution equipment shall be by long-term lease agreement, and not on an ad hoc or contract-by-contract basis.

I understand that false statements made herein are punishable by Law (Sec. 53a-157), CGS, as revised).

(Name of Corporation or Firm)

(Signature & Title of Official making the Affidavit)

Subscribed and sworn to before me, this _____ day of _____ 20 _____.

Notary Public (Commissioner of the Superior Court)

My Commission Expires _____

CERTIFICATE OF CORPORATION

I, _____, certify that I am the _____
(Official) (President)

of the Corporation named in the foregoing instrument; that I have been duly authorized to affix the seal of the Corporation to such papers as require the seal; that _____, who signed said instrument on behalf of the Corporation, was then of said corporation; that said instrument was duly signed for and in behalf of said Corporation by authority of its governing body and is within the scope of its corporation powers.

(Signature of Person Certifying)

(Date)

ITEM #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. (cu.m) 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 (cubic meter) 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 (cubic meter) 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.

| <u>Pay Item</u> | <u>Pay Unit</u> |
|---------------------|-----------------|
| Test Pit Excavation | c.y. (cu.m) |

ITEM #0921001A - CONCRETE SIDEWALK

Concrete sidewalks shall be constructed in accordance with Article 9.21, supplemented as follows:

Article 9.21.01 - Description: Add the following:

This item shall include furnishing and installing Detectable Warning Strips in the locations and to the dimensions and details shown on the plans or as directed by the Engineer.

Article 9.21.02 – Materials: Add the following:

The Detectable Warning Strip, for new construction, shall be chosen from the Department's Qualified Products Lists. The tile shall conform to the dimensions shown on the plans Manufacturer's specifications and have a brick red homogeneous color throughout in compliance with Federal Standard 595A Color #22144 or approved equal.

Article 9.21.03 – Construction Methods: Add the following:

The Detectable Warning Strip, for new construction, shall be set directly in poured concrete according to the plans and the Manufacturer's specifications and details. The flanges shall be embedded in wet concrete so that after the concrete is cured the surface of the detectable warning strip does not project above the adjacent concrete surface. The Contractor shall place two 25-pound concrete blocks or sandbags on each tile to prevent the tile from floating after installation.

The detectable warning strip shall be installed 6" from the edge of road along the full width of the ramp. The rows of truncated domes in a detectable warning surface shall then be aligned to be perpendicular or radial to the grade break between the ramp, landing, or blended transition and the street.

Article 9.21.04 - Method of Measurement: Add the following:

The Detectable Warning strip will not be measured for payment. All materials, equipment, tools and labor incidental thereto shall be included in the Bid price for Concrete Sidewalk.

ITEM #0921036A - RETROFIT DETECTABLE WARNING STRIP

Article 9.21.01 - Description: Add the following:

This item shall include furnishing and installing Detectable Warning Strips for retrofit construction in the locations and to the dimensions and details shown on the plans or as ordered by the Engineer.

Article 9.21.02 – Materials: Add the following:

The Detectable Warning Strip, for retrofit construction, shall be a prefabricated detectable warning surface tile chosen from the Department’s Qualified Products Lists. 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.

Article 9.21.03 – Construction Methods: Add the following:

The Detectable Warning Strip for retrofit construction shall be installed according to the plans and all Manufacturers requirements for environmental conditions, site preparations, installation procedures, curing procedures, and material compatibility.

The detectable warning strip shall be installed 6” from the edge of road along the full width of the ramp. The rows of truncated domes in a detectable warning surface shall then be aligned to be perpendicular or radial to the grade break between the ramp, landing, or blended transition and the street.

The Contractor is responsible for removing any material spatters or debris and repairing any damage to the existing sidewalk arising from the installation of the tile.

Article 9.21.04 - Method of Measurement: Add the following:

The Detectable Warning Strip for retrofit construction will be measured for payment by each tile installed and accepted.

Article 9.21.05 – Basis of Payment: Add the following:

Retrofitting the existing concrete sidewalk with a Detectable Warning Strip will be paid for at the contract unit price for each “Retrofit Detectable Warning Strip” complete in place. This price shall include all tiles; saw cutting concrete, cleaning, adhesive, drilling holes for fasteners, fasteners, materials, equipment, tools and labor incidental thereto.

| | |
|-----------------------------------|----------|
| Pay Item | Pay Unit |
| Retrofit Detectable Warning Strip | Each |

ITEM #0925101A - RELAY BRICK WALK

Description: Work under this item shall consist of removing and reconstructing brick walk which has been disturbed by excavation at the locations shown on the plans or as directed by the Engineer in conformance with these specifications.

Materials: Gravel for base shall conform to Article M.02.02 for granular fill. Leveling base material shall be concrete sand conforming to ASTM C-33 for fine aggregates or No. 10 as shown in AASHTO M 43-54 (1974) as specified in table II.

Construction Methods: Existing bricks shall be carefully removed. If any bricks are broken during removal, the Contractor shall be responsible for replacing them at his own cost. Upon reconstruction of the brick walk, all soft and yielding material and other portions of the subbase which will not readily compact shall be removed and replaced with suitable materials. The surface of the subbase shall be compacted with mechanical equipment capable of delivering a ground pressure of not less than 300 pounds per linear inch (54 kilograms per linear centimeter) of contact width. The amount of compaction shall be as specified by the Engineer but in no case shall that amount be less than four complete passes of the compacting equipment. The dry density after compaction shall conform to Article 2.14.03 of the standard specifications, Form 816. After compaction, the subbase shall be trued to the required line and grade. No additional payment will be made for any materials which are required to bring the subbase to the lines, grade and cross-sections of the site. The Contractor shall protect the subbase from damage by exercising such precautions as the Engineer deems necessary. The subbase surface shall be maintained in such condition as to permit proper drainage. It shall be checked and approved prior to placement of the leveling base. The leveling base shall be screeded loose to a thickness of approximately 2" (50mm). The leveling shall be treated with a soil sterilizer, of a type to be approved by the Engineer, prior to the placement of the bricks. The exact thickness of the leveling base is to be determined at the job site.

Care shall be taken by the Contractor to ensure the screeded leveling base is loose and undisturbed prior to placement of the bricks. Bricks are to be installed "Hand-tight" with care being taken not to disturb the leveling bed. Mason string lines shall be used to insure proper lines and grades. Bricks are to be vibrated into the leveling base with a vibratory plate capable of achieving a 3500 to 5000 pounds (1590 to 2268 kilograms) compaction force. Such vibratory compaction shall be accomplished on all bricks prior to the end of operations on each working day. Compaction of the bricks shall continue until finish grade, as directed by the Engineer, is achieved. All joints shall be filled after final compaction with the same material used for the leveling base.

Method of Measurement: This work will be measured for payment by the actual number of square feet (square meters) of complete and accepted relayed brick walk.

Basis of Payment: This work will be paid for at the contract unit price per square foot (square meter) for "Relay Brick Walk" complete and accepted in place which price shall include all removal, storage, granular fill, concrete sand, disposal of surplus material, and all materials, equipment, tools and labor incidental thereto. No additional payment will be made for any materials which are required to bring the subbase to the lines, grade and cross-sections of the site.

ITEM #0952001A - SELECTIVE CLEARING AND THINNING

Section 9.52 is amended as follows:

Article 9.52.03 – Construction Methods is supplemented as follows:

Where directed by the Engineer, materials to be cut, trimmed or removed shall be those items that restrict continuous visibility to traffic signal faces approaching a signalized intersection to less than the minimum sight distance required for the 85th percentile speed based on Table 4D-2 in the 2009 Edition of the FHWA's Manual on Uniform Traffic Control Devices.

ITEM #0969070A - CONSTRUCTION FIELD OFFICE FURNISHINGS AND EQUIPMENT

Description: This item requires that all equipment, labor, materials, service contracts, maintenance, replacements, and incidental work necessary to maintain said equipment, be provided by the Contractor, for the duration of the work, and if necessary, for a maximum of ninety days thereafter. The equipment will be supplied for the exclusive use of ConnDOT forces and others who may be engaged to augment ConnDOT forces with relation to the contract. Ownership and liability of the equipment shall remain with the Contractor.

Materials/Supplies/Equipment: Materials, supplies and equipment shall be in like new condition as approved by the Engineer.

General Requirements: This item does not include an office, but does include the equipment indicated below.

The Contractor shall provide the additional equipment and/or services described in this specification to the satisfaction of the Engineer.

The following equipment shall be provided:

| QTY | Description: |
|-----|--|
| 2 | Digital Camera as specified below under <u>Computer Hardware and Software</u> . All supplies and maintenance shall be provided by the Contractor. |
| 2 | Cellular Phone as specified below under <u>Computer Hardware and Software</u> . All supplies, maintenance and service plans shall be provided by the Contractor. |
| 2 | Laptop computer as specified below under <u>Computer Hardware and Software</u> . All supplies and maintenance shall be provided by the Contractor. |
| 1 | Concrete Curing Box as specified below under <u>Concrete Testing Equipment</u> . |
| 1 | Concrete Air Meter as specified below under <u>Concrete Testing Equipment</u> . |
| 1 | Concrete Slump Cone as specified below under <u>Concrete Testing Equipment</u> . |

The equipment required herein shall remain the property of the Contractor. Any supplies required to maintain or operate the equipment above listed above shall be provided by the Contractor for the duration of the project at no additional charge.

Computer Hardware and Software:

The ConnDOT Project Engineer will provide the Contractor with a copy of the current PC specifications as soon as possible after the contract is awarded.

Before ordering the computer hardware and software, the Contractor must submit a copy of their proposed PC specifications to the ConnDOT Project Engineer for review by the ConnDOT Data Center. If the specification meets or exceeds the minimum specifications listed below, then the Contractor will be notified that the order may be placed.

Arrangements must be made a minimum of 24 hours in advance of delivery of equipment to the Data Center. Arrangements should be made by calling 860-594-3500 and following the instructions. All software, hardware and licenses listed below shall be clearly labeled, specifying the (1) Project No., (2) Contractor Name, (3) Project Engineer's Name and (4) Project Engineer's Phone No., and shall be delivered to the ConnDOT Data Center, 2710 Berlin Turnpike, Newington, CT, where it will be configured and prepared for field use. Installation if necessary will then be coordinated with ConnDOT field personnel.

The computer system furnished shall have all software and hardware necessary for the complete installation of the latest versions of the software listed, and therefore supplements the minimum specifications below. The Engineer reserves the right to expand or relax the specification to adapt to the software and hardware limitations and availability, the compatibility with current agency systems, and to provide the Department with a computer system that can handle the needs of the project. This requirement is to ensure that the rapid changing environment that computer systems have experienced does not leave the needs of the project orphan to what has been specified. **Price adjustment due to the change in the minimum system requirements will not be entertained.**

The Contractor shall provide the Engineer with a licensed copy registered in the Department's name of the latest versions of the software listed and maintain customer support services offered by each software producer for the duration of the Contract. The Contractor shall deliver to the Engineer all supporting documentation for the software and hardware including any instructions or manuals. The Contractor shall provide original backup media for the software.

The Contractor shall provide the computer system with all required supplies, maintenance and repairs (including labor and parts) throughout the Contract life.

Once the Contract has been completed, the computer will remain the property of the Contractor. Prior to the return of any computer(s) to the Contractor, field personnel will coordinate with the Data Center personnel for the removal of Department owned equipment, software, data, and associated equipment.

A) Digital Camera – Minimum Specification:

Optical – 5 mega pixel, with 3x optical zoom.

Memory – 16 GB.

Features – Date/time stamp feature.

Connectivity – USB cable or memory card reader.

Software – Must be compatible with Windows 7 Professional 64-Bit.

Power – Rechargeable battery and charger.

B) Laptop Computer – Minimum Specification:

Processor – Intel® Core i5 Processor (2.50 GHz, 1333 MHz FSB, 3M Cache)

Memory – 4 GB DIMM DDR3 1333MHz.

Screen – 14.0 inch LED anti-glare.
Graphics – Intel Graphics Media Accelerator 3000. or equivalent.
Hard Drive – 250 GB 7200 rpm hard drive (Western Digital, IBM or Seagate).
USB ports – Four (4).
Optical Drive – CD-RW/DVD-RW Combo.
Multimedia Package – Integrated microphone and speakers.
Integrated Network Adapter – comparable to 3COM PCI 10/100/1000 twisted pair Ethernet.
Wireless Network Adapter – Intel® Centrino a/b/g/n.
Card Reader – multi-card reader including SD.
Battery – Two (2) 9-cell batteries: 1-primary and 1-spare.
Power adapters – One (1) AC wall adapter and One (1) 12 Volt DC Auto adapter.
Mouse – Cordless laser 2-button mouse with scroll wheel.
Operating System – Windows 7 Professional 64-Bit Service Pack 1.
Application Software – MS Office 2010 Professional Edition.
Additional Software (Latest Releases, including subscription services for the life of the Contract.–

- Norton Anti-Virus,
- CD/DVD burning software (ROXIO or NERO),
- Adobe Acrobat Standard

Resource or Driver CD/DVD – CD/DVD with all drivers and resource information so that computer can be restored to original prior to shipment back to the contractor.
Carrying Case – Carrying case sized to carry laptop and accessories.

The Contractor is responsible for service and repairs to all computer hardware. All repairs must be performed with-in 48 hours. If the repairs require more than a 48 hours then a replacement must be provided. All supplies and maintenance for the computers, laptops, shall be provided by the Contractor.

Repair(s) or replacement(s) of equipment for any reason shall be provided at no additional cost to the State excluding the case stated below.

Major repair or replacement of equipment due to physical damage, shall be limited to not more than two (2) occurrences per unit.

If the number of occurrences of major repair or replacement of computer equipment exceed two (2) occurrences per unit, due to physical damage, the cost of the repair or replacement, excluding the Contractor's labor and equipment costs, shall be compensated on a Cost Plus basis under a separate item.

Communications:

The Contractor shall provide rugged cell phones with unlimited nation-wide calling plan that operates on the Verizon, ATT or Sprint networks. The phones should be capable of sending and

receiving text messaging and shall also include voice mail. Additional features beyond those described shall be at no additional cost to the Department. Accessories for each cell phone shall include holster, AC wall charger, DC auto charger, and extended life battery.

Concrete Testing Equipment:

If the Contract includes items that require compressive strength cylinders for concrete, in accordance with the Schedule of Minimum Testing Requirements for Sampling Materials for Test, the Contractor shall provide the following. All testing equipment will remain the property of the Contractor at the completion of the project.

- A) Concrete Cylinder Curing Box – meeting the requirements of Section 6.12 of the Standard Specifications.
- B) Air Meter – The air meter provided shall be in good working order and will meet the requirements of AASHTO T 152.
- C) Slump Cone Mold – Slump cone, base plate, and tamping rod shall be provided in like-new condition and meet the requirements of AASHTO T119, Standard Test Method for Slump of Hydraulic-Cement Concrete.

Method of Measurement: The furnishing and maintenance of the construction field office furnishings and equipment will be measured for payment by the number of calendar months that the equipment is in place and in operation, measured to the nearest month.

There will not be a price adjustment due to a change in the minimum computer system requirements.

Basis of Payment: The furnishing and maintenance of the construction field office furnishings and equipment will be paid at the listed unit price per month for the respective item “Construction Field Office Furnishings and Equipment”, which price shall include all material, equipment, labor, service contracts, licenses, repair or replacement of hardware and software, and work incidental thereto, as outlined in the various sections of this specification.

The State will be responsible for payment of data communication user fees and for toll calls by State personnel.

| <u>Pay Item</u> | <u>Pay Unit</u> |
|---|-----------------|
| Construction Field Office Furnishings and Equipment | Month |

ITEM #0970006A - TRAFFICPERSON (MUNICIPAL POLICE OFFICER)
ITEM #0970007A - TRAFFICPERSON (UNIFORMED FLAGGER)

9.70.01—Description: Under this item the Contractor shall provide the services of Trafficpersons of the type and number, and for such periods, as the Engineer approves for the control and direction of vehicular traffic and pedestrians. Traffic persons requested solely for the contractor's operational needs will not be approved for payment.

9.70.03—Construction Method: Prior to the start of operations on the project requiring the use of Trafficpersons, a meeting will be held with the Contractor, Trafficperson agency or firm, Engineer, and State Police, if applicable, to review the Trafficperson operations, lines of responsibility, and operating guidelines which will be used on the project. A copy of the municipality's billing rates for Municipal Police Officers and vehicles, if applicable, will be provided to the Engineer prior to start of work.

On a weekly basis, the Contractor shall inform the Engineer of their scheduled operations for the following week and the number of Trafficpersons requested. The Engineer shall review this schedule and approve the type and number of Trafficpersons required. In the event of an unplanned, emergency, or short term operation, the Engineer may approve the temporary use of properly clothed persons for traffic control until such time as an authorized Trafficperson may be obtained. In no case shall this temporary use exceed 8 hours for any particular operation.

If the Contractor changes or cancels any scheduled operations without prior notice of same as required by the agency providing the Trafficpersons, and such that Trafficperson services are no longer required, the Contractor will be responsible for payment at no cost to the Department of any show-up cost for any Trafficperson not used because of the change. Exceptions, as approved by the Engineer, may be granted for adverse weather conditions and unforeseeable causes beyond the control and without the fault or negligence of the Contractor.

Trafficpersons assigned to a work site are to only take direction from the Engineer.

Trafficpersons shall wear a high visibility safety garment that complies with OSHA, MUTCD, ASTM Standards and the safety garment shall have the words "Traffic Control" clearly visible on the front and rear panels (minimum letter size 2 inches (50 millimeters)). Worn/faded safety garments that are no longer highly visible shall not be used. The Engineer shall direct the replacement of any worn/faded garment at no cost to the State.

A Trafficperson shall assist in implementing the traffic control specified in the Maintenance and Protection of Traffic contained elsewhere in these specifications or as directed by the Engineer. Any situation requiring a Trafficperson to operate in a manner contrary to the Maintenance and Protection of Traffic specification shall be authorized in writing by the Engineer.

Trafficpersons shall consist of the following types:

1. Uniformed Law Enforcement Personnel: Law enforcement personnel shall wear the high visibility safety garment provided by their law enforcement agency. If no high visibility safety garment is provided, the Contractor shall provide the law enforcement personnel with a garment meeting the requirements stated below for the Uniformed Flaggers' garment.

Law Enforcement Personnel may be also be used to conduct motor vehicle enforcement operations in and around work areas as directed and approved by the Engineer.

Municipal Police Officers: Uniformed Municipal Police Officers shall be sworn Municipal Police Officers or Uniformed Constables who perform criminal law enforcement duties from the Municipality in which the project is located. Their services will also include an official Municipal Police vehicle when requested by the Engineer. Uniformed Municipal Police Officers will be used on non-limited access highways. If Uniformed Municipal Police Officers are unavailable, other Trafficpersons may be used when authorized in writing by the Engineer. Uniformed Municipal Police Officers and requested Municipal Police vehicles will be used at such locations and for such periods as the Engineer deems necessary to control traffic operations and promote increased safety to motorists through the construction sites.

2. Uniformed Flagger: Uniformed Flaggers shall be persons who have successfully completed flagger training by the American Traffic Safety Services Association (ATSSA), National Safety Council (NSC) or other programs approved by the Engineer. A copy of the Flagger's training certificate shall be provided to the Engineer before the Flagger performs any work on the project. Uniformed Flaggers shall conform to Chapter 6E, Flagger Control, in the Manual of Uniformed Traffic Control Devices (MUTCD) and shall wear high-visibility safety apparel, use a STOP/SLOW paddle that is at least 18 inches (450 millimeters) in width with letters at least 6 inches (150 millimeters) high. The paddle shall be mounted on a pole of sufficient length to be 6 feet (1.8 meters) above the ground as measured from the bottom of the sign.

Uniformed Flaggers will only be used on non-limited access highways to control traffic operations when authorized in writing by the Engineer.

9.70.04—Method of Measurement: Services of Trafficpersons will be measured for payment by the actual number of hours for each person rendering services approved by the Engineer. These services shall include, however, only such trafficpersons as are employed within the limits of construction, project right of way of the project or along detours authorized by the Engineer to assist the motoring public through the construction work zone. Services for continued use of a detour or bypass beyond the limitations approved by the Engineer, for movement of construction vehicles and equipment, or at locations where traffic is unnecessarily restricted by the Contractor's method of operation, will not be measured for payment.

Trafficpersons shall not work more than twelve hours in any one 24 hour period. In case such services are required for more than twelve hours, additional Trafficpersons shall be furnished and measured for payment. In cases where the Trafficperson is an employee on the Contractor's payroll, payment under the item "Trafficperson (Uniformed Flagger)" will be made only for those hours when the Contractor's employee is performing Trafficperson services.

Travel time will not be measured for payment for services provided by Uniformed Municipal Police Officers or Uniformed Flaggers.

Mileage fees associated with Trafficperson services will not be measured for payment.

Safety garments and STOP/SLOW paddles will not be measured for payment.

9.70.05—Basis of Payment: Trafficpersons will be paid in accordance with the schedule described herein.

There will be no direct payment for safety garments or STOP/SLOW paddles. All costs associated with furnishing safety garments and STOP/SLOW paddles shall be considered included in the general cost of the item.

1. Uniformed Law Enforcement Personnel: The sum of money shown on the Estimate and in the itemized proposal as "Estimated Cost" for this work will be considered the bid price even though payment will be made as described below. The estimated cost figure is not to be altered in any manner by the bidder. Should the bidder alter the amount shown, the altered figures will be disregarded and the original price will be used to determine the total amount for the contract.

The Department will pay the Contractor its actual costs for "Trafficperson (Municipal Police Officer)" plus an additional 5% as reimbursement for the Contractor's administrative expense in connection with the services provided.

The invoice must include a breakdown of each officer's actual hours of work and actual rate applied. Mileage fees associated with Trafficperson services are not reimbursable expenses and are not to be included in the billing invoice. The use of a municipal police vehicle authorized by the Engineer will be paid at the actual rate charged by the municipality. Upon receipt of the invoice from the municipality, the Contractor shall forward a copy to the Engineer. The invoice will be reviewed and approved by the Engineer prior to any payments. *Eighty (80%) of the invoice will be paid upon completion of review and approval. The balance (20%) will be paid upon receipt of cancelled check or receipted invoice, as proof of payment.* The rate charged by the municipality for use of a uniformed municipal police officer and/or a municipal police vehicle shall not be greater than the rate it normally charges others for similar services.

2. Uniformed Flagger: Uniformed flaggers will be paid for at the contract unit price per hour for "Trafficperson (Uniformed Flagger)", which price shall include all compensation, insurance benefits and any other cost or liability incidental to the furnishing of the trafficpersons ordered.

| Pay Item | Pay Unit |
|--|----------|
| Trafficperson (Municipal Police Officer) | est. |
| Trafficperson (Uniformed Flagger) | Hr. |

ITEM #0971001A - MAINTENANCE AND PROTECTION OF TRAFFIC

Article 9.71.01 – Description is supplemented by the following:

The Contractor shall maintain and protect traffic as follows and as limited in the Special Provision "Prosecution and Progress":

Ramps and Turning Roadways

The Contractor shall maintain and protect existing traffic operations.

Excepted therefrom will be those periods, during the allowable periods, when the Contractor is actively working, at which time the Contractor shall be allowed to maintain and protect a minimum of one lane of traffic, on a paved travel path not less than 12 feet in width.

All Other Roadways

The Contractor shall maintain and protect a minimum of one lane of traffic in each direction, each lane on a paved travel path not less than 11 feet in width.

Excepted therefrom will be those periods, during the allowable periods, when the Contractor is actively working, at which time the Contractor shall maintain and protect at least an alternating one-way traffic operation, on a paved travel path not less than 11 feet in width. The length of the alternating one-way traffic operation shall not exceed 300 feet and there shall be no more than one alternating one-way traffic operation within the project limits without prior approval of the Engineer.

Excepted therefrom will be those periods, during the allowable periods, when the Contractor is actively working on installing spans or mast arms, at which time the Contractor will be permitted to halt traffic for a period not to exceed ten minutes. The Contractor shall allow all stored vehicles to proceed through the work area before halting traffic for another ten-minute period.

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.

Traffic Operation Over Railroad – Highway Grade Crossing

The Contractor will not be allowed to queue traffic over the crossing at any point during the construction of the project. If, due to the nature of the Contractor's operations, queuing is unavoidable, the Contractor shall utilize the Railroad's Police Protection to ensure that vehicles are kept clear of the crossing area. Subject to the approval of the Railroad and the Engineer, Uniformed Flaggers and/or Town Police Officers may be used in lieu of Railroad Police Protection.

The Contractor shall coordinate its work with the Railroad's authorized representative:

Stratford
Mr. Anthony Lewis
Roadmaster
CSX Transportation
164 Western Avenue
West Springfield, MA 01089
(315) 777-2196
E-mail: tony_lewis@csx.com

Derby/Ansonia
State Road 853 (Division Street)
Crossing #503886N
Metro-North Railroad Company
(203) 975-4165

Norwalk
Route 123 (New Canaan Avenue)
Crossing #500564P
Metro-North Railroad Company
(203) 975-4165

Article 9.71.03 - Construction Method is supplemented as follows:

General

The Contractor is required to delineate any raised structures within the travel lanes, so that the structures are visible day and night, unless there are specific contract plans and provisions to temporarily lower these structures prior to the completion of work.

When the installation of all intermediate courses of bituminous concrete pavement is completed for the entire roadway, the Contractor shall install the final course of bituminous concrete pavement.

When the Contractor is excavating adjacent to the roadway, the Contractor shall provide a 3-foot shoulder between the work area and travel lanes, with traffic drums spaced every 50 feet. At the end of the workday, if the vertical drop-off exceeds 3 inches, the Contractor shall provide a temporary traversable slope of 4:1 or flatter that is acceptable to the Engineer.

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.

Construction vehicles entering travel lanes at speeds less than the posted speed are interfering with traffic, and shall not be allowed without a lane closure. The lane closure shall be of sufficient length to allow vehicles to enter or exit the work area at posted speeds, in order to merge with existing traffic.

Traffic Signals

The Contractor shall keep each traffic signal in the project limits operational at all times during construction in accordance with the Special Provision "Temporary Signalization."

The Contractor shall install final pavement markings and signing prior to the proposed traffic signal being made fully operational.

Loop detectors disturbed by the Contractor's operations shall be made operational, in accordance with the special provision for Item No. 1111451A – Loop Detector Saw Cut, 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.

Requirements for Winter

The Contractor shall schedule a meeting with representatives from the Department including the offices of Maintenance and Traffic, and the Town/City to determine what interim traffic control measures the Contractor shall accomplish for the winter to provide safety to the motorists and permit adequate snow removal procedures. This meeting shall be held prior to October 31 of each year and will include, but not be limited to, discussion of the status and schedule of the following items: lane and shoulder widths, pavement restoration, traffic signal work, pavement markings, and signing.

Signing Patterns

The Contractor shall erect and maintain all signing patterns in accordance with the traffic control plans contained herein. Proper distances between advance warning signs and proper taper lengths are mandatory.

Pavement Markings - Limited Access Highways, Turning Roadways and Ramps

During construction, the Contractor shall maintain all pavement markings throughout the limits of the project.

Interim Pavement Markings

The Contractor shall install painted pavement markings, which shall include lane lines (broken lines), shoulder edge lines, stop bars, lane-use arrows and gore markings, on each intermediate course of bituminous concrete pavement and on any milled surface by the end of the work day/night. All painted pavement markings will be paid under the appropriate items.

If the Contractor does not install permanent Epoxy Resin Pavement Markings by the end of the work day/night on exit ramps where the final course of bituminous concrete pavement has been installed, the Contractor shall install temporary 12 inch wide white stop bars. The temporary stop bars shall consist of Temporary Plastic Pavement Marking Tape and shall be installed by the end of the work day/night. Stop bars may consist of two 6 inch wide white markings or three 4 inch wide white markings placed side by side. The Contractor shall remove and dispose of these markings when the permanent Epoxy Resin Pavement Markings are installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

If an intermediate course of bituminous concrete pavement will be exposed throughout the winter, then Epoxy Resin Pavement Markings should be installed unless directed otherwise by the Engineer.

Final Pavement Markings

The Contractor should install painted pavement markings on the final course of bituminous concrete pavement by the end of the work day/night. If the painted pavement markings are not installed by the end of the work day/night, then Temporary Plastic Pavement Marking Tape shall be installed as described above and the painted pavement markings shall be installed by the end of the work day/night on Friday of that week.

If Temporary Plastic Pavement Marking Tape is installed, the Contractor shall remove and dispose of these markings when the painted pavement markings are installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

The Contractor shall install permanent Epoxy Resin Pavement Markings in accordance with Section 12.10 entitled "Epoxy Resin Pavement Markings, Symbols, and Legends" after such time as determined by the Engineer.

Pavement Markings -Non-Limited Access Multilane Roadways

Secondary and Local Roadways

During construction, the Contractor shall maintain all pavement markings on paved surfaces on all roadways throughout the limits of the project.

Interim Pavement Markings

The Contractor shall install painted pavement markings, which shall include centerlines, 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.

TRAFFIC CONTROL DURING CONSTRUCTION OPERATIONS

The following guidelines shall assist field personnel in determining when and what type of traffic control patterns to use for various situations. These guidelines shall provide for the safe and efficient movement of traffic through work zones and enhance the safety of work forces in the work area.

TRAFFIC CONTROL PATTERNS

Traffic control patterns shall be used when a work operation requires that all or part of any vehicle or work area protrudes onto any part of a travel lane or shoulder. For each situation, the installation of traffic control devices shall be based on the following:

- Speed and volume of traffic
- Duration of operation
- Exposure to hazards

Traffic control patterns shall be uniform, neat and orderly so as to command respect from the motorist.

In the case of a horizontal or vertical sight restriction in advance of the work area, the traffic control pattern shall be extended to provide adequate sight distance for approaching traffic.

If a lane reduction taper is required to shift traffic, the entire length of the taper should be installed on a tangent section of roadway so that the entire taper area can be seen by the motorist.

Any existing signs that are in conflict with the traffic control patterns shall be removed, covered, or turned so that they are not readable by oncoming traffic.

When installing a traffic control pattern, a Buffer Area should be provided and this area shall be free of equipment, workers, materials and parked vehicles.

Typical traffic control plans 19 through 25 may be used for moving operations such as line striping, pot hole patching, mowing, or sweeping when it is necessary for equipment to occupy a travel lane.

Traffic control patterns will not be required when vehicles are on an emergency patrol type activity or when a short duration stop is made and the equipment can be contained within the shoulder. Flashing lights and appropriate trafficperson shall be used when required.

Although each situation must be dealt with individually, conformity with the typical traffic control plans contained herein is required. In a situation not adequately covered by the typical traffic control plans, the Contractor must contact the Engineer for assistance prior to setting up a traffic control pattern.

PLACEMENT OF SIGNS

Signs must be placed in such a position to allow motorists the opportunity to reduce their speed prior to the work area. Signs shall be installed on the same side of the roadway as the work area. On multi-lane divided highways, advance warning signs shall be installed on both sides of the highway. On directional roadways (on-ramps, off-ramps, one-way roads), where the sight distance to signs is restricted, these signs should be installed on both sides of the roadway.

ALLOWABLE ADJUSTMENT OF SIGNS AND DEVICES SHOWN ON THE TRAFFIC CONTROL PLANS

The traffic control plans contained herein show the location and spacing of signs and devices under ideal conditions. Signs and devices should be installed as shown on these plans whenever possible.

The proper application of the traffic control plans and installation of traffic control devices depends on actual field conditions.

Adjustments to the traffic control plans shall be made only at the direction of the Engineer to improve the visibility of the signs and devices and to better control traffic operations. Adjustments to the traffic control plans shall be based on safety of work forces and motorists, abutting property requirements, driveways, side roads, and the vertical and horizontal curvature of the roadway.

The Engineer may require that the traffic control pattern be located significantly in advance of the work area to provide better sight line to the signing and safer traffic operations through the work zone.

Table I indicates the minimum taper length required for a lane closure based on the posted speed limit of the roadway. These taper lengths shall only be used when the recommended taper lengths shown on the traffic control plans cannot be achieved.

TABLE I – MINIMUM TAPER LENGTHS

| POSTED SPEED LIMIT MILES PER HOUR | MINIMUM TAPER LENGTH IN FEET FOR A SINGLE LANE CLOSURE |
|--------------------------------------|---|
| 30 OR LESS | 180 |
| 35 | 250 |
| 40 | 320 |
| 45 | 540 |
| 50 | 600 |
| 55 | 660 |
| 65 | 780 |

SECTION 1. WORK ZONE SAFETY MEETINGS

- 1.a) Prior to the commencement of work, a work zone safety meeting will be conducted with representatives of DOT Construction, Connecticut State Police (Local Barracks), Municipal Police, the Contractor (Project Superintendent) and the Traffic Control Subcontractor (if different than the prime Contractor) to review the traffic operations, lines of responsibility, and operating guidelines which will be used on the project. Other work zone safety meetings during the course of the project should be scheduled as needed.
- 1.b) A Work Zone Safety Meeting Agenda shall be developed and used at the meeting to outline the anticipated traffic control issues during the construction of this project. Any issues that can't be resolved at these meetings will be brought to the attention of the District Engineer and the Office of Construction. The agenda should include:
- Review Project scope of work and time
 - Review Section 1.08, Prosecution and Progress
 - Review Section 9.70, Trafficpersons
 - Review Section 9.71, Maintenance and Protection of Traffic
 - Review Contractor's schedule and method of operations.
 - Review areas of special concern: ramps, turning roadways, medians, lane drops, etc.
 - Open discussion of work zone questions and issues
 - Discussion of review and approval process for changes in contract requirements as they relate to work zone areas

SECTION 2. GENERAL

- 2.a) If the required minimum number of signs and equipment (i.e. one High Mounted Internally Illuminated Flashing Arrow for each lane closed, two TMAs, Changeable Message Sign, etc.) are not available; the traffic control pattern shall not be installed.
- 2.b) The Contractor shall have back-up equipment (TMAs, High Mounted Internally Illuminated Flashing Arrow, Changeable Message Sign, construction signs, cones/drums, etc.) available at all times in case of mechanical failures, etc. The only exception to this is in the case of sudden equipment breakdowns in which the pattern may be installed but the Contractor must provide replacement equipment within 24 hours.
- 2.c) Failure of the Contractor to have the required minimum number of signs, personnel and equipment, which results in the pattern not being installed, shall not be a reason for a time extension or claim for loss time.
- 2.d) In cases of legitimate differences of opinion between the Contractor and the Inspection staff, the Inspection staff shall err on the side of safety. The matter shall be brought to

the District Office for resolution immediately or, in the case of work after regular business hours, on the next business day.

SECTION 3. INSTALLING AND REMOVING TRAFFIC CONTROL PATTERNS

- 3.a) Lane Closures shall be installed beginning with the advanced warning signs and proceeding forward toward the work area.
- 3.b) Lane Closures shall be removed in the reverse order, beginning at the work area, or end of the traffic control pattern, and proceeding back toward the advanced warning signs.
- 3.c) Stopping traffic may be allowed:
 - As per the contract for such activities as blasting, steel erection, etc.
 - During paving, milling operations, etc. where, in the middle of the operation, it is necessary to flip the pattern to complete the operation on the other half of the roadway and traffic should not travel across the longitudinal joint or difference in roadway elevation.
 - To move slow moving equipment across live traffic lanes into the work area.
- 3.d) Under certain situations when the safety of the traveling public and/or that of the workers may be compromised due to conditions such as traffic volume, speed, roadside obstructions, or sight line deficiencies, as determined by the Engineer and/or State Police, traffic may be briefly impeded while installing and/or removing the advanced warning signs and the first ten traffic cones/drums only. Appropriate measures shall be taken to safely slow traffic. If required, traffic slowing techniques may be used and shall include the use of Truck Mounted Impact Attenuators (TMAs) as appropriate, for a minimum of one mile in advance of the pattern starting point. Once the advanced warning signs and the first ten traffic cones/drums are installed/removed, the TMAs and sign crew shall continue to install/remove the pattern as described in Section 4c and traffic shall be allowed to resume their normal travel.
- 3.e) The Contractor must adhere to using the proper signs, placing the signs correctly, and ensuring the proper spacing of signs.
- 3.f) Additional devices are required on entrance ramps, exit ramps, and intersecting roads to warn and/or move traffic into the proper travel path prior to merging/exiting with/from the main line traffic. This shall be completed before installing the mainline pattern past the ramp or intersecting roadway.
- 3.g) Prior to installing a pattern, any conflicting existing signs shall be covered with an opaque material. Once the pattern is removed, the existing signs shall be uncovered.

- 3.h) On limited access roadways, workers are prohibited from crossing the travel lanes to install and remove signs or other devices on the opposite side of the roadway. Any signs or devices on the opposite side of the roadway shall be installed and removed separately.

SECTION 4. USE OF HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

- 4.a) On limited access roadways, one Flashing Arrow shall be used for each lane that is closed. The Flashing Arrow shall be installed concurrently with the installation of the traffic control pattern and its placement shall be as shown on the traffic control plan. For multiple lane closures, one Flashing Arrow is required for each lane closed. If conditions warrant, additional Flashing Arrows should be employed (i.e.: curves, major ramps, etc.).
- 4.b) On non-limited access roadways, the use of a Flashing Arrow for lane closures is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to use the Flashing Arrow.
- 4.c) The Flashing Arrow shall not be used on two lane, two-way roadways for temporary alternating one-way traffic operations.
- 4.d) The Flashing Arrow board display shall be in the “arrow” mode for lane closure tapers and in the “caution” mode (four corners) for shoulder work, blocking the shoulder, or roadside work near the shoulder. The Flashing Arrow shall be in the “caution” mode when it is positioned in the closed lane.
- 4.e) The Flashing Arrow shall not be used on a multi-lane roadway to laterally shift all lanes of traffic, because unnecessary lane changing may result.

SECTION 5. USE OF TRUCK MOUNTED IMPACT ATTENUATOR VEHICLES (TMAs)

- 5.a) For lane closures on limited access roadways, a minimum of two TMAs shall be used to install and remove traffic control patterns. If two TMAs are not available, the pattern shall not be installed.
- 5.b) On non-limited access roadways, the use of TMAs to install and remove patterns closing a lane(s) is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to utilize the TMAs.
- 5.c) Generally, to establish the advance and transition signing, one TMA shall be placed on the shoulder and the second TMA shall be approximately 1,000 feet ahead blocking the lane. The flashing arrow board mounted on the TMA should be in the “flashing arrow” mode when taking the lane. The sign truck and workers should be immediately ahead of

the second TMA. In no case shall the TMA be used as the sign truck or a work truck. Once the transition is in place, the TMAs shall travel in the closed lane until all Changeable Message Signs, signs, Flashing Arrows, and cones/drums are installed. The flashing arrow board mounted on the TMA should be in the “caution” mode when traveling in the closed lane.

- 5.d) A TMA shall be placed prior to the first work area in the pattern. If there are multiple work areas within the same pattern, then additional TMAs shall be positioned at each additional work area as needed. The flashing arrow board mounted on the TMA should be in the “caution” mode when in the closed lane.
- 5.e) TMAs shall be positioned a sufficient distance prior to the workers or equipment being protected to allow for appropriate vehicle roll-ahead in the event that the TMA is hit, but not so far that an errant vehicle could travel around the TMA and into the work area. For additional placement and use details, refer to the specification entitled “Type ‘D’ Portable Impact Attenuation System”. Some operations, such as paving and concrete repairs, do not allow for placement of the TMA(s) within the specified distances. In these situations, the TMA(s) should be placed at the beginning of the work area and shall be advanced as the paving or concrete operations proceed.
- 5.f) TMAs should be paid in accordance with how the unit is utilized. When it is used as a TMA and is in the proper location as specified, and then it should be paid at the specified hourly rate for “Type ‘D’ Portable Impact Attenuation System”. When the TMA is used as a Flashing Arrow, it should be paid at the daily rate for “High Mounted Internally Illuminated Flashing Arrow”. If a TMA is used to install and remove a pattern and then is used as a Flashing Arrow, the unit should be paid as a “Type ‘D’ Portable Impact Attenuation System” for the hours used to install and remove the pattern, typically 2 hours (1 hour to install and 1 hour to remove), and is also paid for the day as a “High Mounted Internally Illuminated Flashing Arrow”.

SECTION 6. USE OF TRAFFIC DRUMS AND TRAFFIC CONES

- 6.a) Traffic drums shall be used for taper channelization on limited-access roadways, ramps, and turning roadways and to delineate raised catch basins and other hazards.
- 6.b) Traffic drums shall be used in place of traffic cones in traffic control patterns that are in effect for more than a 36-hour duration.
- 6.c) Traffic Cones less than 42 inches in height shall not be used on limited-access roadways or on non-limited access roadways with a posted speed limit of 45 mph and above.
- 6.d) Typical spacing of traffic drums and/or cones shown on the Traffic Control Plans in the Contract are maximum spacings and may be reduced to meet actual field conditions as required.

SECTION 7. USE OF (REMOTE CONTROLLED) CHANGEABLE MESSAGE SIGNS (CMS)

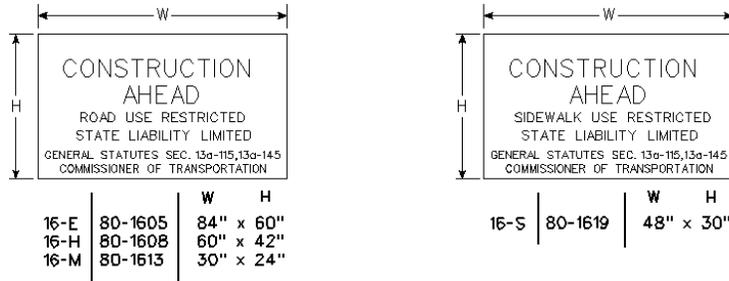
- 7.a) For lane closures on limited access roadways, one CMS shall be used in advance of the traffic control pattern. Prior to installing the pattern, the CMS shall be installed and in operation, displaying the appropriate lane closure information (i.e.: Left Lane Closed - Merge Right). The CMS shall be positioned ½ - 1 mile ahead of the lane closure taper. If the nearest Exit ramp is greater than the specified ½ - 1 mile distance, than an additional CMS shall be positioned a sufficient distance ahead of the Exit ramp to alert motorists to the work and therefore offer them an opportunity to take the exit.
- 7.b) CMS should not be installed within 1000 feet of an existing CMS.
- 7.c) On non-limited access roadways, the use of CMS for lane closures is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to use the CMS.
- 7.d) The advance CMS is typically placed off the right shoulder, 5 feet from the edge of pavement. In areas where the CMS cannot be placed beyond the edge of pavement, it may be placed on the paved shoulder with a minimum of five (5) traffic drums placed in a taper in front of it to delineate its position. The advance CMS shall be adequately protected if it is used for a continuous duration of 36 hours or more.
- 7.e) When the CMS are no longer required, they should be removed from the clear zone and have the display screen cleared and turned 90° away from the roadway.
- 7.f) The CMS generally should not be used for generic messages (ex: Road Work Ahead, Bump Ahead, Gravel Road, etc.).
- 7.g) The CMS should be used for specific situations that need to command the motorist's attention which cannot be conveyed with standard construction signs (Examples include: Exit 34 Closed Sat/Sun - Use Exit 35, All Lanes Closed - Use Shoulder, Workers on Road - Slow Down).
- 7.h) Messages that need to be displayed for long periods of time, such as during stage construction, should be displayed with construction signs. For special signs, please coordinate with the Office of Construction and the Division of Traffic Engineering for the proper layout/dimensions required.

7.i) The messages that are allowed on the CMS are as follows:

| <u>Message No.</u> | <u>Frame 1</u> | <u>Frame 2</u> | <u>Message No.</u> | <u>Frame 1</u> | <u>Frame 2</u> |
|--------------------|----------------------------|-----------------|--------------------|-----------------------------|------------------|
| 1 | LEFT LANE CLOSED | MERGE RIGHT | 9 | LANES CLOSED AHEAD | REDUCE SPEED |
| 2 | 2 LEFT LANES CLOSED | MERGE RIGHT | 10 | LANES CLOSED AHEAD | USE CAUTION |
| 3 | LEFT LANE CLOSED | REDUCE SPEED | 11 | WORKERS ON ROAD | REDUCE SPEED |
| 4 | 2 LEFT LANES CLOSED | REDUCE SPEED | 12 | WORKERS ON ROAD | SLOW DOWN |
| 5 | RIGHT LANE CLOSED | MERGE LEFT | 13 | EXIT XX CLOSED | USE EXIT YY |
| 6 | 2 RIGHT LANES CLOSED | MERGE LEFT | 14 | EXIT XX CLOSED USE YY | FOLLOW DETOUR |
| 7 | RIGHT LANE CLOSED | REDUCE SPEED | 15 | 2 LANES SHIFT AHEAD | USE CAUTION |
| 8 | 2 RIGHT LANES CLOSED | REDUCE SPEED | 16 | 3 LANES SHIFT AHEAD | USE CAUTION |

For any other message(s), approval must be received from the Office of Construction prior to their use. No more than two (2) displays shall be used within any message cycle.

SERIES 16 SIGNS



THE 16-S SIGN SHALL BE USED ON ALL PROJECTS THAT REQUIRE SIDEWALK RECONSTRUCTION OR RESTRICT PEDESTRIAN TRAVEL ON AN EXISTING SIDEWALK.

SERIES 16 SIGNS SHALL BE INSTALLED IN ADVANCE OF THE TRAFFIC CONTROL PATTERNS TO ALLOW MOTORISTS THE OPPORTUNITY TO AVOID A WORK ZONE. SERIES 16 SIGNS SHALL BE INSTALLED ON ANY MAJOR INTERSECTING ROADWAYS THAT APPROACH THE WORK ZONE. ON LIMITED- ACCESS HIGHWAYS, THESE SIGNS SHALL BE LOCATED IN ADVANCE OF THE NEAREST UPSTREAM EXIT RAMP AND ON ANY ENTRANCE 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.

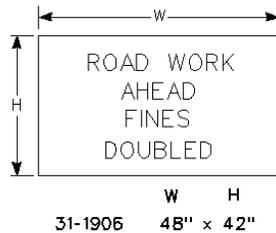
SIGN 16-M SHALL BE USED ON OTHER TOWN ROADWAYS.

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 WHEN THERE ARE WORKERS ON THE HIGHWAY OR WHEN THERE IS OTHER THAN EXISTING TRAFFIC OPERATIONS.

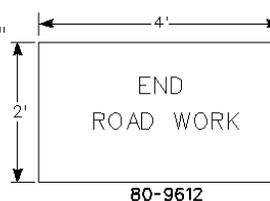
THE "ROAD WORK AHEAD, FINES DOUBLED" REGULATORY SIGNS SHALL NOT BE INSTALLED ON TOWN ROADS.

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.



REV'D 1-02



 CONNECTICUT
 DEPARTMENT OF TRANSPORTATION
 BUREAU OF ENGINEERING &
 HIGHWAY OPERATIONS
 DIVISION OF TRAFFIC ENGINEERING
 CONSTRUCTION
 TRAFFIC CONTROL PLAN
 REQUIRED SIGNS

APPROVED J. Carey DATE 1-02
 PRINCIPAL ENGINEER

NOTES FOR TRAFFIC CONTROL PLANS

1. IF A TRAFFIC STOPPAGE OCCURS IN ADVANCE OF SIGN (A), THEN AN ADDITIONAL SIGN (A) SHALL BE INSTALLED IN ADVANCE OF THE STOPPAGE.
2. SIGNS (AA), (A), AND (D) SHOULD BE OMITTED WHEN THESE SIGNS HAVE ALREADY BEEN INSTALLED TO DESIGNATE A LARGER WORK ZONE THAN THE WORK ZONE THAT IS ENCOMPASSED ON THIS PLAN.
3. SEE TABLE 1 FOR ADJUSTMENT OF TAPERS IF NECESSARY.
4. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN TRAFFIC DRUMS SHALL BE USED IN PLACE OF TRAFFIC CONES.
5. ANY LEGAL SPEED LIMIT SIGNS WITHIN THE LIMITS OF A ROADWAY / LANE CLOSURE AREA SHALL BE COVERED WITH AN OPAQUE MATERIAL WHILE THE CLOSURE IS IN EFFECT, AND UNCOVERED WHEN THE ROADWAY / LANE CLOSURE IS RE-OPENED TO ALL LANES OF TRAFFIC.
6. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN ANY EXISTING CONFLICTING PAVEMENT MARKINGS SHALL BE ERADICATED OR COVERED, AND TEMPORARY PAVEMENT MARKINGS THAT DELINEATE THE PROPER TRAVELPATHS SHALL BE INSTALLED.
7. DISTANCES BETWEEN SIGNS IN THE ADVANCE WARNING AREA MAY BE REDUCED TO 100' ON LOW-SPEED URBAN ROADS (SPEED LIMIT < 40 MPH).
8. IF THIS PLAN IS TO REMAIN IN OPERATION DURING THE HOURS OF DARKNESS, INSTALL BARRICADE WARNING LIGHTS - HIGH INTENSITY ON ALL POST-MOUNTED DIAMOND SIGNS IN THE ADVANCE WARNING AREA.
9. A CHANGEABLE MESSAGE SIGN SHALL BE INSTALLED ONE HALF TO ONE MILE IN ADVANCE OF THE LANE CLOSURE TAPER.
10. SIGN (P) SHALL BE MOUNTED A MINIMUM OF 7 FEET FROM THE PAVEMENT SURFACE TO THE BOTTOM OF THE SIGN.

TABLE 1 - MINIMUM TAPER LENGTHS

| POSTED SPEED LIMIT (MILES PER HOUR) | MINIMUM TAPER LENGTH FOR A SINGLE LANE CLOSURE |
|--|---|
| 30 OR LESS | 180' (55m) |
| 35 | 250' (75m) |
| 40 | 320' (100m) |
| 45 | 540' (165m) |
| 50 | 600' (180m) |
| 55 | 660' (200m) |
| 65 | 780' (240m) |

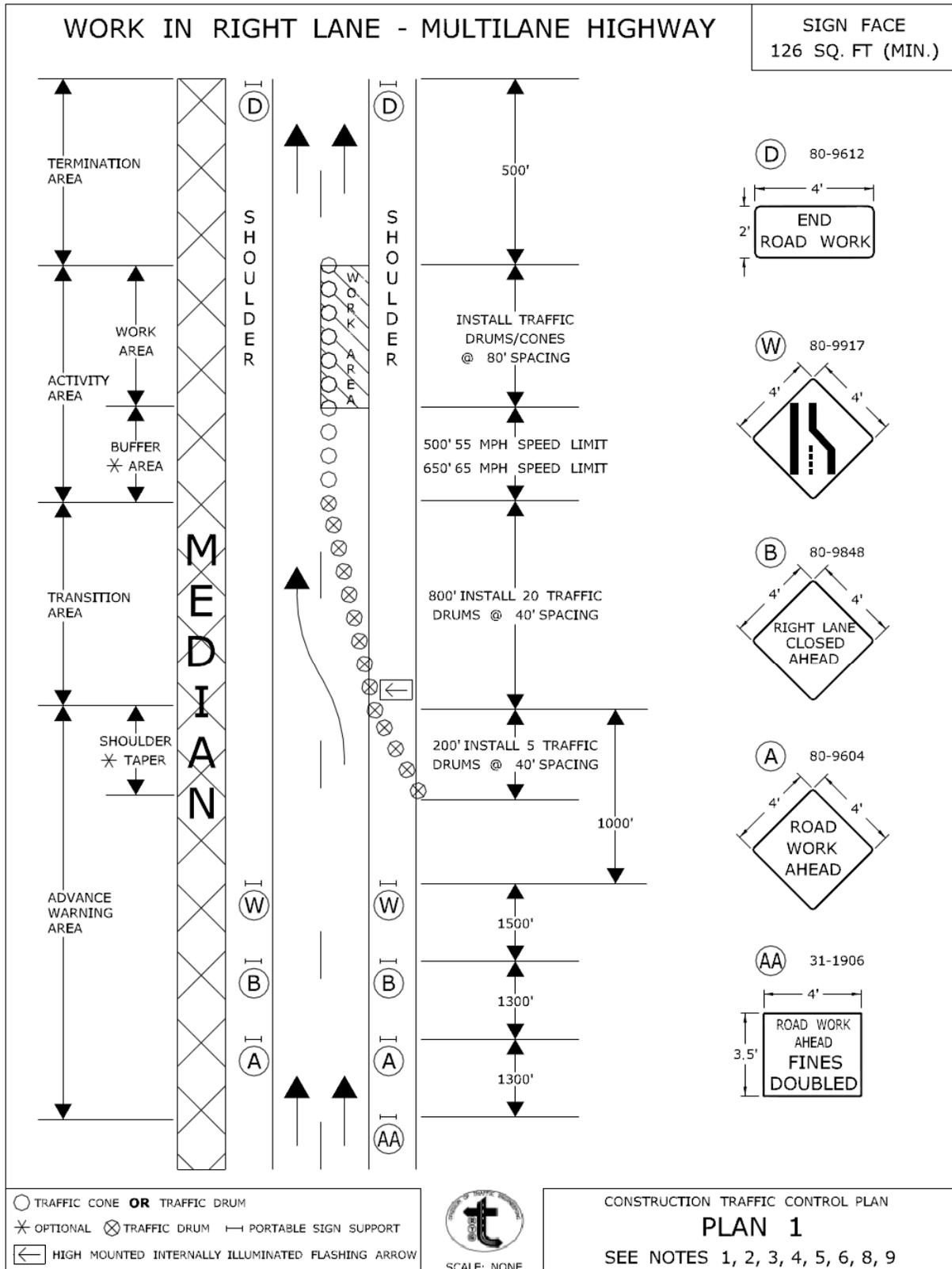
METRIC CONVERSION CHART (1" = 25mm)

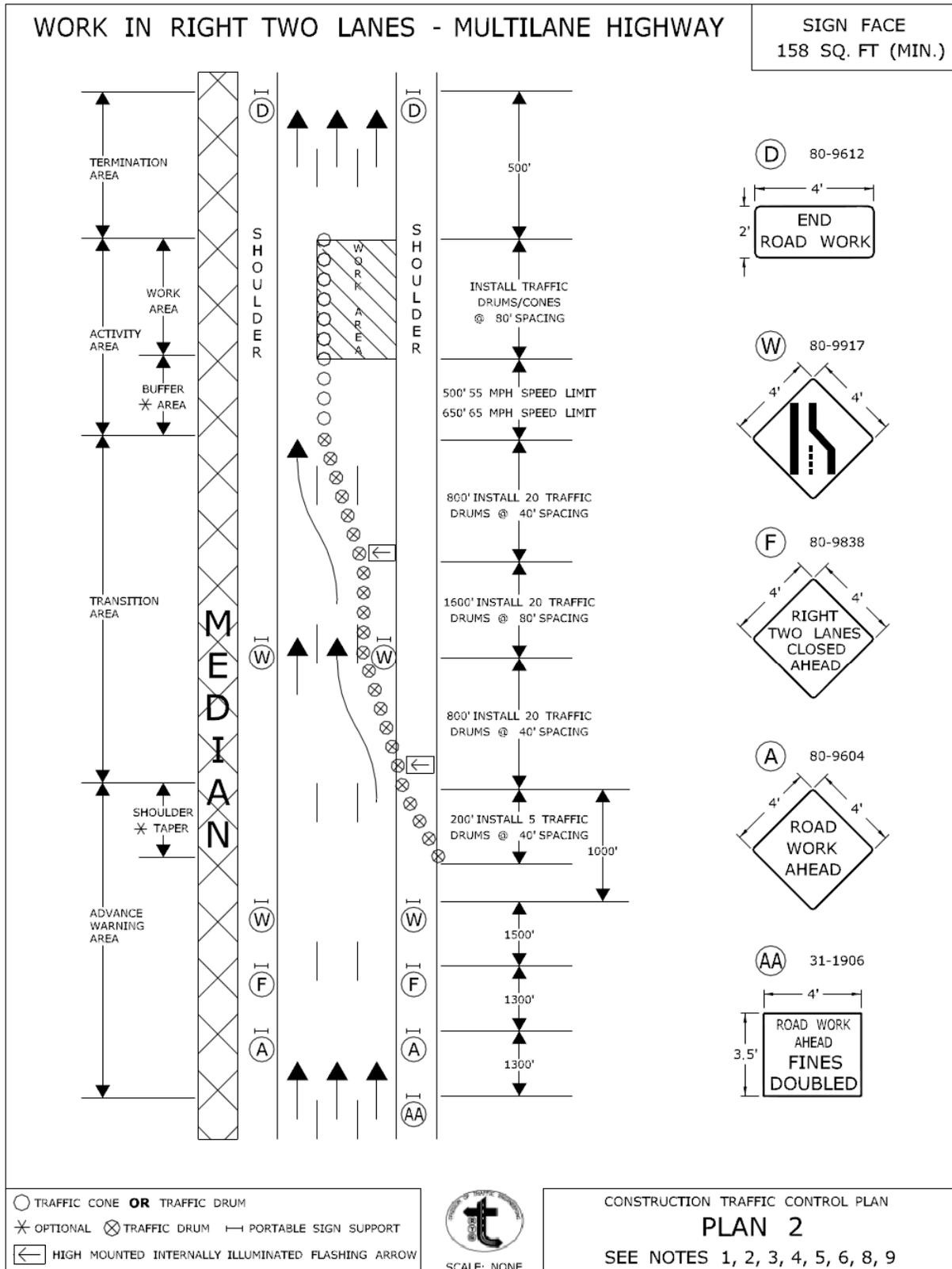
| ENGLISH | METRIC | ENGLISH | METRIC | ENGLISH | METRIC |
|---------|--------|---------|--------|---------|--------|
| 12" | 300mm | 42" | 1050mm | 72" | 1800mm |
| 18" | 450mm | 48" | 1200mm | 78" | 1950mm |
| 24" | 600mm | 54" | 1350mm | 84" | 2100mm |
| 30" | 750mm | 60" | 1500mm | 90" | 2250mm |
| 36" | 900mm | 66" | 1650mm | 96" | 2400mm |



SCALE: NONE

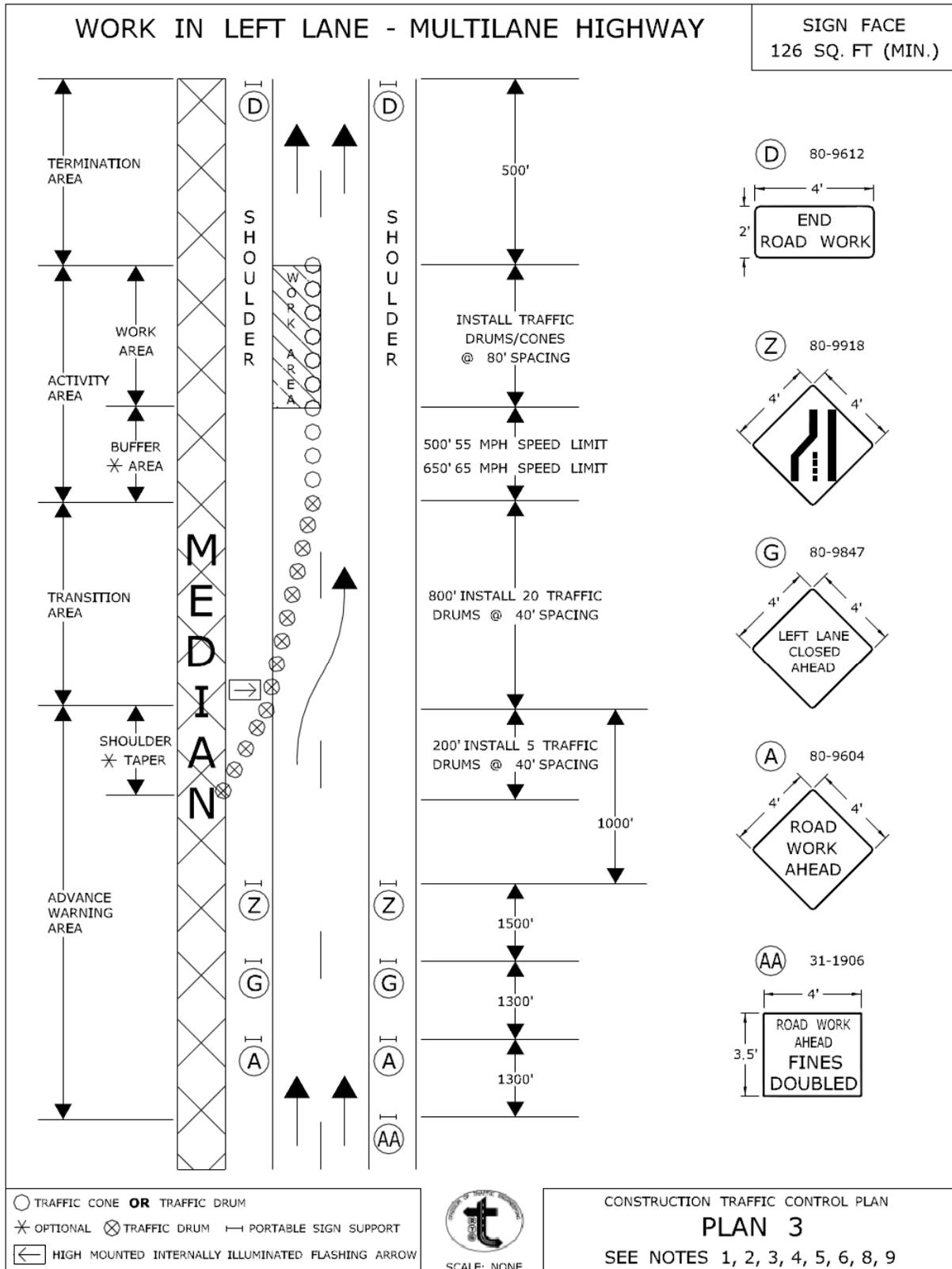
CONSTRUCTION TRAFFIC CONTROL PLAN NOTES

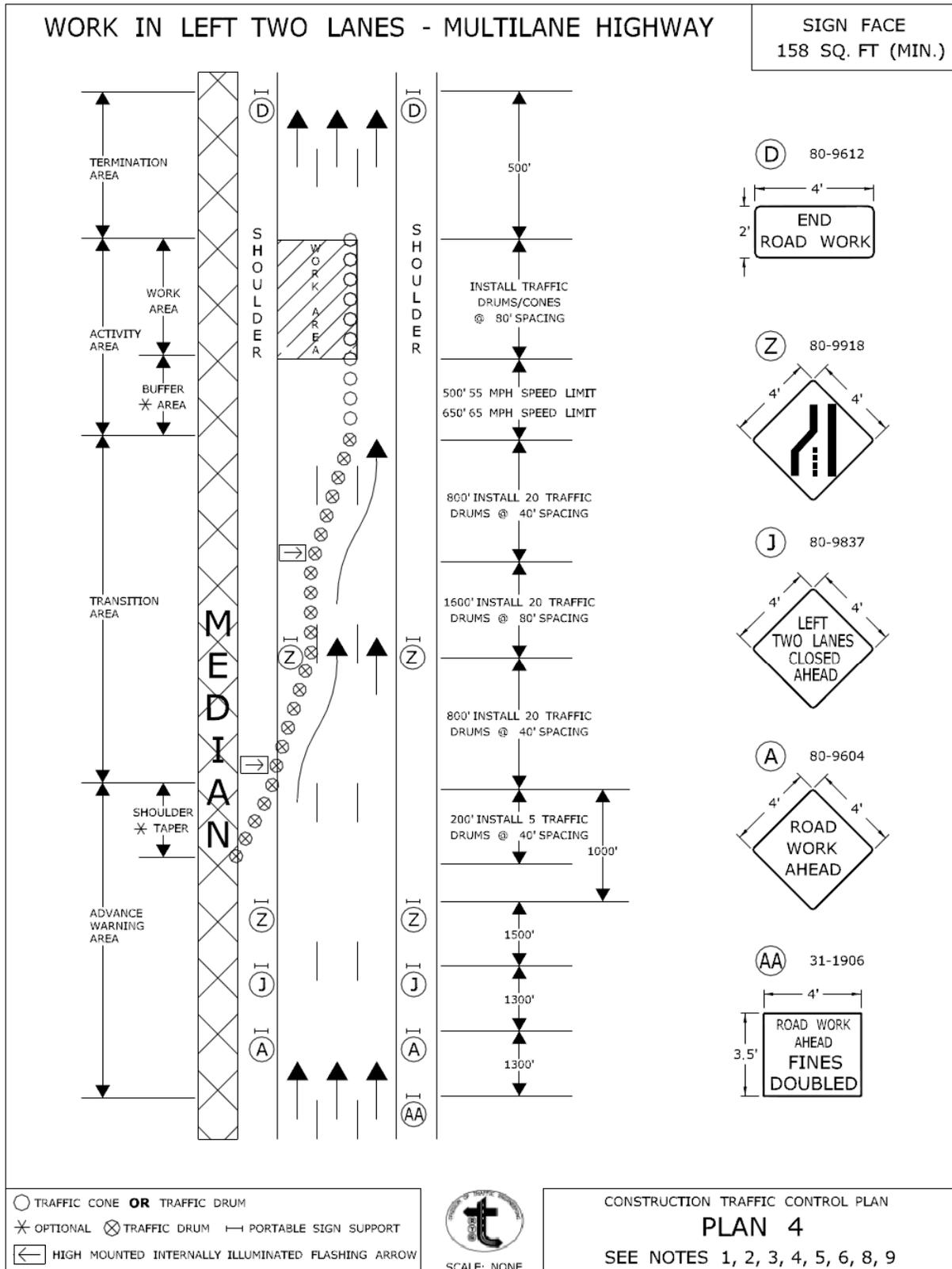




CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

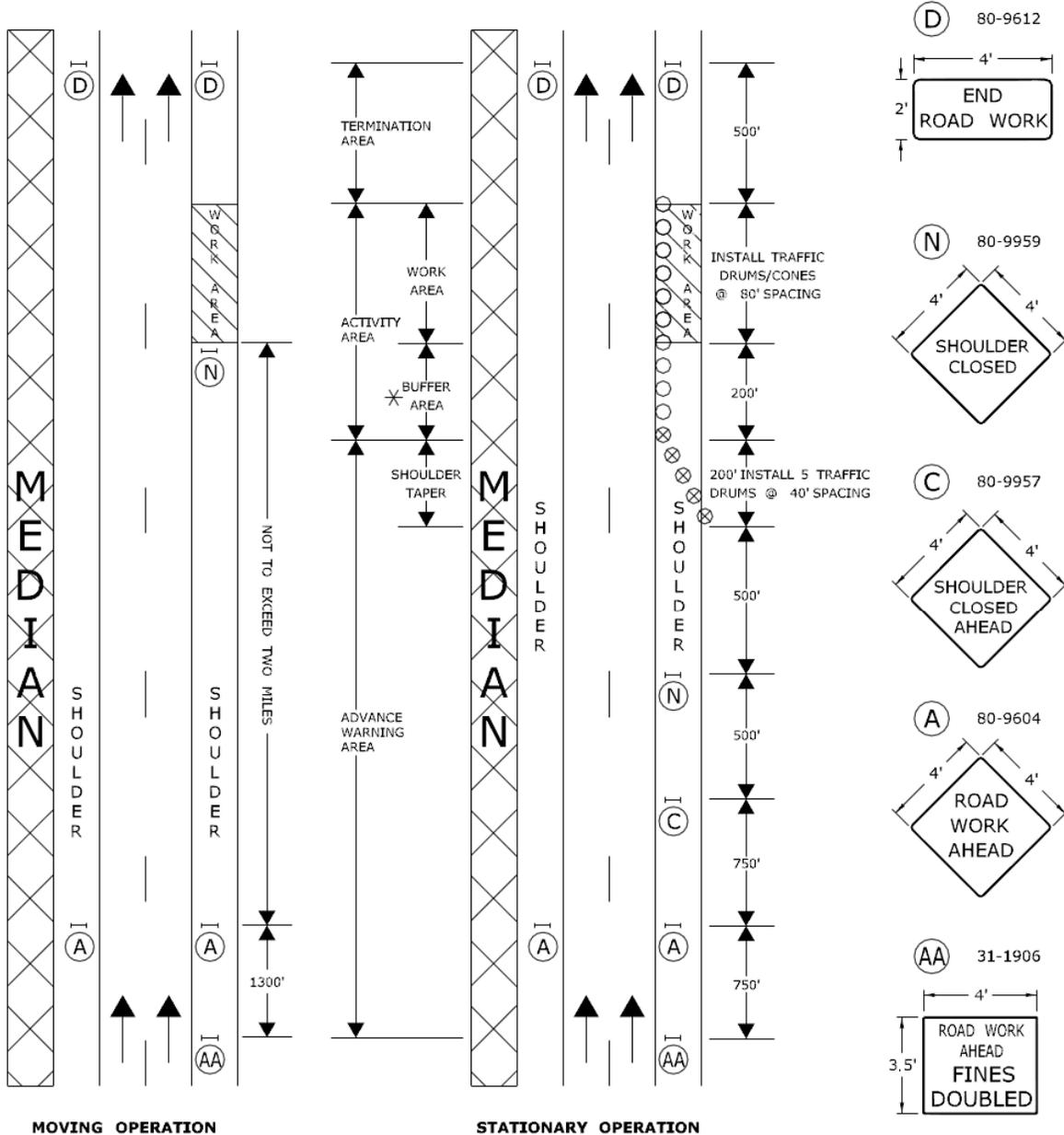
APPROVED *Charles S. Harlow*
PRINCIPAL ENGINEER
2012.06.05 15:51:23-04'00"





WORK IN SHOULDER AREA - MULTILANE HIGHWAY

SIGN FACE
94 SQ. FT (MIN.)



- TRAFFIC CONE OR TRAFFIC DRUM
- ✱ OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

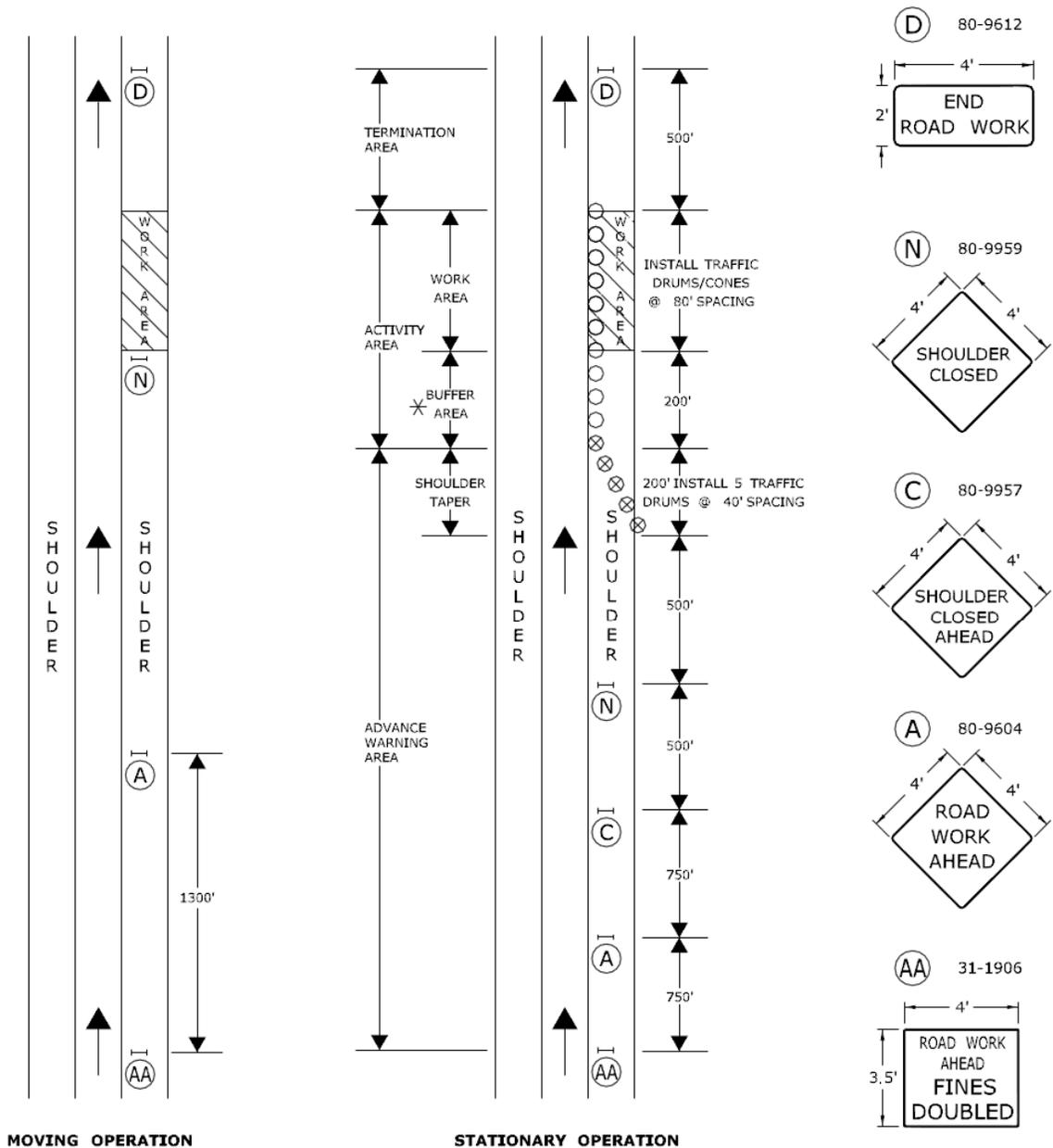
CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 6
SEE NOTES 1, 2, 4, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
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APPROVED *Charles S. Harlow*
PRINCIPAL ENGINEER
2012.06.05 15:52:38-04'00"

WORK IN SHOULDER AREA - TURNING ROADWAYS / RAMPS

SIGN FACE
70 SQ. FT (MIN.)



- TRAFFIC CONE **OR** TRAFFIC DRUM
- ✱ OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

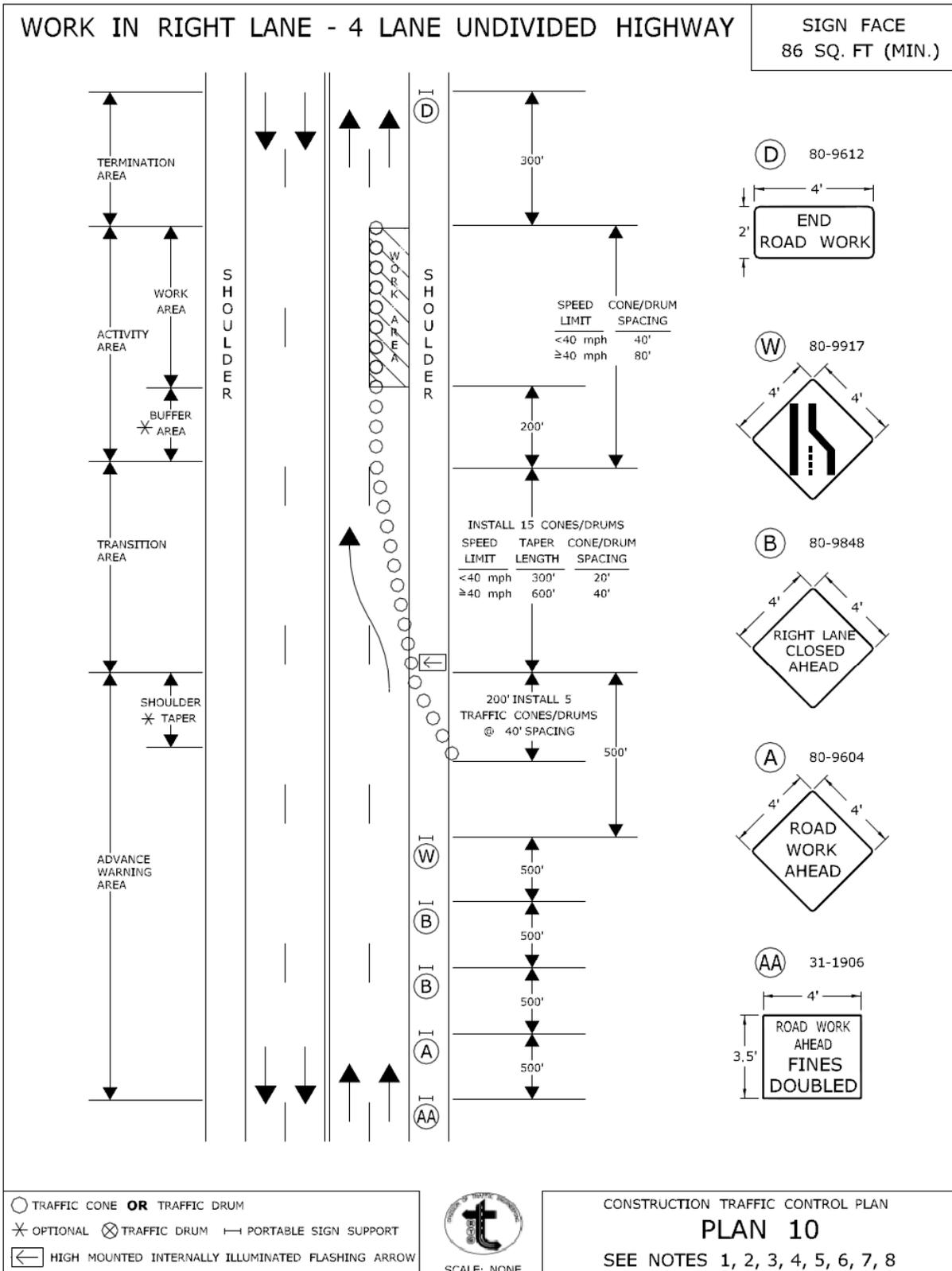
CONSTRUCTION TRAFFIC CONTROL PLAN

PLAN 9

SEE NOTES 1, 2, 4, 8

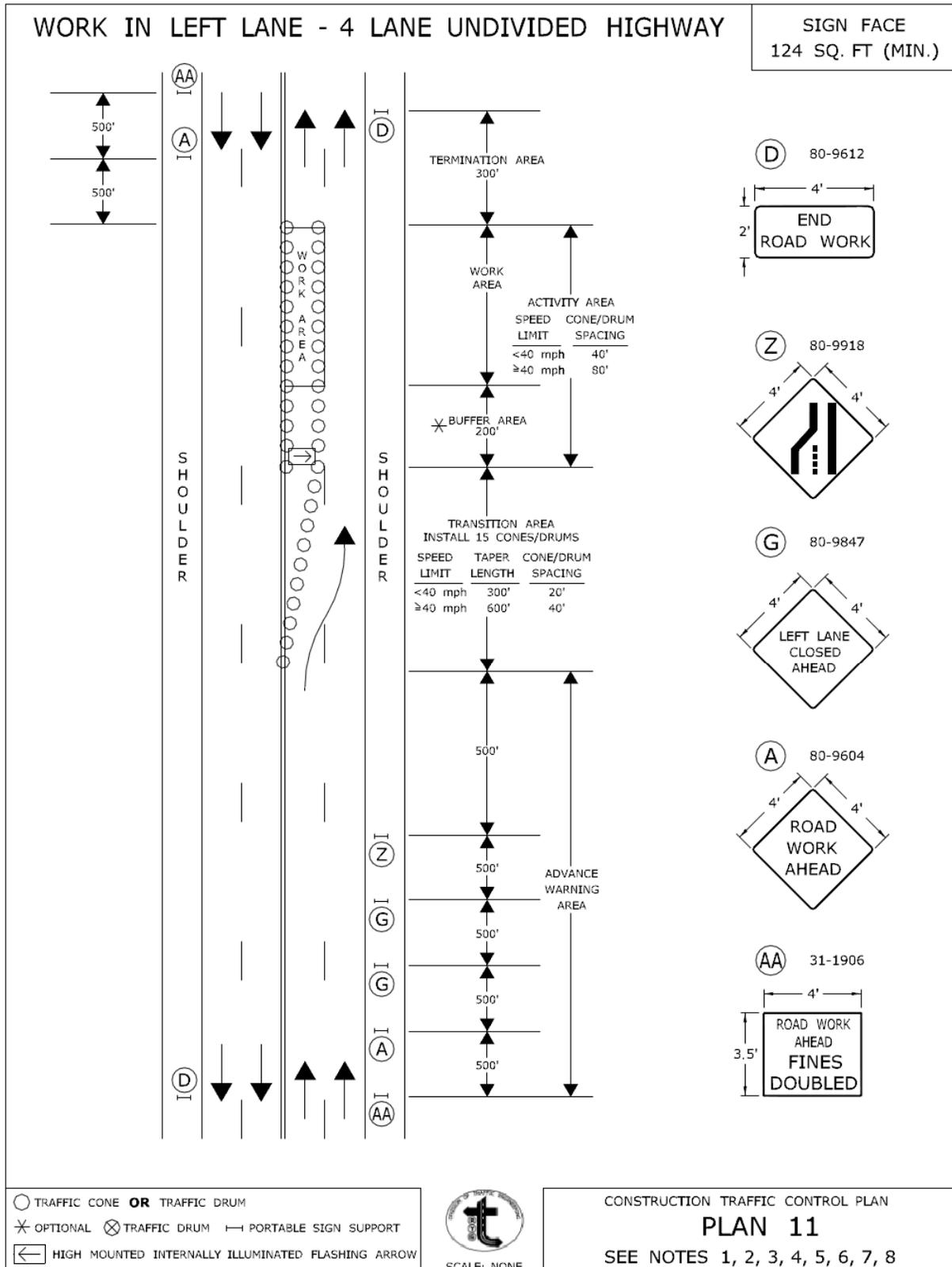
CONNECTICUT DEPARTMENT OF TRANSPORTATION
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APPROVED *Charles S. Harlow*
PRINCIPAL ENGINEER
2012.06.05 15:53:0400'



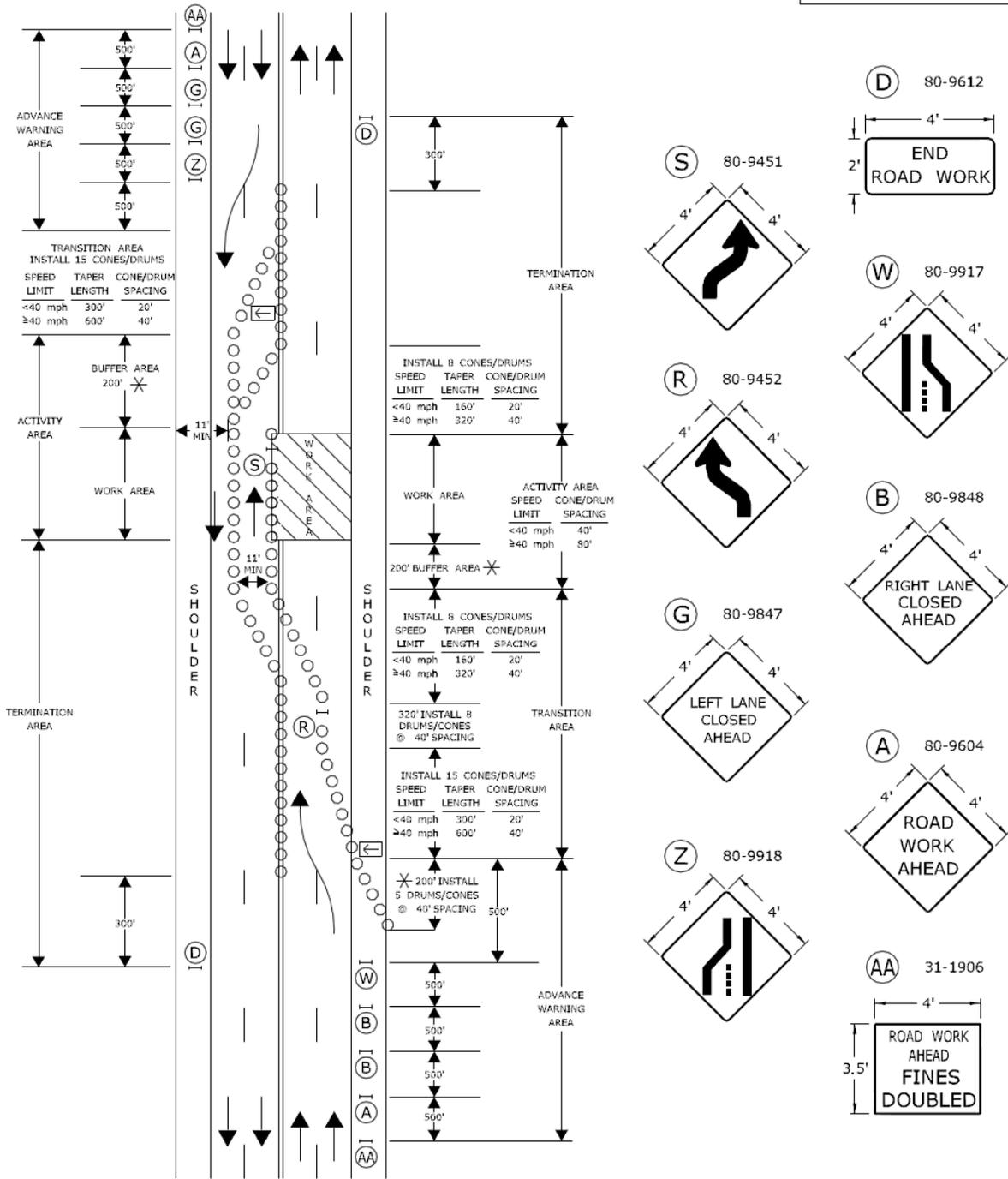
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APPROVED *Charles S. Harlow* Charles S. Harlow
2012.06.05 15:54:15-0400
PRINCIPAL ENGINEER



WORK IN BOTH LANES - 4 LANE UNDIVIDED HIGHWAY

SIGN FACE
204 SQ. FT. (MIN.)



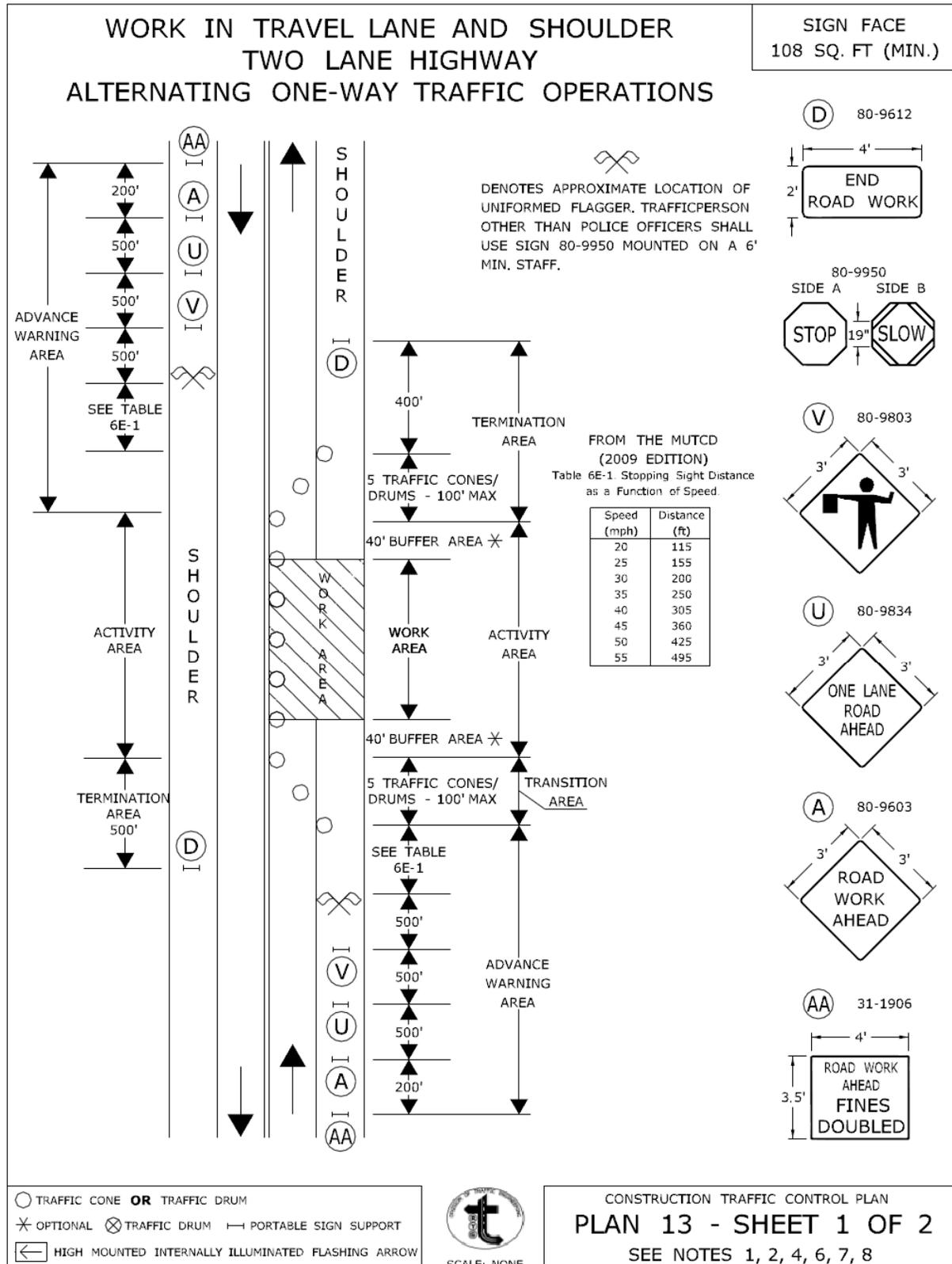
- TRAFFIC CONE **OR** TRAFFIC DRUM
- ✱ OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ← HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 12
SEE NOTES 1, 2, 3, 4, 5, 6, 7, 8

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Charles S. Harlow
2012.06.05 15:55:01-0400'



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CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 13 - SHEET 1 OF 2
SEE NOTES 1, 2, 4, 6, 7, 8

APPROVED *Charles S. Harlow* Charles S. Harlow
2012.06.05 15:55:23-04'00"
PRINCIPAL ENGINEER

WORK IN TRAVEL LANE AND SHOULDER TWO LANE HIGHWAY ALTERNATING ONE-WAY TRAFFIC OPERATIONS

SIGN FACE
108 SQ. FT (MIN.)

HAND SIGNAL METHODS TO BE USED BY UNIFORMED FLAGGERS

THE FOLLOWING METHODS FROM SECTION 6E.07, FLAGGER PROCEDURES, IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES," SHALL BE USED BY UNIFORMED FLAGGERS WHEN DIRECTING TRAFFIC THROUGH A WORK AREA. THE STOP/SLOW SIGN PADDLE (SIGN NO. 80-9950) SHOWN ON THE TRAFFIC STANDARD SHEET TR-1220 01 ENTITLED, "SIGNS FOR CONSTRUCTION AND PERMIT OPERATIONS" SHALL BE USED.

A. TO STOP TRAFFIC

TO STOP ROAD USERS, THE FLAGGER SHALL FACE ROAD USERS AND AIM THE STOP PADDLE FACE TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FREE ARM SHALL BE HELD WITH THE PALM OF THE HAND ABOVE SHOULDER LEVEL TOWARD APPROACHING TRAFFIC.



B. TO DIRECT TRAFFIC TO PROCEED

TO DIRECT STOPPED ROAD USERS TO PROCEED, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FLAGGER SHALL MOTION WITH THE FREE HAND FOR ROAD USERS TO PROCEED.



C. TO ALERT OR SLOW TRAFFIC

TO ALERT OR SLOW TRAFFIC, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. TO FURTHER ALERT OR SLOW TRAFFIC, THE FLAGGER HOLDING THE SLOW PADDLE FACE TOWARD ROAD USERS MAY MOTION UP AND DOWN WITH THE FREE HAND, PALM DOWN.



- TRAFFIC CONE **OR** TRAFFIC DRUM
- * OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

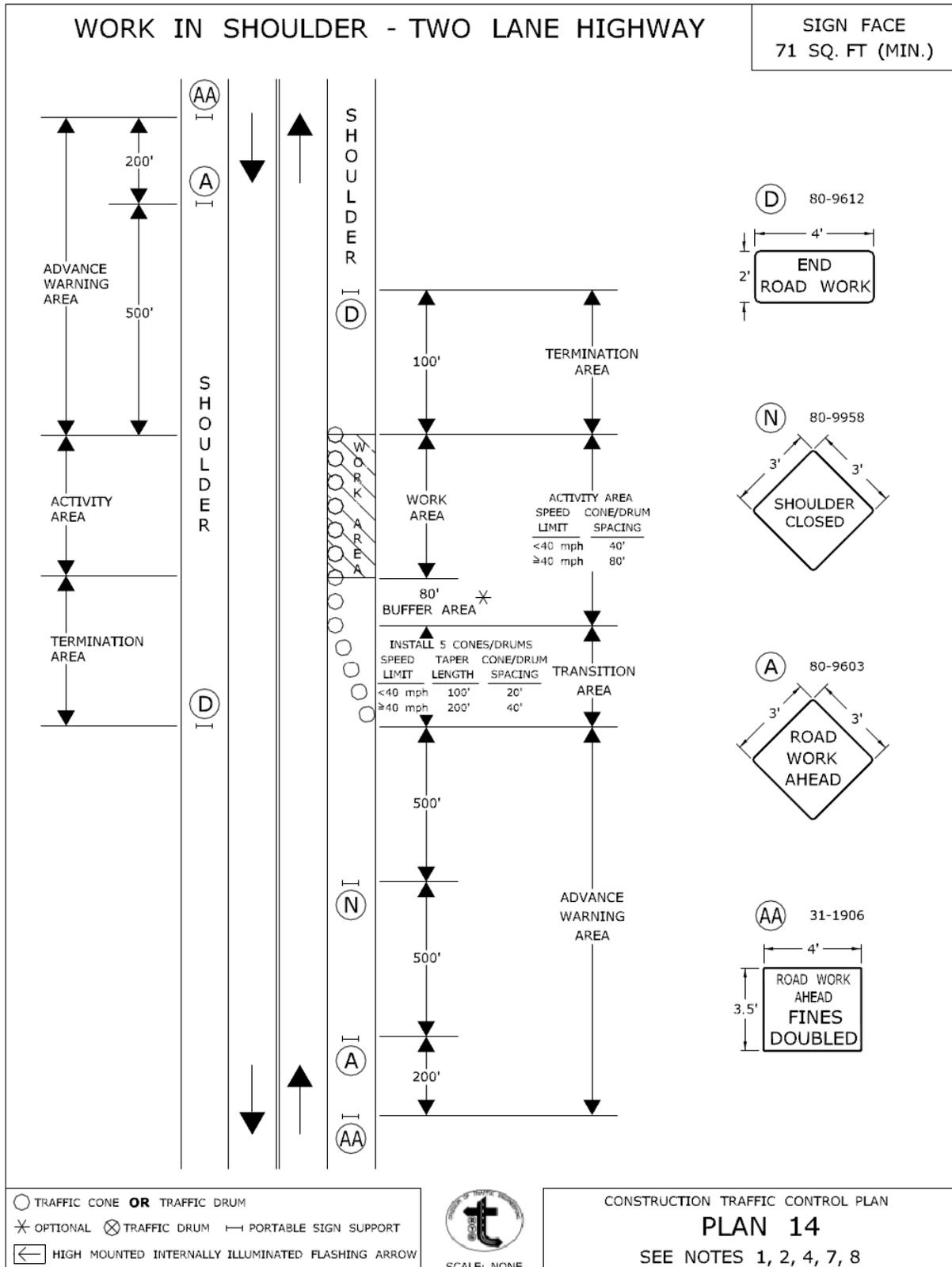


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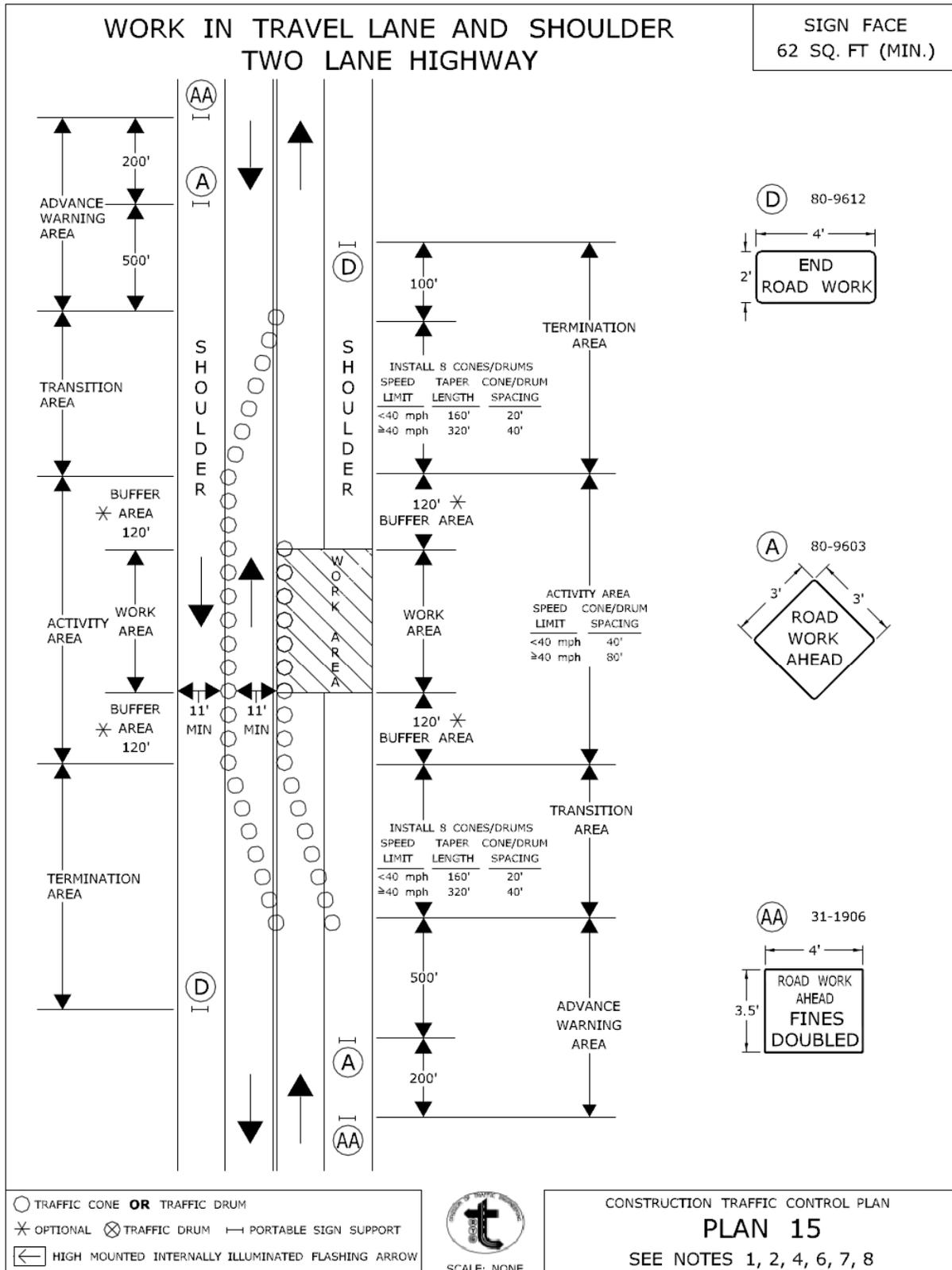
CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 13 - SHEET 2 OF 2
SEE NOTES 1, 2, 4, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow* Charles S. Harlow
2012.06.05 15:55:45-04'00"
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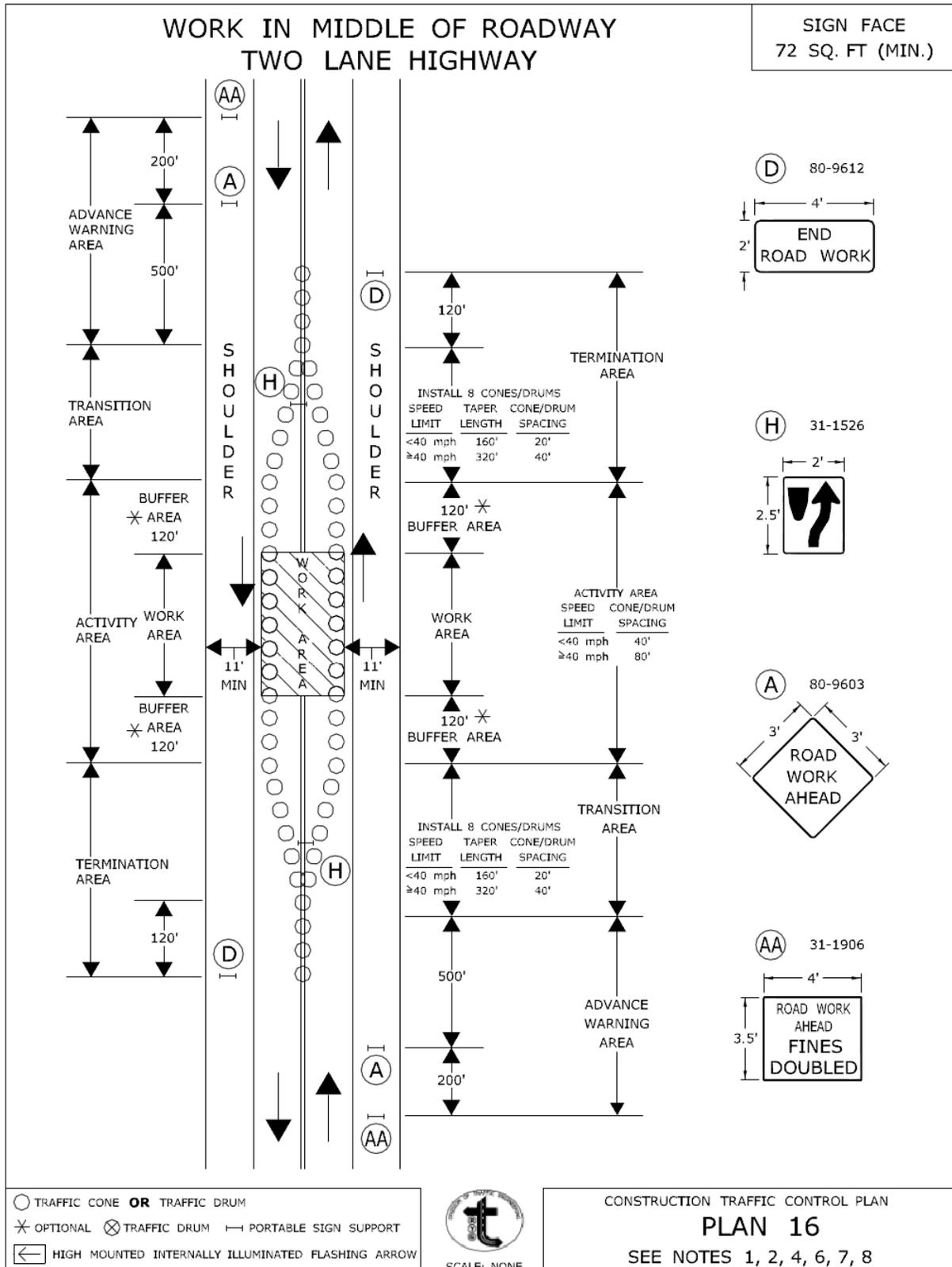


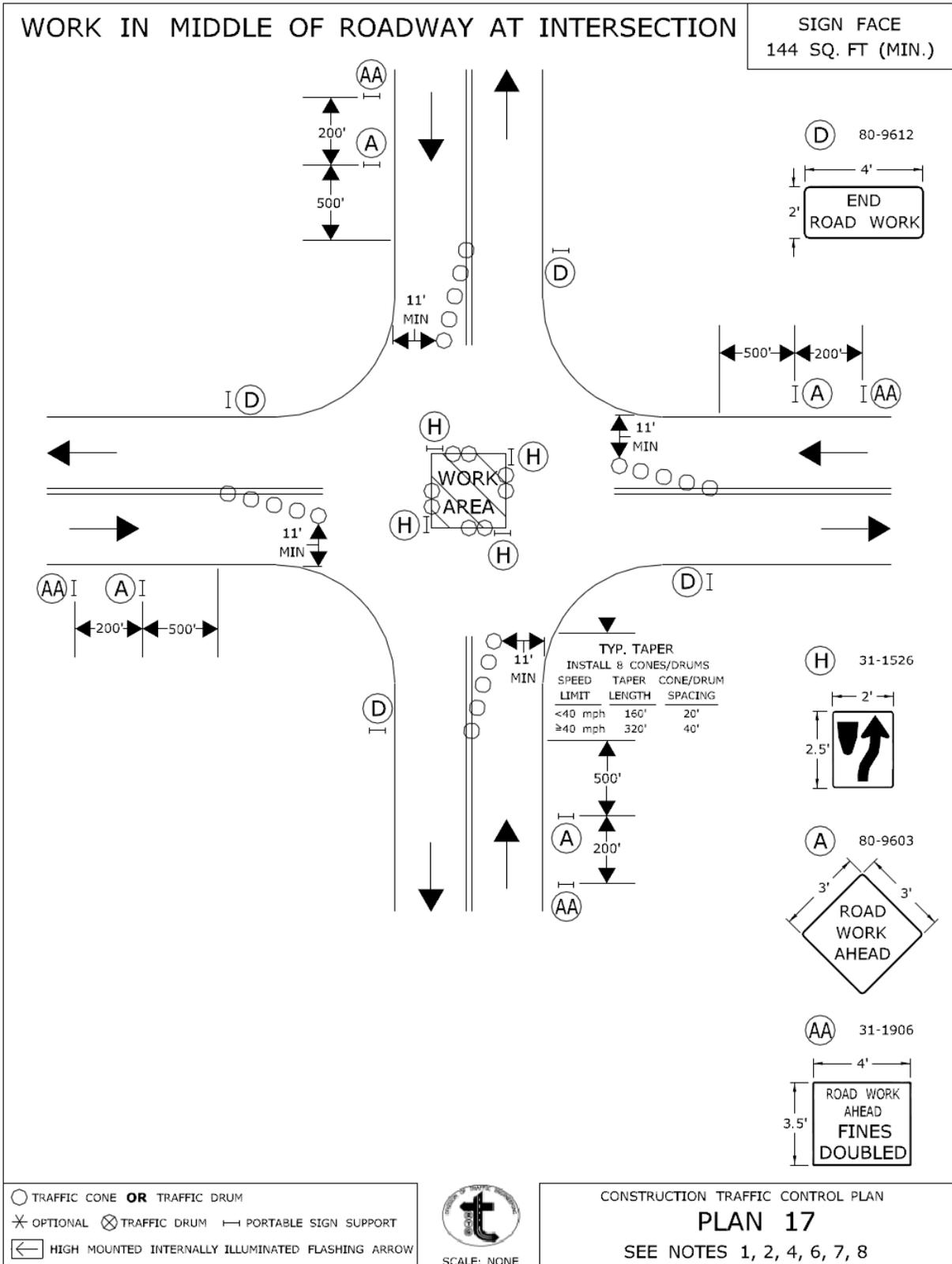
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CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

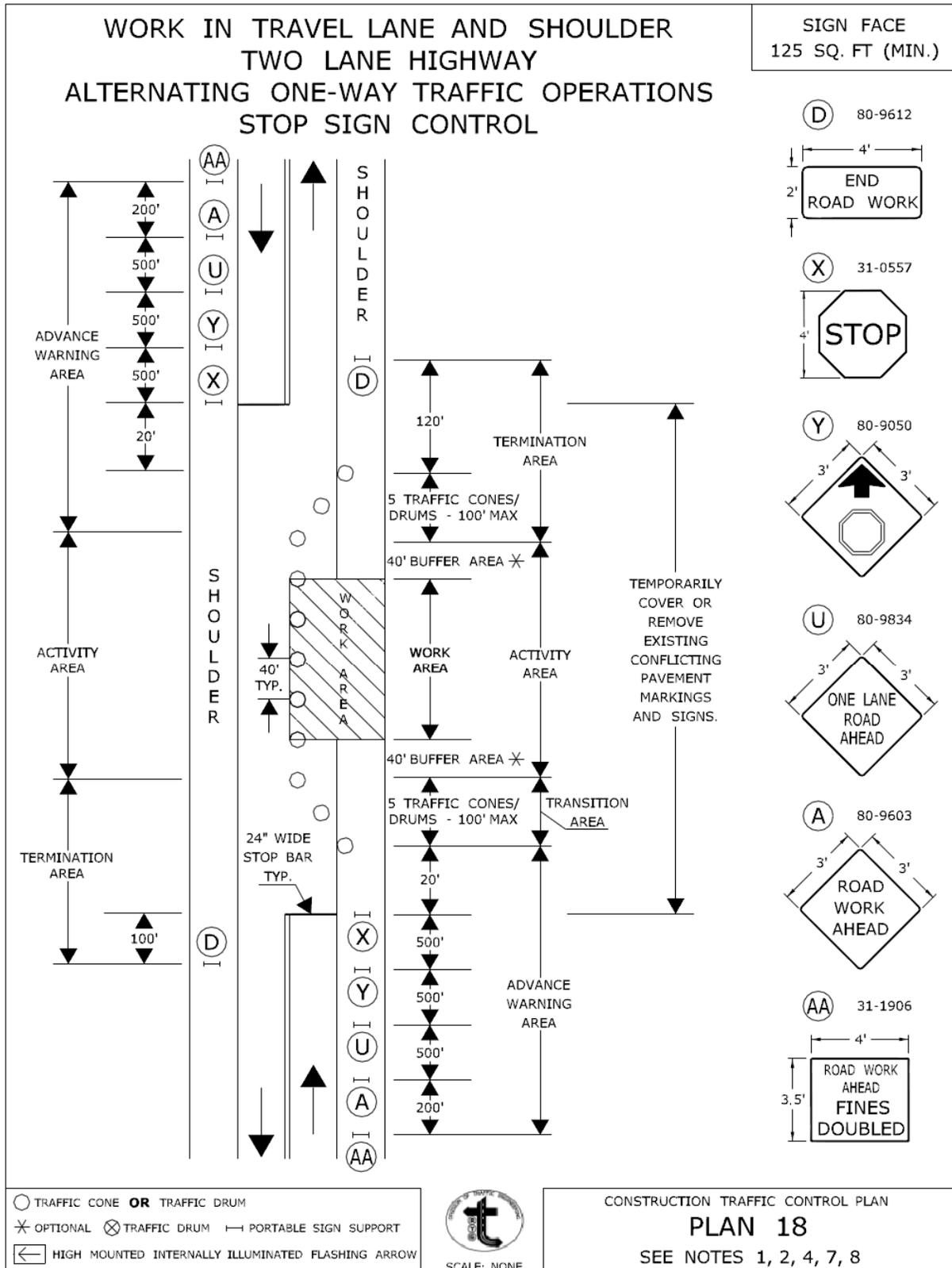
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Article 9.71.05 – Basis of Payment is supplemented by the following:

The temporary relocation of signs and supports, and the furnishing, installation and removal of any temporary supports shall be paid for under the item “Maintenance and Protection of Traffic”. Temporary overhead sign supports and foundations shall be paid for under the appropriate item(s).

The cost of furnishing, installing, and removing the material for the 4H:1V traversable slope shall be paid for under the item “Maintenance and Protection of Traffic.”

ITEM #1001002A - TRENCHING AND BACKFILLING – TYPE I

For Project 173-412 - City of Stamford –Intersection 135-259 - U.S. Route 1 at Elm Street

The materials for this work shall conform to the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction (Form 816) Article M.16.06 amended as follows:

Article 10.01.01 - Description:

In the second paragraph, replace “pavement or sidewalk structure” with the following:
“pavement, pavement base and sidewalk structure including brick pavers”

In the second paragraph insert the following:

It shall also include the removal, reconstruction, and/or resetting of curbing disturbed by the trenching and backfilling operation.

10.01.03 - Construction Methods:

Add the following paragraph: The Contractor shall reinstall the brick pavers in accordance with the details on the drawings.

The minimum depth of the trench shall be “36 inches”. When other utilities are encountered at this depth the new conduit may be placed between 24 inches and 36 inches with concrete encasement. If the conduit depth can not be more than 24 inches, the contractor shall excavate the trench to place the conduit under the conflicting utility. This additional depth excavation length shall be measured for twice the unit price.

10.01.05 - Method of Measurement:

Curbing replacement and brick paver replacements will not be measured for payment, but shall be included in the price per linear meter of Trenching and Backfilling.

10.01.05 - Basis of Payment:

In the second paragraph, replace “pavement or structure” with the following:
“pavement and pavement base”

In the second paragraph, add the following:

It shall also include the replacement, reconstruction and/or resetting of curbing and replacement of brick pavers.

Delete the fifth paragraph and replace with the following:

Pavement, pavement structure, sidewalk or curbing replaced beyond the maximum trench limits as shown on the plans and approved by the Engineer will be not be paid for separately but will be included in the cost for the Contract unit price for "Trenching and Backfilling". The limits of the replacement shall be as approved under the Construction Staking item. The concrete encasement in trench where required shall be included in the unit price.

ITEM #1002200A - TRAFFIC CONTROL FOUNDATION - SPAN POLE - TYPE "A"

FOR PROJECT 173-404 – INTERSECTION #126-242 – SR 714 AT DRIVE TO SHELTON SQUARE SOUTH AND DRIVE TO DUCHESS - SHELTON

Subarticle 10.02.03 - Construction Methods:

Add the following at the end of the subarticle;

Where called for on the plans, in the specifications or by the Engineer, Traffic Control Foundation - Span Pole - Type "A" shall be constructed as a drilled shaft utilizing temporary casing (to support the excavation) and either dry or wet construction techniques (for placement of the concrete).

Temporary casings shall be metal, smooth, clean, watertight, and of ample strength to withstand both handling and driving stresses and the pressure of both concrete and the surrounding earth materials. Temporary casing shall be installed for the full depth of the drilled shaft or to the top of bedrock. Temporary casing shall be removed immediately after placement of the shaft concrete. Permanent casing or casing left in place will not be permitted.

The use of the dry construction method is permitted if less than one foot of water accumulates in the bottom of a hole without pumping over a one hour period, the excavation remains stable and any loose material and water can be removed prior to placement of concrete. The wet construction method shall be used at sites where a dry excavation cannot be maintained for placement of the shaft concrete. In wet construction, concrete shall be placed by tremie methods.

The Traffic Control Foundation - Span Pole - Type "A" shall be 3ft longer in length than the standard, Traffic Control Foundation - Span Pole, as shown in the plans, for a total concrete depth of 13ft and total reinforcing bar depth of 12.5ft.

Traffic Control Foundation - Span Pole - Type "A" shall be used at the following locations;

S.R. 714 (Bridgeport Ave.) at Driveway to Shelton Square (Southerly) and Duchess Restaurant –Southwest Corner

S.R. 714 (Bridgeport Ave.) at Driveway to Shelton Square (Southerly) and Duchess Restaurant –Southeast Corner

Pay Item

Traffic Control Foundation - Span Pole - Type "A"

ITEM #1002202A - TRAFFIC CONTROL FOUNDATION – MAST ARM

Description: Work under this item shall consist of designing and constructing drilled shaft foundations for mast arm assemblies, in accordance with the details shown on the plans, in accordance with these specifications and as ordered by the Engineer.

Materials: The reinforcing steel shall be uncoated, ASTM A615, Grade 60 reinforcement conforming to the requirements of Article M.06.01.

The concrete for the drilled shaft shall be dense, homogeneous, fluid, resistant to segregation and consolidate under self-weight. The concrete for the drilled shaft shall be a Contractor designed Portland cement concrete with a 3/8" (No. 8) maximum coarse aggregate size and minimum 28 day compressive strength of 4,000 psi. The initial concrete slump shall be from 6" to 8". The concrete shall maintain a minimum 4" slump for the duration of the concrete placement. The concrete shall contain 3% - 7% air entrainment. The mix concrete design, including admixtures, shall be submitted to the Engineer for approval.

The slurry shall be Contractor designed mineral slurry that meets the range of values listed herein. The slurry mix design, including admixtures, shall be submitted to the Engineer for approval.

Rigid metal conduit, ground rod sleeves and related hardware, and end caps shall be galvanized steel conduit, and shall conform to Article M.15.09.

Ground rods shall be 5/8" in diameter by 12'-0" long copper clad steel. The copper cladding shall be a minimum thickness of 0.128". The ground clamp shall be a square-head bolt type, approved for direct burial.

Bare copper wire shall conform to Article M.15.13.

Topsoil shall conform to Article M.13.01.

Fertilizer shall conform to Article M.13.03.

Seed mixture shall conform to Article M.13.04.

Mulch shall conform to Article M.13.05.

Erosion control matting shall conform to Article M.13.09.

Construction Methods: The design of drilled shaft foundations shall conform to the requirements of AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals – latest edition, including the latest interim specifications, amended as follows:

- The foundation shall be designed for the soils and rock properties and parameters based on the subsurface conditions (character of the soil and rock, presence of ground water, etc.) in the location of, adjacent to and below the drilled shaft foundation excavation. The need and extent of all subsurface explorations and investigations shall be determined by the Contractor.
- The concrete for the foundation shall have a compressive strength, f'_c , of 4,000 psi at 28 days.
- The reinforcement shall be uncoated and conform to ASTM A615, Grade 60.
- The foundation shall be designed for the mast arm assembly reactions of all group loads and load combinations. The reactions shall include axial, shear, flexural and torsional load effects. No reduction of the reactions or increase in the allowable stresses of the materials is permitted.
- The diameter of the drilled shaft foundation shall be 3'-0", unless otherwise allowed by the Engineer.
- The design of the drilled shaft foundation shall include embedment of the foundation in soil, the embedment of the foundation in rock or the embedment of the foundation partially in soil and partially in rock, as applicable.
- The design of the drilled shaft embedment depth shall account for the slope of the finished grade.
- The minimum embedment for a drilled shaft foundation, constructed entirely in soil, shall be no less than 12'-0" below the finished grade at the low side of a sloping grade. The minimum embedment for a drilled shaft foundation, constructed entirely in rock shall be no less than 8'-0" below the finished grade at the low side of a sloping grade.
- The embedment depth for a drilled shaft foundation, determined by the Brom's design method, shall have a minimum factor of safety of 3.25 applied to the shear and moment load effects. The factor of safety applied to the torsional load effect shall be no less than 1.3.
- The load factor method shall be used for the structural design of the drilled shaft. The drilled shaft may be designed in accordance with the load factor method presented in the latest edition of the Building Code Requirements for Reinforced Concrete", ACI 318, amended as follows:

The load factor applied to all load effects, axial, shear, flexure and torsion, shall be no less than 1.6.

- The drilled shaft foundation shall be reinforced with longitudinal and transverse reinforcement. The area of longitudinal reinforcement should be no less than the sum of the reinforcement required for flexure and the longitudinal reinforcement required for torsion. The area of transverse reinforcement should be no less than the sum of the reinforcement required for shear and the transverse reinforcement required for torsion. Additional transverse reinforcement may be required at the top of the drilled shaft within the limits of the pedestal due to the torsional load on the anchor bolt group.
- The minimum number and size of longitudinal reinforcing bars shall be 16 - #8. The reinforcement shall extend full length of the drilled shaft. Splicing of the longitudinal reinforcement is not permitted.
- The drilled shaft shall be transversely reinforced with spirals or circular enclosed ties. The minimum size of the reinforcement shall be #4. The maximum spacing/pitch of the reinforcement shall be no more than 6". The spiral reinforcement shall be terminated at the top and the bottom with 1 ½ turns of the reinforcing and a 135° hook.
- The design of the foundation shall be coordinated with the traffic structure support to avoid conflicts between the embedded support anchorage and the foundation reinforcement.

The Contractor's foundation designer shall obtain a Professional Liability Insurance Policy in accordance with the requirements of Article 1.05.02-2a. A Contractor shall submit a copy of the certificate of insurance to the Engineer in accordance with the requirements of Article 1.05.02-2a.

Prior to excavating for the foundation, the Contractor shall submit working drawings and design computations for each mast arm assembly foundation 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 construction, including a copy of the certificate of insurance, shall be prepared and submitted for each mast arm assembly foundation. **A single set of drawings with tabulated data for multiple foundation locations is not permitted.** The alpha-numeric support 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 foundation shall be submitted in an electronic portable document format (.pdf) with appropriate bookmarks. The packaged set shall include the following:

- title sheet
- table of contents

- contact information for designer – contact information should include name and address of design firm, name of contact person with phone number and email address
- copy of the certificate of insurance
- foundation working drawings
- foundation design computations

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.

The electronic portable document format (.pdf) working drawings shall be created on ANSI D (22" x 34") full scale (1" electronic file = 1" paper) sheets. (The purpose of creating the drawings on ANSI D sheets is so that the sheets may be printed/plotted at that size or smaller without loss of legibility.) Each drawing shall have a border and title block. Located in the lower right hand corner of the drawing adjacent to the title block, each drawing shall have a rectangular box, 2 1/4" wide x 1 3/4" 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 1/2" x 11") letter sheets.

The working drawings shall include complete details of all foundation components. The drawings shall include, but not be limited to the following:

- the project number, town and support identification number
- reference to the design specifications, including interim specifications
- material specifications for all components
- embedment depths for foundation in soil, rock and a combination of soil and rock
- anchor bolt details, including dimensions, embedment and projection

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

- the project number, town and support identification number
- 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 foundation with dimensions, loads and references to the local and global coordinate systems used (as applicable), to facilitate review of the results
- sign support reactions of all group loads and load combinations
- soil and rock design parameters
- computations demonstrating the geotechnical and structural capacity of the drilled shaft for all applicable axial and lateral load combinations

The Contractor shall submit the packaged set of working drawings and calculations to the project's "Engineer of Record". The project's "Engineer of Record" is identified in the signature block on the mast arm assembly foundation 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 project's "Engineer of Record".

Prior to excavating for the foundation, the Contractor shall submit the following:

Reinforcing Steel Shop Drawings: Based on the accepted foundation design, the Contractor shall prepare reinforcing steel shop drawings for each foundation in accordance with Subarticle 1.05.02-3. The drawings shall be reviewed and stamped approved (or approved as noted) by the foundation designer. Four copies of each reviewed and stamped drawing shall be submitted to the Engineer at the District Construction office. One copy of each reviewed and stamped drawing shall be submitted to the project's "Engineer of Record".

Concrete and Slurry Mix Designs: The Contractor shall submit to the Engineer at the District Construction office the concrete mix design and the slurry mix design, including admixtures, for review.

Foundation Construction Procedure: The Contractor shall submit to the Engineer at the District Construction office a written foundation construction procedure outlining the equipment; drilling procedure for soil and rock, including removal of obstructions and removal of excavated spoils; temporary casing placement and removal; slurry placement; reinforcement, anchor bolt and conduit placement; and concrete placement required for the drilled shaft foundation

construction for review. The procedure should include contingencies for the various soil, rock and subsurface water conditions that may be encountered during the foundation construction. Also required in this submission are the following;

The Engineer will evaluate the foundation construction procedure for conformance with the contract documents and will then notify the Contractor of any additional information required and/or changes necessary to meet the contract requirements. All procedural approvals given by the Engineer shall be subject to trial in the field and shall not relieve the Contractor of the responsibility to satisfactorily complete the work as detailed in the plans and specifications. The Contractor shall not commence construction of the drilled shafts until the Engineer has accepted the foundation construction procedure.

Excavations required for shafts shall be performed through whatever materials are encountered, to the dimensions and elevations in the working drawings or as ordered by the Engineer. The methods and equipment used shall be suitable for the intended purpose and materials encountered. Shaft excavation may be performed by combinations of augering, rotary drilling, down-the-hole hammer, reverse circulation drilling, claming, scraping, or other means approved by the Engineer. Generally, either the dry method, wet method, or temporary casing method may be used, as necessary, to produce sound, durable concrete foundation shafts free of defects. The Contractor shall select and use the method that is needed to properly accomplish the work, as determined by site conditions and subject to the approval of the Engineer. The Contractor is responsible for maintaining the stability of the shaft excavation during all phases of construction.

The dry method consists of drilling the shaft excavation, removing accumulated water and loose material from the excavation, and placing the shaft concrete in a relatively dry excavation. The dry construction method shall be used only at sites where the groundwater table and site conditions are suitable to permit construction of the shaft in a relatively dry excavation, and where the sides and bottom of the shaft are stable and may be visually inspected prior to placing the concrete. The use of the dry construction method is permitted if less than one foot of water accumulates in the bottom of a hole without pumping over a one hour period, the excavation remains stable and any loose material and water can be removed prior to placement of concrete.

The wet construction method shall be used at sites where a dry excavation cannot be maintained for placement of the shaft concrete. Wet construction methods consist of using a mineral slurry to maintain stability of the hole perimeter while advancing the excavation to final depth, placing the reinforcing cage and shaft concrete. This procedure may require desanding and cleaning the slurry; final cleaning of the excavation by means of a bailing bucket, air lift, submersible pump or other devices; and placing the shaft concrete with a tremie. Unless it is demonstrated to the satisfaction of the Engineer that the surface casing is not required, temporary surface casings shall be provided to aid shaft alignment and position, and to prevent sloughing of the top of the shaft excavation. Surface casing is defined as the amount of casing required from the ground surface to a point in the shaft excavation where sloughing of the surrounding soil does not occur.

The temporary casing construction method shall be used at all sites where the dry or wet construction methods are inappropriate. Temporary casing construction method consists of advancing the excavation through caving material by the wet method. Temporary casing may be installed by driving or vibratory procedures in advance of excavation to the lower limits of the caving material. When a nearly impervious formation is reached, a casing is placed in the hole and sealed in the nearly impervious formation. After the drilling fluid is removed from the casing, drilling may proceed as with the dry method except that the casing is withdrawn when the shaft concrete is placed. If seepage conditions prevent use of the dry method, excavation is completed using the wet method. Temporary casing may be installed by driving or vibratory procedures in advance of excavation to the lower limits of the caving material. Slurry may be omitted if the casing can be installed with only minor caving of the hole.

If the Engineer determines that the foundation material encountered during excavation is unsuitable or differs from that anticipated in the design of the shaft, or if rock is encountered at an unanticipated elevation, the Contractor's foundation designer shall determine if the foundation embedment should be revised from that shown on the working drawings. If rock is encountered, the Engineer shall be notified to inspect and determine the elevation of the top of competent rock. Any revisions to the foundation embedment during construction shall be reviewed by the Engineer.

Excavated materials which are removed from the shaft excavation and any drilled fluids used shall be disposed of by the Contractor as directed by the Engineer and in accordance with Section 1.10.

Casings shall be metal, smooth, clean, watertight, and of ample strength to withstand both handling and driving stresses and the pressure of both concrete and the surrounding earth materials. The outside diameter of casing shall not be less than the specified size of the shaft. Temporary casings shall be removed while the concrete remains workable (i.e., a slump of 4" or greater). Before the casing is withdrawn and while the casing is being withdrawn, a 5'-0" minimum head of fresh concrete in the casing shall be maintained so that all the fluid trapped behind the casing is displaced upward without contaminating the shaft concrete. The required minimum concrete head may have to be increased to counteract groundwater head outside the casing. Separation of the concrete by hammering or otherwise vibrating the casing, during withdrawal operations, shall be avoided. Casing extraction shall be at a slow, uniform rate with the pull in line with the shaft axis.

Slurry used in the drilling process shall be a mineral slurry. The slurry shall have both a mineral grain size that will remain in suspension and sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. The percentage and specific gravity of the material used to make the suspension shall be sufficient to maintain the stability of the excavation and to allow proper concrete placement. The level of the slurry shall be maintained at a height sufficient to prevent caving of the hole.

The mineral slurry shall be premixed thoroughly with clean fresh water at a temperature above 41° F and adequate time allotted for hydration prior to introduction into the shaft excavation.

The elevation of the slurry within the shaft foundation shall be maintained within 24” of the top casing and at least 48” above the existing water level during drilling and until the concrete placement is essentially complete. The slurry properties shall be maintained at all times, including non-working periods and stoppages. The slurry shall be circulated and agitated, continuously if necessary, to maintain the slurry properties and to prevent it from setting up in the shaft.

The Contractor, in the presence of the Engineer, shall perform control tests on the slurry to ensure that the density, viscosity, and pH fall within the acceptable limits tabulated below. The Contractor shall provide all equipment required to perform the tests. If desanding is required, sand content shall not exceed 4% (by volume) at any point in the shaft excavation as determined by the American Petroleum Institute sand content test.

Range of Values (at 68°F)

| Property (Units) | Time of Slurry Introduction | Time of Concreting (in Hole) | Test Method |
|-------------------------------|------------------------------------|-------------------------------------|--------------------|
| Density (pcf) | 64.3 to 69.1 | 64.3 to 75.0 | Density Balance |
| Viscosity (seconds per quart) | 28 to 45 | 28 to 45 | Marsh Cone |
| pH | 8 to 11 | 8 to 11 | pH paper or meter |

The control tests to determine unit weight (density), viscosity, and pH values of the slurry shall be done during the shaft excavation to establish a consistent working pattern.

Prior to placing shaft concrete, slurry samples shall be taken from the bottom and at intervals not exceeding 10’-0” for the full height of slurry. Any heavily contaminated slurry that has accumulated at the bottom of the shaft shall be eliminated. The mineral slurry shall be within specification requirements immediately before shaft concrete placement.

The hole shall be covered when left unattended.

After completing the shaft excavation, all loose material existing at the bottom of the hole shall be removed.

Prior to placing the reinforcement into the shaft, the Contractor, in the presence of the Engineer, shall determine the shaft dimensions, depth and alignment of the shaft. The concrete shaft shall not be out of plumb by more than ¼ inch per foot of depth. The Contractor shall provide all equipment necessary for checking the shaft excavation. The Engineer shall inspect the shaft and verify that it has been properly cleaned.

The reinforcing steel shall be fabricated and assembled in accordance with Article 6.02.03. All reinforcement shall be assembled with wire ties. Welding to assemble the reinforcement is not permitted.

Immediately after the shaft excavation has been inspected and approved by the Engineer and prior to placement of the concrete, the assembled reinforcing steel cage, including cage stiffener bars, spacers, centralizers, and other necessary appurtenances, shall be carefully placed into the shaft excavation as a unit. Dropping or forcing cages into the shaft will not be allowed. The reinforcing steel in the shaft shall be tied and supported so that the reinforcing steel will remain within allowable tolerances of its intended position until the concrete will support the reinforcing steel. When concrete is placed by tremie methods, temporary hold-down devices shall be used to prevent uplifting of the reinforcing steel cage during concrete placement. Concrete spacers or other approved noncorrosive spacing devices shall be used at sufficient intervals not exceeding 5'-0" along the shaft to insure concentric location of the cage within the shaft excavation. When the size of the longitudinal reinforcing steel is larger than a #8 bar, such spacing shall not exceed 10'-0". After placement of the reinforcing cage, the Engineer shall inspect the shaft to ensure that it has remained clean. If the inspection indicates that loose material has accumulated at the bottom of shaft excavation, the Contractor shall remove the reinforcing cage and reclean the shaft.

If directed by the Engineer, the top of the shaft shall be formed square with the length of the sides matching the diameter of the shaft.

Concrete shall be placed in the shaft excavation as soon as possible, but no more than 4 hours after completion of excavation and cleaning of the bottom of the excavation, and no more than 2 hours after placement of the reinforcing steel cage. Concrete shall be placed in a continuous operation to the top of the shaft. The concrete level shall be horizontal during the pouring operations. Concrete placement shall continue after the shaft is full until good quality concrete is evident at the top of the shaft. The elapsed time from the beginning of concrete placement in the shaft to the completion of placement shall not exceed 2 hours.

In dry construction, concrete shall be placed in a single continuous operation with the flow of concrete down the center of the shaft excavation so as to consolidate the concrete on impact. During placement operations, the concrete is not permitted to hit the reinforcing steel. A dropchute, consisting of a hopper and flexible hose, may be used to direct the concrete down the center of the foundation and prevent the concrete from hitting the reinforcing steel. Accumulated water shall be removed before placing the concrete. At the time of concrete placement, no more than 2" of water may exist at the bottom of the excavation and loose sediment no more than ½" over one-half the base is acceptable.

In wet (slurry) construction, concrete to be placed by the tremie method, where the concrete displaces the slurry from bottom of the excavation to the top. The concrete shall be placed through a top metal hopper and into a rigid leak-proof elephant trunk tremie tube, sufficiently large enough to permit free flow of concrete. The tremie tube shall be positioned so that it can be removed without disturbing the reinforcing. Initially, the discharge end of the tremie tube

shall be sealed closed (plugged) to prevent slurry from entering the tube after it is placed in the excavation and before the tube is filled with concrete. After concrete placement has started, the tremie tube shall be kept full of concrete to the bottom of the hopper to maintain a positive concrete head. The flow of concrete shall be induced by slightly raising the discharge end of the tube, always keeping the tube end in the deposited concrete. No horizontal movement of the tremie tube will be permitted.

The shaft concrete shall be vibrated or rodded to a depth of 5'-0" below the ground surface except where soft uncased soil or slurry remaining in the excavation will possibly mix with the concrete.

Exposed concrete shall be cured and finished in accordance with Subarticle 6.01.03-21.

Anchor bolt assemblies shall be embedded in the concrete as shown on the working drawings. A template plate shall be used to hold the anchor bolt assemblies, conduits and ground rod sleeve in the correct position. The anchor bolts shall be installed plumb.

All conduit ends terminating below grade shall be capped with a malleable iron caps. All above-grade conduit ends shall be terminated with an insulated bonding bushing with tinned insert.

Ground rod and ground wire shall be installed as shown on the plans.

No construction operations that would cause soil movement adjacent to the shaft, other than mild vibration, shall be conducted for at least 48 hours after shaft concrete has been placed.

The top of the foundations shall be backfilled and the adjacent disturbed ground surfaces restored to match the surrounding area after the concrete has cured and the forms are removed. Placement of topsoil shall conform to Articles 9.44.01 and 9.44.03. Turf establishment shall conform to Article 9.50.03.

The mast arm assemblies shall not be erected on the foundation until the concrete in the shaft has reached a compressive strength of 4000 psi.

Method of Measurement: This work will be measured for payment by the number of foundation units, each completely installed and accepted.

The work to remove rock from the foundation excavation will be measured from the top of rock to the bottom of rock excavation.

Basis of Payment: The work will be paid for at the contract unit price each for "Traffic Control Structure – Mast Arm," completed and accepted in place, which price shall include all equipment, materials, tools and labor incidental to the subsurface exploration, design, fabrication, construction and disposal of drilling spoils, of the foundations at the locations specified on the plans.

Backfilling and restoration of adjacent ground surfaces (pavement, slope protection, topsoil & seed, etc.) in all areas disturbed by the work will not be paid for separately, but will be included as part of the work. The Engineer will determine the type, thickness and horizontal limits of the surfaces to be restored.

When rock is encountered within the limits of excavation, its removal will be paid for at the contract unit price per vertical foot for "Rock in Foundation Excavation," which price shall include any additional excavation to remove the rock and any additional concrete required to fill the excavation beyond the designed foundation hole dimensions. Rock, in so far as it applies to "Rock in Foundation Excavation," shall be defined as rock in definite ledge formation, boulders, or portions of boulders, cement masonry structures, concrete structures or portland cement concrete pavement which has a cross-sectional area that exceeds 50% of the cross-sectional area of the designed foundation hole.

**ITEM #1002214A - TRAFFIC CONTROL FOUNDATION – CONTROLLER
TYPE IV (MODIFIED)**

**This item to be used only at Intersection #15-294 – James Street at Lyon Terrace –
Bridgeport - Project 173-404**

Article 10.02.03 - Construction Methods: Add the following paragraph:

Where a foundation is placed within or adjacent to a concrete sidewalk, unless otherwise directed by the Engineer, the entire section of sidewalk shall be replaced in accordance with Section 9.21.

Add the following paragraph:

Traffic Control Foundation shall be 25” W by 31” D cast in place, and in conformity with these specifications. The controller foundation shall be cast-in-place and have a reveal of 150 mm (6”) in grass area and 100 mm (4”) in sidewalk area. The number of conduits when shown on the city’s controller foundation detail is for illustration purposes only.

Article 10.02.05 - Basis of Payment: In the first paragraph, insert the word "bituminous" before the word "sidewalk".

Add the following sentence:

All concrete sidewalk replaced due to foundation installation shall be paid for at the contract unit price for "Concrete Sidewalk".

ITEM #1002291A - MODIFICATION OF TRAFFIC CONTROL FOUNDATION

Description:

This item shall consist of modifying existing traffic control foundation of the type specified at the locations shown on the plans or as directed by the Engineer and in conformity with these special provisions.

Materials:

Concrete replacement shall be Class "A" concrete conforming to Article M.03.01 and for Rigid Metal Conduit, Article M.15.09.

Concrete bonding compound shall be of an approved type as directed by the Engineer.

Construction Methods:

All work shall be in accordance with the following procedure or as directed by the Engineer.

- a) Remove concrete foundation by cutting, chiseling or any other method approved by the Engineer as required to install new conduit sweeps.
- b) Position new conduit sweeps, and apply an approved concrete bonding compound on the exposed concrete surfaces as recommended by the manufacturer.
- c) Forms shall be positioned so that all existing exposed foundation at grade level or above will be matched. All work shall be in accordance with Article 6.01.03
- d) Allow concrete to cure and backfill as indicated on the details.

When all conduits, existing and new, are used, one additional 50mm (2") rigid metal conduit sweep shall be installed as a spare. Existing conduits that will be abandoned shall be cut and capped approximately two feet from the foundation.

Surfaces, new and existing, of a foundation which is modified, shall be "Grout Clean-Down Finish" as described in Article 6.01.03.21.

Where a foundation is modified within or adjacent to a concrete sidewalk, unless otherwise directed by the Engineer, the entire section of sidewalk shall be replaced in accordance with Section 9.21.

Method Of Measurement:

The work for this item shall be measured for payment by the number of foundations modified.

Basis Of Payment:

This work will be paid for at the contract unit price each for "Modification Of Traffic Control Foundation", which price shall include all costs for cutting of bases, bonding compound, forms, concrete, conduit sweeps, and all fittings, material, equipment, labor and tools incidental thereto.

All concrete sidewalk replaced due to foundation modification shall be paid for at the contract unit price for "Concrete Sidewalk".

ITEM #1008908A - CLEAN EXISTING CONDUIT

Description:

Clean existing conduit as required, as shown on the plans or as directed by the Engineer to remove dirt and debris to facilitate the installation of new cable.

Construction Methods:

Where cable is to be installed in existing conduit the conduit may have to be cleared prior to the installation. Cleaning will only be necessary if the new cable cannot be easily installed in the existing conduit. By field inspection, and with the concurrence of the Engineer, determine the sections of conduit that require cleaning.

Remove all existing cable from conduit. Install temporary cable elsewhere, as necessary, to maintain normal signalization complete with vehicle & pedestrian detection, EVPS, and coordination. Clean the conduit by one of the following methods:

- 1) Rodding.
- 2) A high pressure jet spray, or air pressure.
- 3) By pulling a mandrel or ball through the conduit.

Submit in writing the anticipated method of cleaning the conduit to the Engineer for approval prior to cleaning any conduit.

If the conduit is found damaged to any extent that the cleaning process will not clear the obstruction, it will be the judgment of the Engineer whether to replace the entire conduit run or excavate and replace only the damaged section.

If the existing conduit is found to be missing hardware such as bonding bushings and bond wire, the missing material shall be provided and installed under this item prior to installation of the cable.

Method of Measurement:

This work shall be measured from termination point to termination point. This work shall be measured for payment on actual number of linear feet (meters)..

Basis of Payment:

The work under the Item "Clean Existing Conduit" shall be paid for at the contract unit price per linear foot (meters), which price shall include all material, tools, equipment, labor, and work incidental thereto. Work pertaining to temporary operation shall be paid for under Item 1108xxxA - Temporary Signalization (Site X). Replacement of any damaged conduit shall be paid for under the applicable conduit item.

| Pay Item | Pay Unit |
|------------------------|----------|
| Clean Existing Conduit | l.f. (m) |

**ITEM #1010038A - PRECAST POLYMER CONCRETE HAND HOLE
TYPE I (36" X 36")**

**FOR PROJECT 173-412 - CITY OF STAMFORD –INTERSECTION 135-259 - U.S.
ROUTE 1 AT ELM STREET**

DESCRIPTION

This item shall consist of furnishing and installing Polymer Concrete Hand hole of the type called for at the location and to the dimensions and details shown on the plans, or as ordered by the Engineer and in conformity with these specifications.

The Precast Polymer Concrete Hand Hole Type I refers to 36" (w) X 36" (d) X 36" (h) hand holes.

REQUIRED SUBMITTALS

Shop Drawings:

Submit 5 copies of shop drawings for hand holes and covers in accordance with the contract general requirements.

Material Certificate of Compliance:

Submit 5 copies of material certificate of compliance for hand holes and covers in accordance with the contract general requirements.

MATERIALS

The materials for this work shall conform to the following specifications.

Precast Polymer Concrete Hand hole: These handholes shall be as manufactured by "Quazite" or City approved equal. Enclosures, covers and extensions shall be of monolithic material construction; components of dissimilar materials shall not be used. All products shall conform to all test provisions of ANSI/SCTE 77 "Specification For Underground Enclosures Integrity" for Tier15 (heavy duty) applications (Design Test Load = 22,500/33,750 lbs). The following requirements shall apply:

All components in an assembly (box & cover) shall be manufactured using matched surface tooling. All covers are required to have a minimum coefficient of friction of 0.50 in accordance with ASTM C 1028. Enclosures are to be UL listed.

Covers (Design Test Load = 16,000/22,500 lbs) shall be secured with two stainless steel bolts. Bolts shall be self retaining and shall withstand a minimum of 70 ft. lbs. torque and have a minimum 750 lbs. pull out strength. Nuts shall be floating and shall provide a minimum of 1/2" movement from the center of the nut.

The LOGO on the Polymer Concrete Hand hole shall indicate "Traffic Signal" for signalization projects unless shown otherwise on the Plans, and shall be indicated as such in the submitted shop drawing.

CONSTRUCTION METHODS

Precast Polymer Concrete Hand hole: Excavation shall be 12 inches deeper than finished grade level. With the box set in place, crushed rock or gravel shall be installed in the excavation to a depth of 12 inches and with cover installed, soil is to be back filled and compacted around the box. At final installation the box and cover shall be flush with finished grade. When the hand hole is placed in the sidewalk the back fill shall be replaced with the trap-rock as fill material.

The areas disturbed by the excavation for the hand holes shall be neatly graded to conform to the adjacent surface and contours. Where topsoil has been removed, it shall be replaced to its original depth (except that in no case shall this depth be less than four inches) and the area shall be fertilized, seeded and mulched.

Where hand holes are shown in sidewalk or paved areas, the concrete hand hole shall be set flush and the surrounding area shall be replaced with the same type of material as removed.

All conduits entering the hand hole shall be bonded together by means of a jumper running from ground bushings on the conduit ends. All open conduit entrances in the walls of precast hand hole shall be grouted to prevent the surrounding sand or dirt entering into the hand hole.

When hand hole is placed in sidewalk areas, the sidewalk shall be sawcut at the nearest joint and the complete slab(s) of sidewalk shall be removed and replaced. When hand hole is placed in brick sidewalk areas, the sidewalk shall be restored matching the existing Pattern.

METHOD OF MEASUREMENT

This work will be measured for payment by the number of hand holes of the type specified, complete and accepted in-place.

BASIS OF PAYMENT

This work will be paid for at the contract price each for "PRECAST POLYMER CONCRETE HAND HOLE (TYPE)" of the type called for, complete in-place, which price shall include a precast polymer concrete hand hole, cover, crushed stone, excavating, backfilling and replacement of all surrounding areas including sidewalk, pavement, grading and placing topsoil, seeding, fertilizing, mulching and equipment, tools, labor and work incidental thereto. The contract unit price shall also include locating and intercepting existing conduit at those locations shown on the plans, and cutting exiting conduit and installing copper bonding jumpers in accordance with the details.

| <u>PAY ITEM</u> | <u>DESCRIPTION</u> | <u>PAY UNIT</u> |
|------------------------|---|------------------------|
| #1010038A | Precast Polymer Concrete Hand Hole Type I | EA |

ITEM #1010052A - CAST IRON HANDHOLE COVER

ITEM #1010054A - CAST IRON HANDHOLE COVER – TYPE II

Article 10.10.05 - Basis of Payment:

After the words “Cast Iron Handhole Cover, insert the phrase “of the type called for”.

Add to the list of pay items:

| Pay Item | Pay Unit |
|----------------------------------|----------|
| Cast Iron Handhole Cover | EA. |
| Cast Iron Handhole Cover Type II | EA. |

ITEM #1010054A - CAST IRON HANDHOLE COVER – TYPE II

Article 10.10.05 - Basis of Payment:

After the words “Cast Iron Handhole Cover, insert the phrase “of the type called for”.

Add to the list of pay items:

| Pay Item | Pay Unit |
|----------------------------------|----------|
| Cast Iron Handhole Cover Type II | EA. |

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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.03.01.12

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.

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.

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ITEM #1101303A - POLE ANCHOR

Description: Arrange with the utility company for the installation of an anchor and guy on a utility pole. In accordance with the Public Utility Regulatory Authority (PURA) regulations 16-243, the electric distribution company will provide and install the anchor and guy for a utility pole in which it owns an interest. If the electric distribution company does not own an interest, the pole custodian will provide and install the anchor and guy.

Material: Materials provided by utility company.

Construction Methods: Contact the electric distribution company to schedule the installation of the anchor and guy strand. If the electric distribution company does not own an interest in the pole contact the pole custodian to schedule the anchor & guy installation. Verify the below information when shown on the plans and provide the information to the utility company. If not shown on the plans, provide all of the required information to the utility company.

Attachment point

Type of hardware needed

Span load

Direction of span

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. Provide any necessary assistance required by the utility company. Ensure the anchor and guy has been installed and properly tensioned prior to attaching the span wire to the utility pole.

Method of Measurement: This work will be measured for payment for each pole anchor at the actual cost to the Contractor, plus Administrative Expenses as stated in Article 1.09.04 – Extra and Cost-Plus Work, Subsection (e) Administrative Expense, of the Standard Specifications, Form 816.

The sum of money shown in the Contract’s Schedule of Prices and in the itemized Proposal Form as “Estimated Cost” for this work is considered the price bid. Payment will be made only for actual work performed by the utility company and paid for by the Contractor. Furnish receipted invoices to the State clearly documenting work performed by the utility company and paid for by the Contractor.

Basis of Payment: Under this item, the Contractor will be reimbursed for the actual cost of the installation of the anchor and guy by the utility company, plus Administrative Expense, which price shall include all necessary meetings, negotiations, span load calculations, and discussions with utility representatives.

Pay Item
Pole Anchor

Pay Unit
Estimated Cost Plus

ITEM #1102002A - 8 FT ALUMINUM PEDESTAL

This requirement to be used only at Intersection #15-294 – James Street at Lyon Terrace – Bridgeport - Project 173-404

Article 11.02.02 – Materials: The materials for this work shall conform to the requirements of Article M.16.03.

Article M.16.03 – Materials:

Add the following paragraph:

The shaft, base and all brackets and hardware shall be powder coated BLACK at the manufacturer's site. The color shall be Federal Standard No. **27038**.

ITEM #1104026A - 25' STEEL MAST ARM ASSEMBLY**ITEM #1104028A - 30' STEEL MAST ARM ASSEMBLY****ITEM #1104031A - 35' STEEL MAST ARM ASSEMBLY****ITEM #1104033A - 40' STEEL MAST ARM ASSEMBLY****ITEM #1104038A - 50' STEEL MAST ARM ASSEMBLY****ITEM #1104039A - 55' 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.

Materials: The tubular components, such as the pole, arm and luminaire arm shall be made of steel with a minimum yield stress of 35,000 psi.

The structural plate components, such as the baseplate, handhole reinforcement and the plates in the arm to pole ring stiffened, built-up box connection, shall be made of steel that conforms to the requirements of ASTM A709, Grade 50T2.

Anchorage plates shall conform to the requirements of ASTM A709, Grade 50T2.

The steel for arm and pole members; structural plate components, such as the baseplates, connection/flange plates, gusset plates, and the plates in the arm to pole connection; and handhole reinforcement shall meet the following Charpy V-notch impact testing requirements:

| Yield Strength | Thickness in. | Minimum Test Value Energy ft.-lbs. | Minimum Average Energy, ft.-lbf |
|---|--------------------------|---|--|
| $F_y \leq 36 \text{ ksi}$ | ≤ 4 | 20 | 25 at 40°F |
| $36 \text{ ksi} < F_y \leq 50 \text{ ksi}$ | ≤ 2 | 20 | 25 at 40°F |
| $36 \text{ ksi} < F_y \leq 50 \text{ ksi}$ | $2 < t \leq 4$ | 24 | 30 at 40°F |
| $50 \text{ ksi} < F_y \leq 70 \text{ ksi}$ | ≤ 4 (100) | 28 | 35 at -10°F |
| Charpy V-notch sampling and testing shall be in accordance with AASHTO T243, "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.

The filler metal shall have a matching strength relationship with the base metal.

All high strength bolts shall conform to ASTM A325, Type 1. Nuts shall conform to ASTM A563, Grade. Circular, flat, hardened steel washers shall conform to ASTM F436. The bolts, nuts and washers shall be galvanized in accordance with ASTM A153 or ASTM B695, Grade 50. The nuts shall be overtapped to the minimum amount required for the bolt assembly and all surfaces of the nuts shall be lubricated with a lubricant containing a visible dye of any color that contrasts with the color of the galvanizing. The high strength bolts shall conform to the requirements of Subarticle M.06.02-3.

The anchor bolts shall conform to ASTM F1554, Grade 105. The nuts shall conform to ASTM A563, Grade DH. The washers shall conform to ASTM F436. The bolts, nuts and washers shall be galvanized in accordance with ASTM A153. The nuts shall be overtapped to the minimum amount required for the bolt assembly and all surfaces of the nuts shall be lubricated with a lubricant containing a visible dye of any color that contrasts with the color of the galvanizing.

All steel components, including anchor bolts, shall be completely hot-dip galvanized, after fabrication, in accordance with ASTM A123 or ASTM A153, as applicable. Repairs to damaged areas of the hot-dip galvanized coatings shall conform to the requirements of ASTM A780 amended as follows:

Paints containing zinc dust, if used for repairs, shall contain either between 65% to 69% metallic zinc by weight or greater than 92% metallic zinc by weight in dry film.

The silicone sealant shall be a 1-component, 100% silicone sealant recommended for use with galvanized steel.

Neoprene gasket material for the access openings shall conform to ASTM D1056, Grade 2A2 or 2A3. Other grades of neoprene approved by the Engineer may be used.

Closed cell elastomer for sealing the space between the foundation and base plate shall conform to ASTM D1056, Grade 2A2 or 2A3 and shall have a pressure-sensitive adhesive backing on one side for adhesion to steel. Closed cell elastomer contained within the anchor bolt pattern shall not interfere with the anchor bolt leveling nuts and shall not block the opening in the base plate.

Bare copper grounding conductor shall be #8 AWG stranded bare copper wire conforming to M.15.13. The grounding bolt shall be stainless steel with a hex head.

All materials used in the finished structure shall be new. The use of materials that have been previously used in a structure or salvaged from a structure is not permitted.

The Contractor shall submit Certified Test Reports and Materials Certificates in conformance with Article 1.06.07 for the steel used 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. 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 importance 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. 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”.
- 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", measured from the centerline of the pole to the tip of the arm, unless otherwise shown on the traffic signal control plan.
- The maximum luminaire arm length shall be 15'-0".
- The maximum diameter of the pole at its base shall be 18".
- The maximum diameter of the arm at the arm-pole connection shall be 15".
- The minimum wall thickness of the arm at the pole connection and the pole shall be 5/16".
- The arm, luminaire arm and pole shall be tubular members with either round or multisided cross-sections. 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).
- Multisided tubular members less than or equal to 13" in diameter shall have a minimum of 8 sides. Multisided tubular members greater than 13" in diameter and less than or equal to 18" in diameter shall have no less than 12 sides.
- Multisided tubular members shall have a minimum internal bend radius of 5 times the tubular member thickness or 1", whichever is greater.
- 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 1 longitudinal seam weld. The seam weld shall be ground smooth and flush with the adjacent base metal.
- The longitudinal seam welds within 6" 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".

- 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" 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" 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. The thickness of the backing ring shall not exceed ¼". The height of the backing ring shall not exceed 2". 100% of the complete joint penetration groove welds shall be non-destructively tested by the ultrasonic method. Complete joint penetration groove welds connecting tubular members to transverse plates shall be non-destructively tested by the ultrasonic method for toe cracks after galvanizing. 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". 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 ½".
- 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".
- The anchor bolt to base plate connection shall be designed as a double-nut connection with shear holes. The anchor bolts shall use an embedded anchorage plate, ½" minimum thickness, to transmit loads from the pole base to the concrete foundation. The use of hooked anchor bolts is not permitted. The minimum number of anchor bolts shall be 8. The minimum anchor bolt diameter shall be 2". 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" or the tension development length of the vertical foundation reinforcement plus the end concrete cover, whichever is greater. Each anchor bolt shall be supplied with 4 nuts and 4 washers. Washers shall be placed on the top and bottom surfaces of the pole base plate and anchorage plate. Welding to the anchor bolts is not permitted.
- The horizontal deflection of the free end of the arm under the Group Load Combinations II and III due to wind and ice loads only shall not exceed $(L + H)/150$, where L is the span length of the cantilever arm measured from centerline of the pole to the free end of the arm and H is the height of the pole measured from the top of the baseplate to the centerline of the arm. The vertical deflection of the free end of the arm under the Group Load Combinations II and III due to wind and ice loads only shall not exceed $(L + H)/150$, where L is the span length of the cantilever arm measured from centerline of the pole to the free end of the arm and H is the height of the pole measured from the top of the baseplate to the centerline of the arm.

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". The maximum vertical clearance from the top of the finished road to the

bottom of the traffic signals shall be 18'-0". 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 each connection shall be visible. The use of tapped holes in the plates of each connection is not permitted. A hole(s) shall be provided in each connection to allow wires to pass from the pole to the arm and luminaire arm. The sides of all holes in each connection shall be ground smooth and the edges rounded by grinding to prevent the wires from chafing.

Vent and drain holes shall be provided for galvanizing. The number, size and location of vent and drain holes should be coordinated with the galvanizer prior to the submission of the mast arm assembly design. The area of vent and drain holes at each end of a member shall be at least 30% of the inside area of the member for members 3" in diameter and greater and 45% of the inside area of the member for members smaller than 3" in diameter. The vent and drain holes shall be strategically located for reducing stress and for proper galvanizing. The holes shall be made by drilling. Flame cut holes are not permitted. The edges of all holes shall be rounded by grinding. After galvanizing, exposed holes placed in the sign support components for galvanizing shall be sealed with neoprene plugs.

A J-hook shall be welded to the inside of the pole at the top for wire handling and support.

The mast arm shall have a handhole adjacent to the base of the pole. The handhole shall be located away from traffic. The bottom of the handhole shall be located a distance equal to the diameter of the tubular member or 1'-9" from the top of the baseplate, whichever is greater. The handhole shall be reinforced with a frame having a minimum 4" wide by minimum 6" high clear opening. The maximum width of the opening for the handhole shall not be greater than 40% of the tubular member diameter at that section. The corners of the handhole opening shall be rounded to a radius of 30% to 50% of the width of the 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 weld shall start and end at the same location and which shall be either at the top or bottom of the handhole centerline. The weld shall be non-destructively tested in accordance with the magnetic particle method. The handhole shall be provided with a cover connected to the frame with no less than 4 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"; 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", for the reviewers stamp. On the ANSI B sheets, the minimum text height and width shall be 1/16". All letter characters shall be uppercase. Design computations, procedures and other supporting data shall be submitted on 8 ½" x 11 (Letter) sheets.

Working drawings submitted in an electronic portable document format (.pdf) shall be created on ANSI D (22" x 34") full scale (1" electronic file = 1" paper) sheets. (The purpose of creating the

drawings on ANSI D sheets is so that the sheets may be printed/plotted at that size or smaller without loss of legibility.) Each drawing shall have a border and title block. Located in the lower right hand corner of the drawing adjacent to the title block, each drawing shall have a rectangular box, 2 1/4" wide x 1 3/4" 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 1/2" x 11") 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, 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
- vent and drain holes for galvanizing
- dead load and permanent camber
- a plan view of the anchor bolt layout relative to the orientation of the arm
- anchor bolt dimensions, including embedment and projection
- 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

- 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.
- coefficients and factors used in the design
- results of all group loads and load combinations
- stress ratios and combined stress ratios for all group loads and load combinations
- horizontal and vertical deflections due to Group Load Combinations I, II and III for dead, wind and ice 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 project's "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
Research and Materials
Traffic Engineering
Traffic Signal Lab
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 of members and components is not permitted. All exterior and interior surfaces of the mast arm members and components, including the interior of the ring-stiffened built-up box connection, shall be completely galvanized.

Galvanized members and components shall be free from uncoated areas, blisters, flux deposits, and gross inclusions. Lumps, projections, globules, or heavy deposits of zinc which will interfere with the intended use of the material will not be permitted.

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.

Prior to shipping, all galvanized surfaces of the members and components shall be inspected, in the presence of the Engineer, to determine the acceptability of the galvanized coating. Galvanized coatings may be found acceptable by the Engineer if all surfaces of the members and components meet the galvanizing requirements herein. Only mast arm members and

components with acceptable galvanized coatings shall be shipped. If the galvanized coating on any member or component is found not acceptable, the Contractor shall submit a repair procedure to the Engineer for review.

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. The use or installation of galvanized hardened steel washer between the faying surfaces of the connection is not permitted. 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 exposed threads of all the embedded anchor bolts shall be cleaned of accumulated dirt and concrete and lubricated. The threads and bearings surfaces of all the anchor bolt nuts shall be cleaned and lubricated. The anchor bolts and nuts are properly lubricated if the nuts can be turned by hand on the anchor bolt threads. The lubricant shall contain a visible dye of any color that contrasts with the color of the galvanizing. Re-lubricate the threads of the anchor bolts and nuts if more than 24 hours has elapsed since earlier lubrication, or if the anchor bolts and nuts have become wet since they were first lubricated.

Install (turn) the leveling nuts onto the anchor bolts and align the nuts to the same elevation or plane. Place a structural hardened washer on top of each leveling nut, 1 washer on each anchor bolt.

The pole shall be erected so that the centerline of the pole will be plumb after the application of all the dead loads. The pole may be initially installed raked in the opposite direction of the overhead member to obtain the plumb condition. Raking the pole may be accomplished by installing the leveling nuts in a plane other than level.

Install the pole base plate atop the washers resting on the leveling nuts, place a structural hardened washer on each anchor bolt resting it on the top of the base plate, and install (turn) a top nut on each anchor bolt until the nut contacts the washer. The leveling nuts and washers shall be inspected, and if necessary the nuts (turned), so that the washers are in full contact with the bottom surface of the base plate.

Tighten the top nuts to a snug tight condition in a star pattern. Snug tight is defined as the maximum rotation resulting from the full effort of one person using a 12" long wrench or equivalent. A star tightening pattern is one in which the nuts on opposite or near-opposite sides of the bolt circle are successively tightened in a pattern resembling a star (e.g., For an 8-bolt circle with bolt sequentially numbered 1 to 8, tighten nuts in the following bolt order: 1, 5, 7, 3, 8, 4, 6, 2.).

Tighten leveling nuts to a snug tight condition in a star pattern.

Before final tightening of the top nuts, mark the reference position of each top nut in a snug-tight condition with a suitable marking on 1 flat with a corresponding reference mark on the base plate at each bolt. Then incrementally turn the top nuts using a star pattern one-sixth of a turn beyond snug tight. Turn the nuts in at least two full tightening cycles (passes). After tightening, verify the top nut rotation. The top nuts shall have full thread engagement. The distance from the bottom of the leveling nuts to the top of the foundation shall not exceed 1".

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. The use or installation of galvanized hardened steel washer between the faying surfaces of the connection is not permitted.

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.

After erection of the mast arm and before the installation of the traffic appurtenances, if the structure exhibits excessive vibration, oscillations or deflections as determined by the Engineer, the Contractor shall immediately stabilize the structure to the satisfaction of the Engineer. Stabilizing the structure may require the removal of a portion of the structure or the entire structure.

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 traffic appurtenances 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" high and placed approximately 12" above the top of the base plate facing the centerline of the roadway.

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.

This special provision is for the City of New Haven intersection #092-314

Article 11.04.02 – Materials

Article M.16.05.02 – Mast Arm Assembly

Delete in entirety and replace with the following:

First Coat: The Mast Arm 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 Mast Arms, anchor bolt covers, handhole covers, post caps, and end caps shall be Traffic Signal Green conforming to Federal Specification TT-E-489. **The color of the finished coat shall be DARK GREEN, federal standard 595, Color No. 14056.**

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, and 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 Contract elects to spray he must provide overspray containment. The minimum overspray containment shall conform to the requirements of SSPC Guide 6 for the Class 3A level.

All Steel Mast Arms will be subject to a visual inspection by the Engineer prior to installation for weld and powder coating workmanship. The Engineer reserves the right to reject any and all Steel Combination Span Poles. Any Steel Combination Span Pole which is not to the satisfaction of the Engineer will be rejected. Any cost associated with the removal, corrections, remanufacturing, and deliveries shall be the responsibility of the Contractor. The Contractor is responsible for re-wrapping Mast Arms for delivery to the intersections.

All defective work shall be corrected to the satisfaction of the Engineer by the Contractor at no cost to the State.

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.

This special provision is for the City of Stamford - Intersection #135-259

The steel mast arm (shaft, arm, and base and camera arm) 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, anchor bolt covers, handhole covers, post caps, and end caps shall be **powder coated black matted finish** conforming to Federal Specification TT-E-489.

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 Contract elects to spray he 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 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.

This special provision is for the City of Bridgeport - Intersection #015-294

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, anchor bolt covers, handhole covers, post caps, and end caps shall be BLACK. The color of the finish coat shall be BLACK, Federal Standard **27038** conforming to Federal Specification TT-E-489.

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, and 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 Contract elects to spray he must provide overspray containment. The minimum overspray containment shall conform to the requirements of SSPC Guide 6 for the Class 3A level.

All Steel Mast Arm Assembly will be subject to a visual inspection by the Engineer prior to installation for workmanship. The Engineer reserves the right to reject any and all Steel Mast Arms. Any Steel Mast Arm Assembly which is not to the satisfaction of the Engineer will be rejected. Any cost associated with the removal, corrections, remanufacturing, and deliveries shall be the responsibility of the Contractor. The Contractor is responsible for re-wrapping Steel Mast Arm Assemblies for delivery to the intersections.

All defective work shall be corrected to the satisfaction of the Engineer by the Contractor at no cost to the City.

ITEM #1105001A - 1 WAY, 1 SECTION SPAN WIRE TRAFFIC SIGNAL

ITEM #1105003A - 1 WAY, 3 SECTION SPAN WIRE TRAFFIC SIGNAL

ITEM #1105007A - 2 WAY, 3 SECTION SPAN WIRE TRAFFIC SIGNAL

ITEM #1105011A - 3 WAY, 3 SECTION SPAN WIRE TRAFFIC SIGNAL

ITEM #1105101A - 1 WAY, 1 SECTION MAST ARM TRAFFIC SIGNAL

ITEM #1105103A - 1 WAY, 3 SECTION MAST ARM TRAFFIC SIGNAL

ITEM #1105203A - 1 WAY, 3 SECTION POLE MOUNTED TRAFFIC SIGNAL

ITEM #1105303A - 1 WAY, 3 SECTION PEDESTAL MOUNTED TRAFFIC SIGNAL

ITEM #1105304A - 1 WAY, 4 SECTION PEDESTAL MOUNTED TRAFFIC SIGNAL

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

ITEM #1105001A, 1105003A, 1105007A, 1105011A, 1105101A,
1105103A, 1105203A, 1105303A, 1105304A

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: Only for Intersection #102-204 - U.S. Route 1 at Scribner Avenue in Norwalk, Intersection #092-314 – Route 337 at Upson Terrace in New Haven and Intersection #015-317 – Route 130 at Park Avenue in Bridgeport

Add the following at the end of the last paragraph:

Where indicated on the plans, install a yellow retroreflective (Type IV sheeting) strip two inches in width 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.

ITEM #1105001A, 1105003A, 1105007A, 1105011A, 1105101A,
1105103A, 1105203A, 1105303A, 1105304A

- 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, dated 2008-2010**. 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.

ITEM #1105001A, 1105003A, 1105007A, 1105011A, 1105101A,
1105103A, 1105203A, 1105303A, 1105304A

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 Bowma-Crimp style forked spade lug, 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:

Add the following:

All brackets and hardware shall be painted dark green by the manufacturer. The color shall be No. 14056, Federal Standard No. 595.

This requirement to be used only at Intersection #15-294 – James Street at Lyon Terrace – Bridgeport – Project 173-404

Sub Article 9 - Painting:

Add the following:

All signal heads, brackets and hardware shall be painted BLACK by the manufacturer. The color shall be Federal Standard No. **27038**.

This requirement to be used only at Intersection #135-259 – U.S. Route 1 at Elm Street – Stamford – Project 173-412

Sub Article 9 - Painting:

Add the following:

All signal heads, brackets and hardware shall be painted MATTE BLACK by the manufacturer. The color shall be Federal Standard No. **37038**.

ITEM #1106001A - 1 WAY PEDESTRIAN SIGNAL POLE MOUNTED

ITEM #1106003A - 1 WAY PEDESTRIAN SIGNAL PEDESTAL MOUNTED

ITEM #1106004A - 2 WAY PEDESTRIAN SIGNAL PEDESTAL MOUNTED

Section 11.06.02 Pedestrian Signal, Materials

Section M.16.07 C. Optical Unit

Delete 2. LED: and replace with the following:

General

- Meet requirements of current MUTCD Section 4E.
- Meet current ITE specifications for Pedestrian Traffic Control Signal Indications - (PTCSI) Part 2: Light Emitting Diode (LED).
- Meet CT DOT, 2008 - 2010 Functional Specifications for Traffic Control Equipment; Section 5D, LED Pedestrian Signal with Countdown Timer.
- Meet EPA Energy Star® requirements for LED Pedestrian Signal Modules.

Operational

- Countdown display only during the flashing Pedestrian Clearance (Ped Clr) Interval. Timer goes blank at end of flashing ped clr even if countdown has not reached zero.

Physical

- Sealed optical module to prevent entrance of moisture and dust.
- Self-contained optical module, including necessary power supplies.
- Designed to securely fit into standard housing without the use of special tools or modifications to the housing.
- Identification information on module: manufacturer's name, model number, serial number, and date code.

Optical

- Multiple LED sources; capable of partial loss of LED's without loss of symbol or countdown message.
- Two complete self contained optical systems. One to display the walking person symbol (walk) and the hand symbol (don't walk). One to display the countdown timer digits.
- Visual Image similar to incandescent display; smooth, non-pixelated.
- Symbol and countdown digit size as shown on the plan.
- Solid hand/person symbol; outline display not allowed.
- Overlaid hand/person symbols and countdown digits arranged side by side.
- Countdown digit display color: Portland Orange in accordance with ITE requirements.
- Countdown digits comprised of two seven segments, each in a figure 8 pattern.
- Photometric Requirements: Luminance, Uniformity, and Distribution in accordance with ITE requirements.

- 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: ≥ 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.

This requirement to be used only at Intersection #15-294 – James Street at Lyon Terrace – Bridgeport - Project 173-404

Add the following:

Painting: Thoroughly clean ferrous metals of rust, dirt and other imperfections that would impair adherence of paint. Shop paint with one coat of rust-inhibitive primer. Finish with two coats of approved, enamel paint specifically designed for outdoor use on metal surfaces as approved and in color selected by Architect.

After fabrication and immediately before coating, newly fabricated steel shall be sand blasted or steel shot blasted to SSPC-SP 10 (near white metal) standard of the Steel Structures Painting Council.

All metal shall be painted with the following shop-applied coating system, as manufactured and specified by TNEMEC Co., Kansas City, MO or equivalent:

- Primer: Series 90-97 Tnemezinc, Urethane zinc-rich primer, to 2.5 to 3.5 mils, dry film thickness.
- Bridge Coat: Series 66 or 69 Hi-Build Epoxoline at 4.0 to 6.0 mils d.f.t.
- Final Coat(s): Series 73 Endura Shield, Aliphatic Acrylic Polyurethane at 3.0 to 5.0 mils d.f.t.; two coats may be required. Color shall match field equipment. Submit color samples for approval prior to fabrication. The color of the finished coat shall be **BLACK 27038** conforming to Federal Specification TT-E-489.
- All recommendations and specifications of the coating manufacturer shall be followed.

This requirement to be used only at Intersection #135-259 – U.S. Route 1 at Elm Street – Stamford – Project 173-412

Add the following:

Painting:

All pedestrian signal heads, brackets and hardware shall be painted MATTE BLACK by the manufacturer. The color shall be Federal Standard No. **37038**.

ITEM #1107007A - PEDESTRIAN PUSHBUTTON AND SIGN (PIEZO)

Article M16.08 - Pedestrian Push Button:

Delete the entire section and replace with the following:

A. General

- Size and force compliant with ADA, Section 14.2.5, Crossing Controls.
- Tamper-proof, and Vandal-proof, Weatherproof, Freeze-proof, Impact-resistant design and construction.
- Completely insulated to preclude electrical shock under any weather conditions.
- Wire entrance through the rear.
- Stainless steel mounting hardware.

B. Actuation

1. Mechanical:

- Single momentary contact switch with tactile feedback.
- Rated at 10 amps, 125 volts.
- Normally open, closed when actuated.

2. Piezo:

- Either non-movable or minimal movement (< 1/16" (1.6)) pressure activation.
- Audible confirmation beep to correspond with circuit closure.
- Visual confirmation LED. On for .025 second to correspond with audible on beep and circuit closure. Visual angle: 160 degrees.
- Minimum 100,000,000 actuations.

C. Housing

- Die cast aluminum meeting requirements of ASTM B85.
- Designed to attach 9" x 12" (230 x 300) four-hole advisory sign.
- Flat back to facilitate surface mount.
- Available hardware to either pedestal top-mount or pole side-mount on diameter range of 3½" (89) to 15" (380).

D. Finish

- Method: Either
 1. Painted with 3 coats of infrared oven-baked paint before assembly.
 - Primer: Baked iron oxide which meets or exceeds FS TT-P-636.
 - Second coat: Exterior-baking enamel, light gray, which meets or exceeds FS TT-E-527.
 - Third coat: Exterior-baking enamel, which meets or exceeds FS TT-E-489.
 2. Electrostatic powder coated after chemically cleaned.
- Color: Dark Green, Federal No 14056, Federal standard No. 595.

This requirement to be used only at Intersection #15-294 – James Street at Lyon Terrace – Bridgeport – Project 173-404

Add the following:

Painting:

All brackets and hardware shall be powder coated BLACK by the manufacturer. The color shall be Federal Standard No. **27038**.

This requirement to be used only at Intersection #135-259 – U.S. Route 1 at Elm Street – Stamford – Project 173-412

Add the following:

Painting:

All brackets and hardware shall be painted MATTE BLACK by the manufacturer. The color shall be Federal Standard No. **37038**.

ITEM #1107011A - ACCESSIBLE PEDESTRIAN SIGNAL

This item to be used only at Intersection #15-294 – James Street at Lyon Terrace – Bridgeport - Project 173-404

Article M16.08 – Pedestrian Push Button:

Delete the entire section and replace with the following:

A. General

The Pedestrian push button and the sign shall meet the ADA requirement. The Accessible Pedestrian Signal (APS) shall be **Polara EZ Communicator/Navigator Fully Integrated Accessible Pedestrian Station** manufactured by Polara or approved equal -: A pedestrian station based unit that provides audible, tactile, and visual signals to the pedestrian.

Accessible Pedestrian Signal (APS) shall provide pedestrians with visual, tactile, and audible information about the intersection crossing. At the pedestrian station APS shall provide the necessary information to understand the status of the walk display.

Audible:

Locator tone shall provide the pedestrian with a tone indication that the intersection is equipped with APS and where it is. **Acknowledge tone** shall provide the pedestrian with the information that they have placed the call. **Informational message** shall inform the pedestrian about the crossing. **Walk Cycle message** shall inform the pedestrian when the Walk Sign is on.

Visual:

A red LED shall be lit when the pedestrian has placed a call.

Tactile:

The directional vibro-tactile arrow shall become active with the Walk Sign.

Components:

The APS consists of three separate components.

Pedestrian Station shall be **Porcelain Enamel:** Porcelain. The steel substrate is coated with porcelain and heated to provide a unified surface that is impervious to ultraviolet light, corrosion, and stain. The sign bracket shall be 9”X12” to accommodate the sign as shown in the detailed drawing, contain the pedestrian push button with LED, Vibro-tactile arrow, and speaker.

The driver board mounts in the pedestrian signal head and connects to the controller inputs. A sound dish mounts to the bottom of the pedestrian signal head. It shall monitor ambient noise levels at the crossing initiation point. The sound dish provides input to the driver board’s

Ambient Gain Control algorithms that adjust the audible outputs to match environmental volume levels.

Installation:

No special tools or programming devices are required to install the APS.

The driver board installs in the pedestrian signal head and is connected to the display incoming power.

The sound dish is installed through the bottom of the pedestrian signal head.

The pedestrian station is attached to the pole.

The controller inputs and 10 C cable are plugged into the back of the PPB.

C. Housing

- Die cast aluminum meeting requirements of ASTM B85.
- Designed to attach 9"x15" four-hole advisory sign type.
- Flat back to facilitate surface mount.
- Available hardware to either pedestal top-mount or pole side-mount on diameter range of 3 1/2" to 15".

D. Finish

- Method: Either
 1. Painted with 3 coats of infrared oven-baked paint before assembly.
 - Primer: Baked iron oxide which meets or exceeds FS TT-P-636.
 - Second coat: Exterior-baking enamel, light gray, which meets or exceeds FS TT-E-527.
 - Third coat: Exterior-baking enamel, which meets or exceeds FS TT-E-489.
 2. Electrostatic powder coated after chemically cleaned.
 - Color: Shall be matching Steel Span Pole/Mast Arm color scheme.

Pay Item:
ACCESSIBLE PEDESTRIAN SIGNAL

Unit:
EA

ITEM #1108115A - FULL ACTUATED CONTROLLER 8 PHASE

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.

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.

This special provision for painting is for the City of New Haven Intersection #092-314 - Project 173-402

Article 11.04.02 – Materials

Article M.16.09.01 – Controllers

Add the following to subsection (d) Finish:

When indicated on the plans, the controller cabinet shall be powder coated.

The color of the finish coat for the controller cabinet shall be DARK GREEN, Federal Standard No. 595, color No. 14056. The contractor shall submit powder coat and sample finishes on aluminum of the intended color to the City of New Haven Department of Transportation, Traffic and Parking for approval.

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.

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

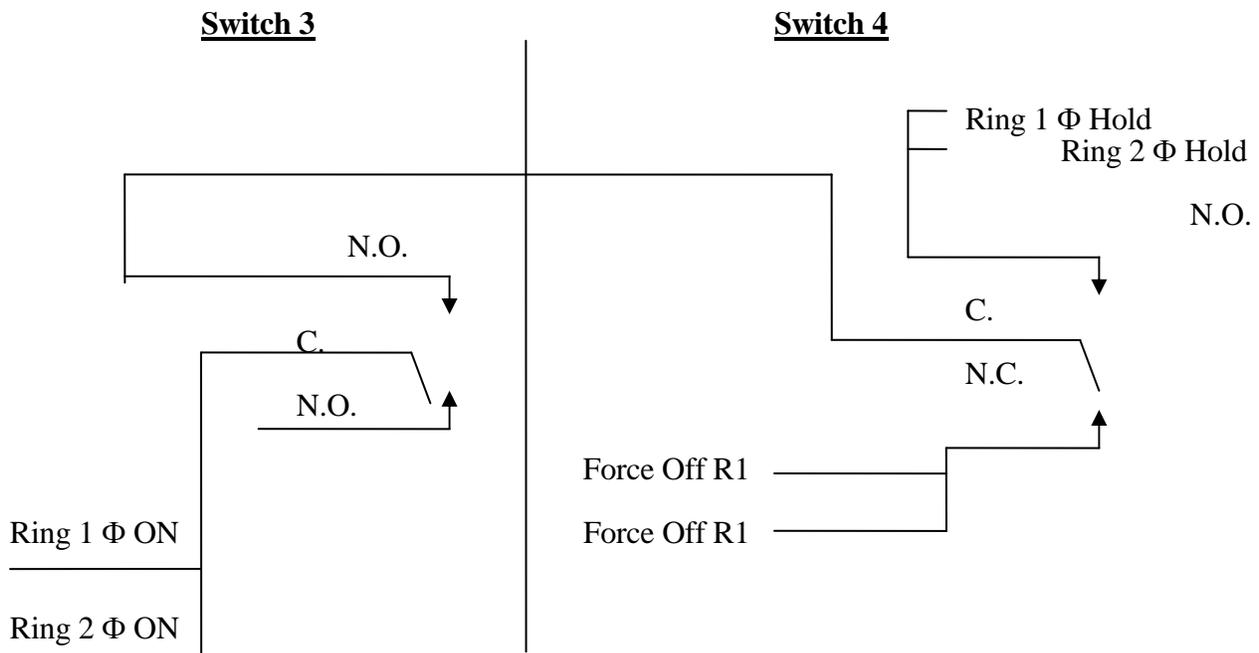


FIG. 1

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:

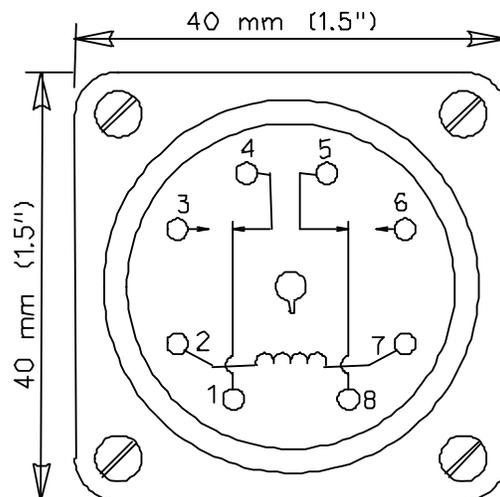
The contacts shall be 2 form C (D.P.D.T), U.L. rated at 5 amps 120 volts A.C. The contacts shall be pure fine silver (gold flash). There shall be no tungsten (lamp) load on the contacts of this relay.

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.

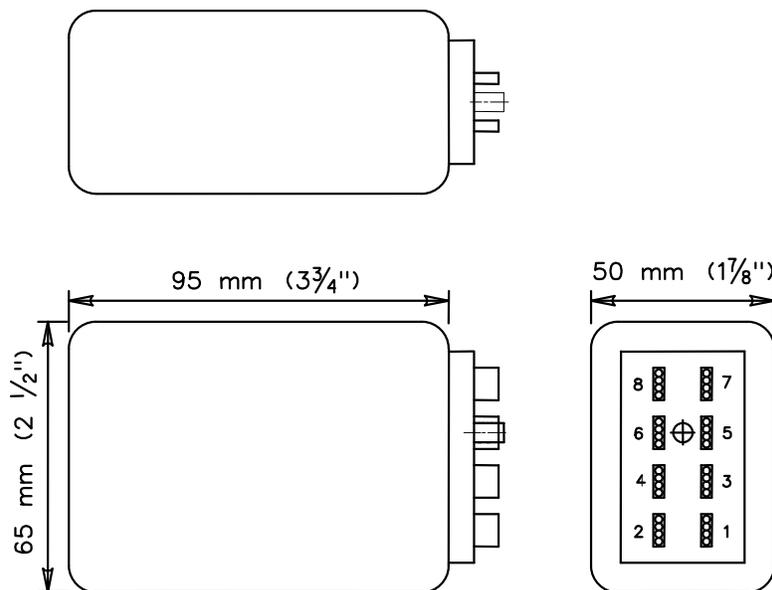
SIZE:

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:

- 1. Coil
- 2. Coil
- 3. N.C. 1
- 4. N.C. 2
- 5. Comm. 1
- 6. Comm. 2
- 7. N.O. 1
- 8. N.O. 2



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:

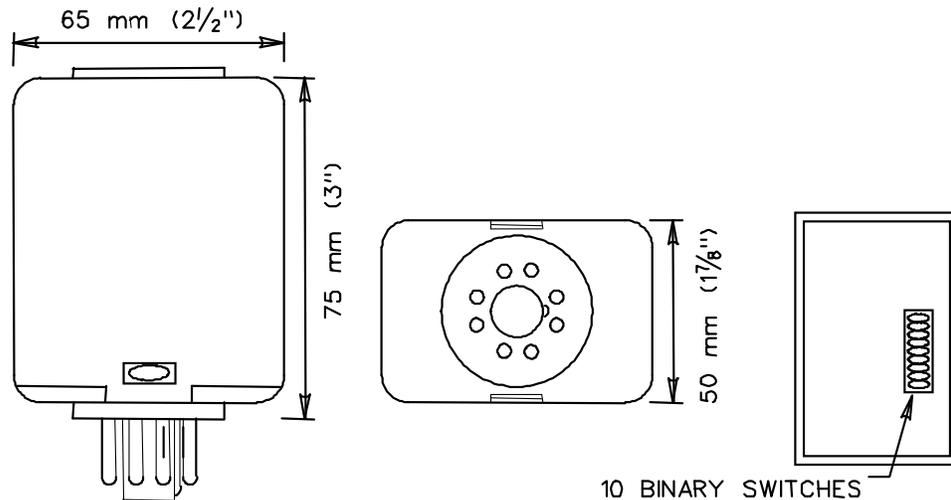
The socket shall be the same as that for the 24 volt relay Type A.

TIME DELAY RELAY

120 VAC SSAC TDM120A or equivalent
24 VDC SSAC TDM24DL or equivalent

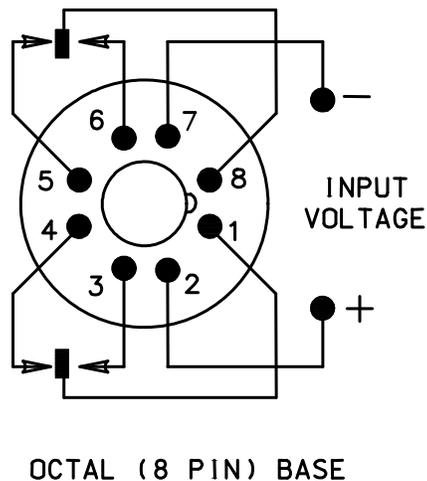
DESCRIPTION:

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.

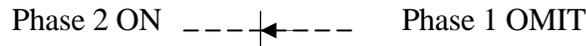


NON-ACTUATED ADVANCE GREEN PHASE

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.

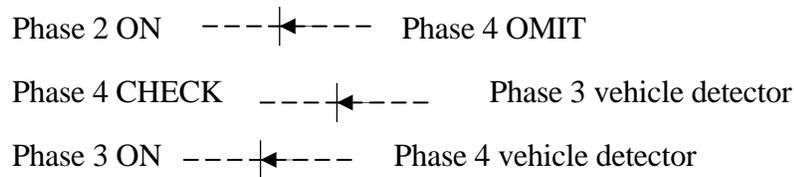
Example: Phase 1 is the advance phase (extendable), in minimum recall.
Phase 2 is the artery, in recall.
Phase 4 is the minor street, in non-lock.



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.

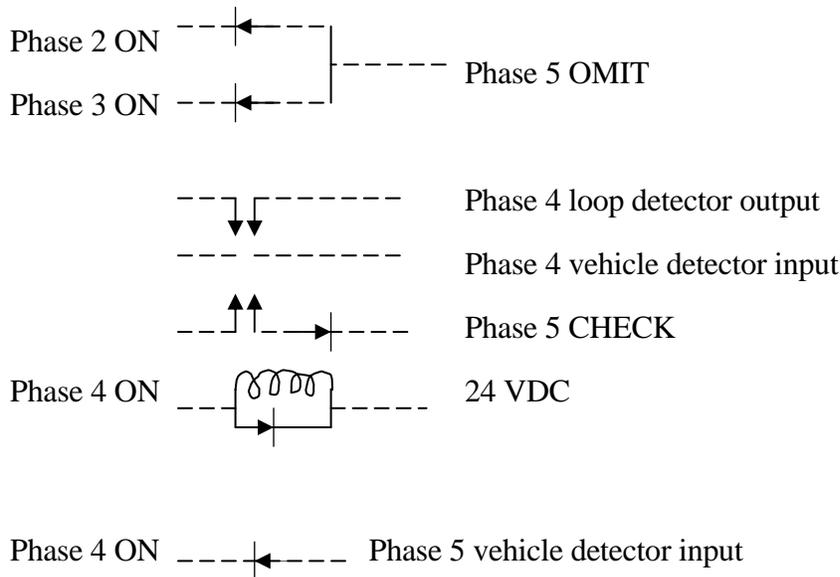


ACTUATED ADVANCE GREEN

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.

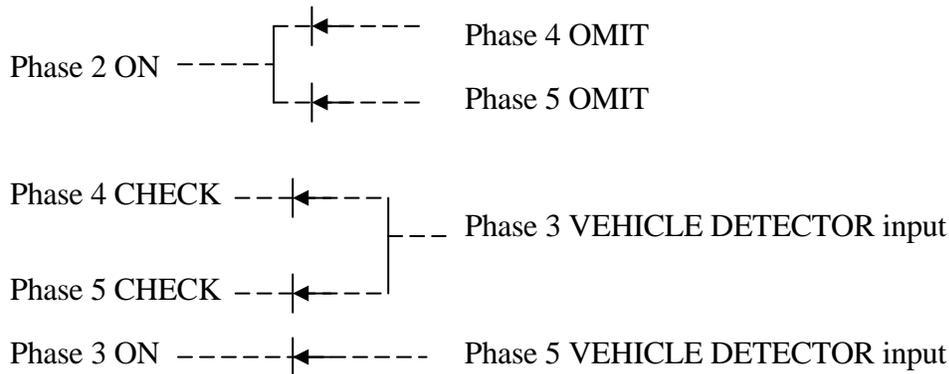
NON-ACTUATED CLEARANCE PHASE

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.



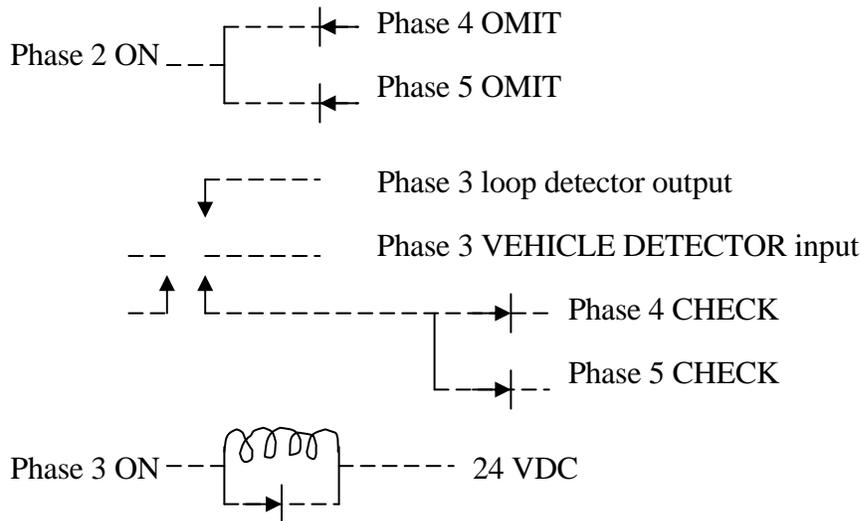
ACTUATED CLEARANCE PHASE

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.



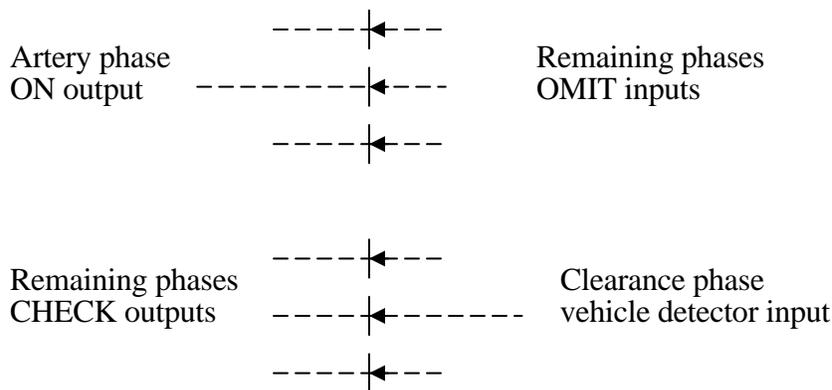
The 24 VDC relay shall be Type C as previously described in these specifications.

FLASHING STOP AHEAD SIGN

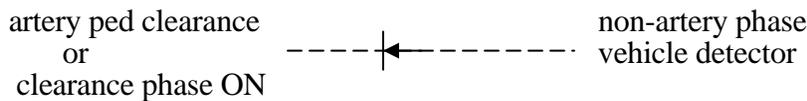
Where the timing and sequence indicates a flashing stop ahead sign, the clearance interval following the phase that the sign is off shall be timed by the following method.

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.

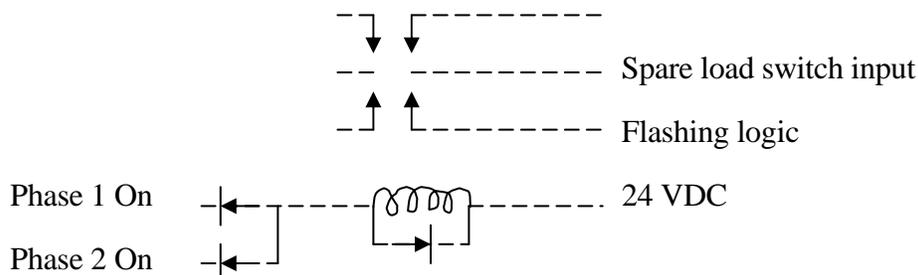
The artery phase ON output shall be diode connected to all other phase OMIT inputs except the clearance phase and the artery phase. The CHECK outputs from the remaining phases (as needed) shall be diode connected to the sign clearance phase vehicle detector input. The clearance phase shall be in the 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

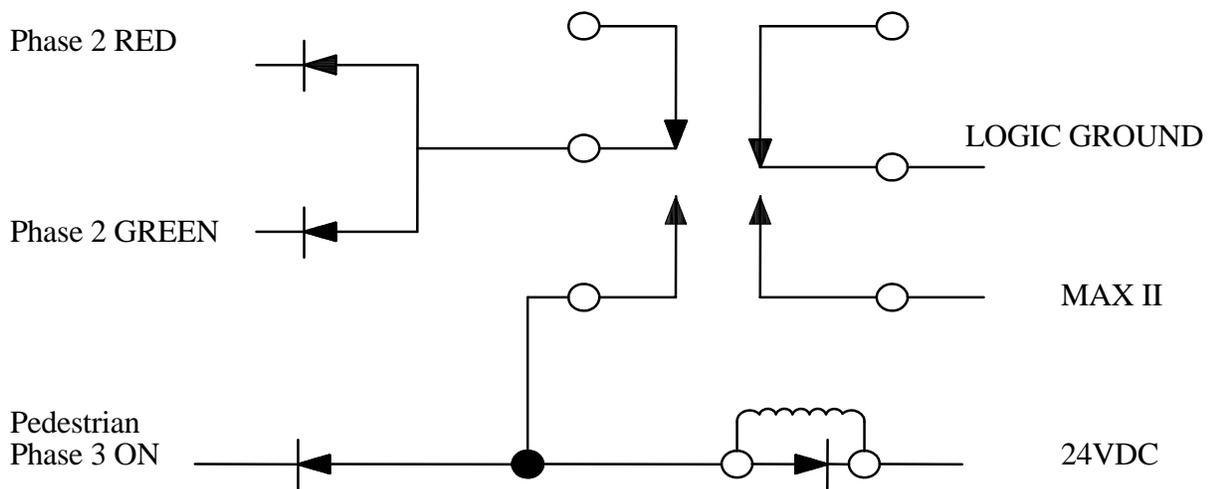
When the sum of the split times, including the walk and don't walk, exceed the background cycle length, the designer may choose to either allow a double cycle of the background timer or reduce the phase timings when the ped phase is called. Reduction of the phase timing by switching to MAX 2 avoids double 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 #1108163A - MODIFY EXISTING CONTROLLER

This item shall consist of modifying the existing traffic controller assembly to provide the revised operation as shown on the plans or as directed by the Engineer. The modification shall include, but not be limited to, revisions to the timing and sequence, cabinet wiring, coordination, pre-emption, field wiring and cabinet wiring diagrams.

MATERIAL

The material for this work shall conform to the requirements of the current special provision of Item #1108115A - FULL ACTUATED CONTROLLER 8 PHASE. The material shall be compatible with the existing equipment. Any material in question shall be approved prior to installation by the Engineer or the Department of Transportation Signal Lab, 280 West Street, Rocky Hill. Contact Mr. Don Assard at (860) 258-0346 or Mr. Mark Zampini at (860) 258-0349 for approval.

CONSTRUCTION METHODS

All revisions to the cabinet wiring shall be neat and orderly. All additional wiring shall be from terminal to terminal. Splices will not be allowed. All changes, additions and deletions shall be documented, dated and drawn on the reproducible original or a reproducible copy of the original cabinet wiring diagram. Four paper copies shall be furnished to the Engineer upon completion of the revision.

METHOD OF MEASUREMENT

This item will be measured for payment as an "Each" item.

BASIS OF PAYMENT

This item will be paid for at the contract price each, for "Modify Existing Controller" which price shall include all necessary load switches, relays, components, hardware, tools, equipment, engineering and labor required to modify the existing controller as shown on the plan. This price shall also include four updated cabinet wiring diagrams.

ITEM #1108187A - SYSTEM INTEGRATION

This item to be used only at Intersection #15-294 – James Street at Lyon Terrace – Bridgeport - Project 173-404

Description:

This item shall consist of the successful integration of all system devices furnished under this contract with City of Bridgeport existing system. This item shall include all required creations, additions and modifications to the graphics subsystem, data base, reporting, system software and all other hardware and software necessary to complete the integration of the traffic signal into the City of Bridgeport System. The Contractor shall include the PDF of the intersection signal equipment layout and cabinet wiring in the documentation of the central system software for each intersection. The City of Bridgeport shall only accept the signal equipment as described under Signal Testing and Acceptance, that all elements of system integration installed according to the plans, specifications, and are fully functional and operational to the satisfaction of the City Engineer without any failure through the 30-day test period. The Contractor shall provide the qualification of the system integrator to the Engineer for review and approval thirty (30) days prior to the start work under this item.

Materials: As required.

Construction Methods:

Integration shall be accomplished with minimal interruption of the operation of the existing local traffic controllers and coordination system. The Contractor shall inform the City Engineer of all ongoing work efforts, schedules and in progress tasks. The City Engineer is to be included, and so instructed, in the system integration as it progresses. The work under this item shall also include management of the Ethernet switches under this contract and existing Ethernet switches, communication and electrical wiring at the operations center to support the additional cabling. The contractor shall coordinate with the City Engineer to implement IP addresses for all field system components and the Operation Center equipment under this contract. The Contractor is responsible for maximizing/optimizing the use of the Ethernet switch capabilities to integrate the overall data transfer (send and receive) among equipment under this project with the exiting communication equipment. The contractor shall provide the Engineer for review and approval the plan of system integration strategies prior to the system integration implementation.

The contractor shall produce computer representations of all intersections, wiring diagram, system detectors, 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 the operations center in a neat manner utilizing cable bundling devices and cable trays as approved by and satisfactory to the City Engineer.

Method of Measurement:

This item shall be measured at the contract lump sum price for the successful integration of the intersection into City of Bridgeport system, to the satisfaction of the City of Bridgeport.

Basis of Payment:

The integrated contract price shall include all software and hardware modifications, graphics, creations, materials, equipments, tools, labor, and incidentals thereto.

Pay Item:

System Integration

Unit

LS

ITEM #1108207A - INSTALL STATE FURNISHED TRAFFIC CONTROLLER AND CABINET

Description:

This item shall consist of installing a traffic controller cabinet, and related equipment, furnished by the State, Department of Transportation, on an existing, modified, or new foundation as indicated on the plans or as directed by the Engineer.

Material:

All material for this work shall be furnished by the State except for miscellaneous electrical hardware, such as spade connectors, electrical tape, and cable ties required to complete the installation.

Construction Methods:

The Contractor shall arrange a schedule to pick up the traffic controller, cabinet, and related material from the Department of Transportation, Signal Lab, located at 280 West Street in Rocky Hill. Contact Mr. Don Assard at (860) 258-0346 or Mr. Mark Zampini at (860) 258-0349, 45 days in advance to schedule pick up of the material. In addition, the Contractor shall telephone 24 hours prior to the scheduled date to confirm the location and time of pick up.

The Contractor shall sign a receipt, listing all material furnished by the State, for each location. All material provided by the State shall be transported, and stored if necessary, with care appropriate for microprocessor electronic equipment. It shall be the Contractor's responsibility from the time of pick up until the new controller is in operation according to plan, to repair or replace any material damaged during delivery or during installation.

The Contractor shall develop a schedule of the dates of the installation of each State furnished controller. The Contractor shall keep the Engineer advised of the schedule and any subsequent changes. The Engineer shall notify the D.O.T., District Electrical Maintenance Office and the D.O.T. Signal Lab of the schedule and all changes to the schedule.

It shall be the responsibility of the Contractor to determine the function of existing traffic signal, pedestrian signal and detector cables, which will be reused, so that correct connection to the new controller may be completed.

The cabinet shall be installed on the foundation in accordance with the plans or as directed by the Engineer. Prior to connection of the field wires to the new controller cabinet, the Contractor shall perform the following tests:

1. Flash out all traffic and pedestrian signal field wires. This shall consist of momentarily connecting each to a 110 VAC fused source. This will ensure the signals are connected to the correct wires and there are no shorts in the field wiring.

2. Voltage test all input circuits. This shall consist of measuring all other field wires, such as vehicle detector, pedestrian pushbutton and pre-emption cables with a volt meter to ensure there is no voltage present which will damage the electronic devices.

Only then will existing and new signal wires and detector cables be connected, as indicated in the signal hook up chart provided with each cabinet.

When secondary service is initially applied to a State furnished controller cabinet, the controller unit, conflict monitor, coordination unit and other electronic equipment shall be unplugged. After the signals are flashing, the controller, conflict monitor and other equipment shall be connected, and the intersection placed in automatic operation.

Method of Measurement:

This work shall be measured for payment by the number of traffic controllers, cabinets and related equipment for each, picked up, installed, operating and accepted in place.

Basis of Payment:

This work will be paid for at the contract unit price each for "INSTALL STATE FURNISHED TRAFFIC CONTROLLER AND CABINET" complete in place, which shall include transportation from the pick up source to the location, storage, all miscellaneous electrical hardware, tools and work incidental thereto.

ITEM #1108578A - FULL ACTUATED CONTROLLER 8 PHASE (MODIFIED)

For Project 173-412 - City of Stamford –Intersection 135-259 - U.S. Route 1 at Elm Street

NEMA TS2 - TYPE 1 Actuated Controller in “P-44” Cabinet

1.0 DESCRIPTION:

This item shall consist of furnishing and installing a **NEMA TS2 TYPE 1 Actuated Controller in “P-44” Cabinet** for controlling the operation of any traffic signal. The cabinet to house the controller shall be completely wired and all sub-bases shall be complete with load switches and flash relays in conformity with this specification. The cabinet shall also have all necessary auxiliary equipment required to provide the sequence and timing for any traffic signal.

2.0 Material:

All materials furnished, assembled, fabricated, or installed shall be new, corrosion resistant, and in strict accordance with the latest provisions set forth by the City of Stamford Specifications. All equipment furnished under this item shall be current production equipment, identical models of which are field operational.

2.1 Controller

The Controller shall be NTCIP compliant and shall meet or exceed NEMA TS2 -1998 specification. The controller shall be as manufactured by either Peek or Naztec.

The controller shall be equipped with LCD display and menu driven software which provides a user-friendly approach to programming and built-in diagnostics to evaluate the operational status. The controller shall have a flash memory which allows the user to upgrade the intersection software without any PROM replacement. The controller shall be Ethernet-enabled to allow communication across a TCP/IP network.

2.2 Cabinet:

Each controller assembly shall be completely wired and housed in a NEMA P-44 rigid metal cabinet with a **CT Gray Paint**. The cabinet shall be of clean-cut design and appearance and shall be substantially constructed of aluminum alloy. The base mounted cabinet shall have a single front door with #2 Corbins lock and approximately 59” high, 44” width, and 26” deep in size. An auxiliary door which shall be equipped with a lock and a police key. Door hinge pins shall be of stainless steel material. Two keys shall be furnished for each lock. When closed, all doors shall fit tightly to neoprene gasket material.

P- Cabinet Base Adapter: A cabinet base adapter shall be furnished with the P-44 cabinet. The dimensions of the adapter base shall be approximately 44”x26”x12”.

2.2.1 Ventilation: The Cabinet ventilation shall include an intake, exhaust, filtration, fan assembly and environmental controls. Each electric fan shall be equipped with ball or roller bearings and with a capacity of at least 100 cfm. The fan shall be mounted with the housing and be vented. The fan shall be thermostatically controller and shall be manually adjustable.

2.2.2. Cabinet's Light:

- The cabinet lamp circuit shall be fused. The fuse holder shall be easily accessible from the front of the cabinet. It shall not be necessary to reach into the cavity above the controller in order to access the fuse holder for the cabinet lamps.

2.2.3. Cabinet Power supply:

- The cabinet power supply shall meet the requirements of the cabinet.
- The cabinet power supply shall provide LED indicators for the line frequency, 12 VDC, 12 VAC, and 24 VDC outputs.
- The cabinet power supply shall provide (on the front panel) jack plugs for access to the +24 VDC for test purposes.
- One cabinet power supply shall be included with each cabinet assembly.

2.2.4. Cabinet Surge Protection: Each cabinet shall be provided with a surge protection device (SPD) on the AC service input. This SPD shall protect the controller and ancillary equipment from electrical surges due to lightning and utility transients.

The SPD device shall be Model No. ZoneDefender PRO-16400 as manufactured by Atlantic Scientific Corporation or approved equal.

2.2.5. Fiber Optic Cable Housing:

The Fiber Optic Drop Cable Housing shall have the following components as manufactured by Corning or approved equal.

| | |
|-----------------------------------|---------------------|
| Single Panel Housing (16x14x5 cm) | Model #SPH-01P |
| Mounting Bracket | Model #SPH-01P-BKT |
| 12 fiber ST Connector Housing | Model #CCH-CP12-19T |

2.2.6. Fiber Optic Patch Cables: The cabinet shall be equipped 6 Single Mode fiber optic patch cables to provide internal distribution to all opto-electronic equipment. The patch cables shall be factory terminated with ST or SC Type connectors or approved connector compatible with the specified equipment complement.

2.2.7. Pullout Drawer: One pullout drawer shall be provided mounted under the bottom shelf in the cabinet. The drawer shall be 25mm (1 inch) high, 330 mm (13 inches) deep, 406 mm (16 inches) wide and capable of holding 18 kg (40 lbs) in weight when the drawer is extended. This

drawer shall have a flip up lid to place a Laptop computer on top when extended while protecting any documentation in the drawer when the cabinet door is open.

2.2.8. Police Door: A switch to control the change from automatic control to flashing operation and vice versa. The controller shall continue to operate when in flash from this switch. A switch to control the change from automatic control to manual operation and vice versa. A manual cord not less than 1.82m/6 foot long, equipped with a rubber cover hand switch, will also be provided and be accessible from the police door. Manual Control will be accomplished by activation of the manual control enable circuit in conjunction with the interval advance circuit. Signal-on-off switch this switch shall override all flash switches, disconnecting power to the traffic and pedestrian signals the signal switch shall not shut off the controller power

2.2.9. Model 200 Solid State Switch Pack: A 3-circuit solid-state load switch with input and output LED's shall control Signal light circuits. Each circuit shall be independent of the other two and within its own metal package. This package shall be attached to the interior wall of the load switch to allow for heat dissipation during operation the load switch shall plug into the load switch rack that is modular and expandable per the functions of the BIU. "RENO A & E Model LS-200 or City approved equal." 16 load switches shall be provided.

2.2.10. Model 204 Flasher Unit: The flasher shall be a solid-state device, producing 50 and 60 flashes per minute with a 50 percent duty cycle. The flasher mechanism shall be mounted on a plug-in base with a plug-in mounting. "RENO A & E Model FL-200 or City approved equal". 2 flashers shall be provided.

2.2.11. Malfunction Management Unit: This specification sets forth the minimum requirements for a shelf-mountable, sixteen channel, LCD display, solid state Malfunction Management Unit (MMU). The MMU shall meet the following specification:

- No circuit cuts shall be allowed on circuit boards in any of the equipment supplied. Any wire jumpers included on circuit boards shall be placed in plated through holes that are specifically designed to contain them. Jumpers that are tack soldered to circuit traces or are added to correct board layout errors are not acceptable.
- ***MMU shall have an Ethernet connector and shall be connected to the Fiber Optic switch.***
- All IC's with 16 or more pins shall be mounted in machine-tooled sockets. All sockets shall have two-piece, machined contacts and closed end construction to eliminate solder wicking. The outer sleeve shall be brass with tin or gold plating and tapered to allow easy IC insertion. The inner contact shall be beryllium copper sub plated with nickel and plated with gold. All sockets shall have thermoplastic bodies meeting UL Specification 94V-0. Other high quality sockets may be acceptable but must have prior approval of the Traffic Operations Division Signal Operations Engineer. Sockets meeting alternate specifications shall be submitted in writing with the bids. Zero insertion force sockets will not be allowed.

- The design shall allow for removal or replacement of a circuit board without unplugging or removing other circuit boards.
- The unit shall be designed so that one side of each board can be completely accessible for troubleshooting and testing the unit while it is still operating. This may be accomplished with extender boards or cables. This need apply to only one circuit board at a time.
- No more than two circuit boards shall be attached to each other to constitute a circuit assembly. Attaching hardware shall use captive nuts or other acceptable method to secure the boards together. Alternate methods shall be submitted in writing with the bids. The boards shall be designed so that the purchaser can test and operate the controller unit with the boards separated.
- If this specification is used to support the purchase of a complete controller assembly, the unused red circuits shall be connected to the AC Line in the controller cabinet.
- A RS232 port shall be accessible from the front panel of the MMU. The RS232 port shall be compatible with a PDA device that provides the following information:

Programming Report

Analyzer Report

History Report

Clear Report Logs

Download Real-Time Clock

A RS232 Communication Cable shall be supplied in interface the MMU to the controller.

- Each Malfunction Monitoring Unit shall have a unique serial number that is permanently and neatly displayed on the face of the unit. If this serial number is not on the face of the unit, then an additional temporary label that is neatly printed or typed shall be affixed to the MMU. The MMU supplied must be the Enhanced model with RS232 communication or City approved equal. 1 MMU shall be provided.

2.2.12. Bus Interface Units:

Each cabinet assembly shall contain 4 Bus Interface Units required for proper operations. One Traficon compatible BIU units shall be provided.

- Each BIU shall have the capability of operating 16 detector inputs or 8 channels of load switches.
- No circuit cuts shall be allowed on circuit boards in any of the equipment supplied. Any wire jumpers included on circuit boards shall be placed in plated through holes that are

specifically designed to contain them. Jumpers that are tack soldered to circuit traces or that are added to correct board layout errors are not acceptable.

- For easy maintenance, Critical Components shall be socket mounted; Dual-in-line (DIP) devices shall be mounted in military specification sockets, a part #8xx-AG11D. All sockets shall have two-piece, machined contacts and closed end construction to eliminate solders wicking. The outer sleeve shall be brass with tin or gold plating and tapered to allow easy I.C. insertion. The inner contact shall be beryllium copper sub-plated with nickel and plated with gold. All sockets shall have thermoplastic bodies meeting UL Specification 94V-0. Each I.C. socket contact shall be plated with at least 50 microns of gold.

2.2.13. Detector Rack:

- The detector rack shall be designed to support four channel detector cards
- The detector rack shall support thirty-two detector inputs.
- The detector rack shall support two BIU slots
- The detector rack shall support two slot for an optical preempt card either two dual channel cards or one four channel card.

4 two channel Loop Detector cards shall be provided.

2.2.14. Quad Channel Detector Sensing Unit: The Inductive loop detector and all other detection devices shall be provided under other items. These units shall plug directly into the detector rack.

2.2.15. Preemption Phase Selector: The preemption phase selector is specified and paid under the phase selector item. The unit shall plug directly into the cabinet.

2.2.16. Power Distribution Assembly: Circuit Breakers shall be listed by UL or ETL. The trip and frame sizes shall be plainly marked (marked on the breaker by the manufacturer), and the ampere rating shall be visible from the front of the breaker. Contacts shall be silver alloy and enclosed in an arc-quenching chamber. Overload tripping shall not be influenced by an ambient air temperature range of from – 18 degrees C to 50 degrees C. The minimum Interrupting Capacity shall be 5,000 Amperes, RMS when the breaker is secondary to a UL approved fuse or primary circuit breaker and both breakers in concert provide the rated capacity. A solid-state contactor shall be supplied and shall be rated at 75 amps. An indicator light shall be visible from the front of the unit.

2.2.17. Technician Panel: A panel shall be provided to test 32 vehicle detector inputs and 4 pedestrian detector inputs for purpose of trouble shooting and testing the cabinet and controller

2.2.18. Model 430 Flash Transfer Relay: The Flash Transfer Relay shall be Model 430. 8 Flash Transfer Relay shall be provided.

2.2.19. Door Ajar Alarm Switch: A door ajar alarm switch shall be installed. The switch shall be of heavy duty, spring- loaded design with single pole normally closed contacts. The switch circuit shall be closed whenever the door is open at an angle of 15 degrees or more. The door ajar switches shall only be used to support the door ajar alarm function; they shall not be used to support any other function (such as cabinet illumination or conflict monitor interlocking).

The switch shall be wired to 2-point barrier style terminal block on the input side of the cabinet. One point of the terminal block shall also be connected to logic ground and the other to cabinet door alarm input. The other point of the terminal strip shall be connected to controller logic ground.

2.2.20. 120 VAC Outlets: The controller cabinet shall be equipped with 2 separate 4 gang outlet boxes (total 8 outlets) with 2 separate 15 AMP breakers.

2.2.21. Construction Methods: The controller, mounted in the controller cabinet shall be installed at the locations shown on the plans.

2.2.22. Programming: Each programmable field hardware component including, but not limited to, local controller, malfunction management unit, detector amplifier, lamp failure monitor, shall be initially programmed by the supplier based on information provided by the City of Stamford Traffic Engineer. One hard copy of the programming data shall be left in each control cabinet and one hard copy shall be delivered to the City.

2.2.23. Ducts:

All conduits in the foundation shall be completely sealed with flexible waterproof duct seal material approved by the Engineer.

2.2.24. Cabinet Door:

The cabinet door shall be open as specified in the plans. If the plans do not indicate this information, the contractor shall confirm with the Engineer regarding the orientation of the cabinet.

A cabinet door alarm shall be enabled to permit monitoring from central.

2.2.25. Cabinet Grounding: All controllers shall be effectively grounded using a 16mm (5/8 inch) by 3 meter (10 foot) minimum copper clad steel rod with #8 AWG solid, bare, tinned copper wire attached to the controller cabinet and to the ground rod by a square head bolt clamp.

Maximum resistance between the grounding electrode and any point in the grounding system shall not exceed 5 ohms. If resistance is greater than 5 ohms, contractor shall increase length of ground rod and take other remedial action may be required to attain specified resistance. Temporary remedial measures (such as wetting the soil) shall not be permitted. The Contractor should document resistance of each ground rod to a reference ground. A test plan shall be submitted for review by the Engineer.

Neutral shall be bonded to ground at point of service with minimum #6 copper jumpers.

2.2.26. Connection of Miscellaneous Cables: All wiring connected to terminal blocks, flashers, relays, switches, radio interference suppresser, etc., shall be identified by use of insulated pre-printed tags over the wire including, but not limited to signal control wires, loop detector lead-in, etc. The wire markers shall carry the legend in plain words with sufficient details so that a translating sheet will not be required.

Cabinets shall be wired to accept and implement all of the features of the specified equipment.

2.2.27. Illuminated Street Name Signs Service Panel: A blank side mounted service panel shall be installed with terminal blocks and a separate circuit breaker to accommodate wiring at least 6 illuminated street name signs.

2.2.28. Video Detection System Service Panel: A blank side mounted panel shall be installed with terminal blocks and a separate circuit breaker to accommodate wiring at least 4 video detection cameras.

2.3 Intentionally left as Blank.

2.4 100 Base-TX Communications:

This setup shall include two Ruggedcom RS900 hardened managed switches with 7 100base TX ports and 2 100base single mode FX ports. All connecting cables for all ports on these units shall be supplied.

3.0 Manuals:

The Supplier shall secure from the manufacturer a comprehensive service controller. Six (6) paper prints of the cabinet wiring diagram the entire field connection chart shall be left blank. A comprehensive parts list, detailing all replaceable components as to manufacturer part number, and commercially available part number, and manufacturer's net price each, shall be provided. This list may be referenced from the drawings supplied with the equipment.

4.0 Guarantee:

The supplier shall secure from the manufacturer a guarantee for the equipment for a period of twelve (12) months, which time shall commence from the date of delivery. If a unit is found to be defective during this twelve month period, it will be the responsibility of the contractor to assume the cost of shipping the controller to and from the factory, supplying parts and making repairs at no cost to the City of Stamford.

5.0 Method of Measurement:

The NEMA TS2-TYPE 1 Actuated Controller and NEMA P-44 Traffic Control Cabinet will be measured as the number of complete units furnished and installed in accordance with the Contract Documents.

6.0 Basis of Payment:

The unit price bid for each NEMA TS2 TYPE 1 Actuated Controller and NEMA P-44 Traffic Control Cabinet shall include the cost of furnishing and installing all material, labor, manufacture training, 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 | Pay Unit |
|---|-----------------|
| NEMA TS2-TYPE 1 Actuated Controller in "P-44" Cabinet | Each |

ITEM #1108649A - ADVANCED TRANSPORTATION CONTROLLER, MODEL 2070

This item to be used only at Intersection #15-294 – James Street at Lyon Terrace – Bridgeport - Project 173-404

Description: This item shall consist of furnishing and installing an Advanced Transportation Controller (ATC) that meets and exceeds the National ATC 5.2b Controller Standards. The Model 2070 ATC will be configured for controlling the operation of the traffic signals as indicated on the phase sequence and timing charts on the plans, and all necessary auxiliary equipment required for satisfactory operation of the traffic signal, at the locations indicated on the plans or indicated by the Engineer and in conformity with these specifications. The Contractor shall furnish the cabinet in such a way that the controller's back face the intersection, and at the same time to meet the requirements of the power company in regards to the installation of service meter. The cabinet details provided in the contract plans are only for illustrative purposes. The orientation of cabinet doors' hinge is subject to change to meet the field condition. The Contractor is required to submit specific shop drawings for each intersection to the Engineer for review and approval prior to manufacturing cabinets.

Materials:

Compliance: All materials furnished, assembled, fabricated, and installed shall be new, corrosion resistant and in strict accordance with the latest provisions set forth by the City of Bridgeport Specifications. All controller units shall meet all requirements set forth in the ATC 5.2b Controller Standard for Type 2070 Controller. The controller units shall comply with all future addenda to the above specifications, prior to the bid opening date. The 2070 controller modules (2070-2B, 2070-3B, 2070-4A, 2070-7A and the controller chassis) shall comply with Caltrans 2009 Transportation Electrical Equipment Specifications (TEES) latest revision prior to bid opening date.

Model 2070ATC Controller: The manufacturer shall supply a fully assembled Model 2070 ATC controller configured to operate in an ITS cabinet as specified by the National ITS Cabinet Standards v01.02.17b. The controller will be in full compliance with the referenced ATC specification as well as provide evidence that the controller units have been approved by the City of Bridgeport. Manufacturer shall submit all test results to the Engineer for review upon request.

The manufacturer and/ or supplier shall furnish, within sixty (60) days after the Notice to Proceed, two (2) model 2070 ATC configured controller units for evaluation by the City. Once evaluation units are approved, the manufacturer shall furnish production controller units according to the delivery schedule of this contract. It is anticipated that the evaluation period will not exceed thirty (30) days.

The manufacturer shall supply Model 2070 ATC controller units with the following modules:

- Type 2070 E Chassis, TEES 2009
- Type 2070-ATC CPU Module with four (4) Ethernet Ports and two (2) USB Ports
- Type 2070-2B with SDLC Connector, TEES 2009
- Type 2070-3B Front Panel Assembly with 8 x 40 Display, TEES 2009
- Type 2070-4A Power Supply, 10AMP, TEES 2009
- Type 2070-7A Serial RS232 Module, TEES 2009

The contractor shall provide one (1) data key with each 2070 ATC controller unit.

Testing, Quality Control, Documentation, and Warranty:

The contractor shall comply with electrical, environmental, and testing requirements defined in the ATC specification.

The Contractor shall, within fifteen days from the date of Notice to Proceed, supply quality control procedures and test report formats as required by the ATC specification.

The Contractor shall comply with all testing, quality control, and reporting procedures specified in the ATC specification.

The Contractor shall submit all documentation required by ATC specification, this specification, and all associated procurement documentation. All cabinet wiring diagrams shall be submitted as a CADD drawing (AutoCAD 2000 format) in addition to hardcopy.

Operation Manuals: All equipment provided under this specification shall be provided with operational manuals, which document the operation and maintenance of the equipment. Additionally, the following documentation shall be provided for the various items furnished.

Manuals shall be printed on 8.5 by 11-inch paper. Schematics, layouts, parts lists, and plan details may be on 11 by 17-inch sheets, but the sheets must be neatly folded to 8.5 by 11-inch size. D size sheets must be neatly folded and bound to fit in the 8.5 by 11-inch manuals. The manual shall be bound in durable covers, and shall suffer no degradation when subjected to normal cabinet temperature testing.

Manual Contents: Each manual shall include the following: General Description, General Characteristics, Installation, Adjustments, Theory of Operation, Systems Description (Including Block Diagram(s)), Detailed Description of Circuit Operations, and Maintenance. Maintenance shall cover Preventative Maintenance, Trouble Analysis, Trouble Shooting Sequence Chart, waveforms, Voltage Measurements, and Alignment Procedures.

Technical Information: Technical information in the form of manufacturer's published data sheets for all mediums and large scale integrated circuits.

Parts List: Parts lists (including circuit and board designation, part type and class, power rating and component manufacturer, and original manufacturer's part number.

Electrical Interconnection Drawing: An electrical interconnection drawing shall be furnished.

Schematic and Logic Diagram: Assembly drawings and a pictorial diagram showing physical locations and identification of each component.

Serial and Revision Numbers: The serial numbers and revision numbers of equipment covered by manuals shall be printed on the front cover of the manuals.

Updated Documentation: Updated documentation shall be provided for any and all design changes or modifications to equipment, circuits, or components supplied to the City. The City shall be notified, in writing, of any impending changes.

Any and all equipment furnished shall be covered by the manufacturer's warranty for a minimum of Two (2) years from date of system acceptance with respect to materials, parts, workmanship, and performance.

The Contractor shall be responsible for all expenses associated with the return of any equipment that the City deems necessary to return to the factory for proper adjustments or repairs during the warranty period. All expenses associated with disassembling, shipping and handling to and from the manufacturer, and reinstallation shall be the responsibility of the Contractor.

The City reserves the right to withhold any payments, should it be discovered that the equipment does not meet the specifications and/or claims of the bidder.

The Contractor/manufacturer and/or supplier shall have field engineers or technicians available on request to assure satisfactory initial operation and to consult with the City or their representatives on any special circumstances that may be required in certain applications.

Model 342-ITS Cabinet:

All cabinets shall be manufactured to the ITS CABINET STANDARD v01.02.17b. The cabinet shall be engineered for simplicity, ease of operation and maintenance. The design shall be inherently temperature compensated to prevent abnormal adverse effects due to temperature in the specified environmental range. Personnel shall be protected from all dangerous voltages per NEC requirements.

The cabinet enclosure shall include but not limited to, enclosure, doors, hinges and door catches, gasketing, ventilation, latches and locks, police panel, cage supports and mounting devices. The housing shall be rainproof with the top of the enclosure crowned to prevent standing water. It shall have front and rear doors the enclosure doorframes shall be double flanged out on all four sides and shall have strikers to hold tension on and form a firm seal between the door gasketing and the frame. Gasketing shall be provided on all door openings and shall be water and dust-tight.

The cabinet foundation bolts shall have metal bolt covers secure in place by set-screws. Bolt covers to envelop the entire bolt opening to avoid water seeping in to the cabinet cavity under water penetration testing procedure.

Dimensions: The cabinet shall be a 342-ITS Cabinet with a maximum: height of 67 inches, width of 24.3 inches, and depth of 33 inches.

Base Adapter: A water tight base adapter shall be furnished to match the exterior dimensions of the Type ITS cabinets furnished under this specification. The adapter shall have a height of 12 inches (250 mm). The base of the cabinet shall be accessible through the base adapter's door opening. The contractor shall furnish and install bolt cover as shown.

Door Latches and locks: The latching mechanism shall be a three-point draw roller type. When the door is closed and latched, the door shall be locked. The locks and handles shall be on the cabinet side to accommodate the door opening to facilitate the back of the **controller** to face the intersection. The lock and lock support shall be rigidly mounted on the door. A seal shall be provided to prevent dust or water entry through the lock opening; Cabinet locks shall be keyed to BEST locks.

Ventilation: The Cabinet ventilation shall include an intake, exhaust, filtration made of paper, two fan assembly and environmental controls. Each electric fan shall be equipped with ball or roller bearings and with a capacity of at least 100 cfm. The fan shall be mounted with the housing and be vented. Fans shall be installed in the front and back of the controller. Replacing the fan shall not require any tool.

The fans shall be thermostatically controlled by two manually adjustable thermostats. The thermostat shall be mounted next to Stop Time switch on the where they are visible and accessible.

Cabinet Cage: A standard EIA 19 inch rack cage shall be installed inside the housing for mounting of the controller unit and cabinet assemblies. The EIA rack portion of the cage shall consist of 2 pairs of continuous, adjustable equipment mounting angles. The angles shall be tapped with 10-32 threads with EIA universal spacing. The angle shall comply with standard EIA-310-B and shall be supported at the top and bottom by either welded or bolted support angles to form a cage. The cage shall mount on the center of the cabinet.

Aluminum Surface: The cabinet exterior shall be painted be painted Black, Federal No. 37038, Federal Standard No. 595.

Light: LED lamps shall be installed in the top of the front and rear of the cabinets. Switches shall be installed on the front and rear doors. Opening of either door shall illuminate both lights. Activation of the LED lamps and associated switches shall not cause any disruption of the controller or any other electrical or electronic device in the cabinet.

The cabinet LED circuit shall be fused. The fuse holder shall be easily accessible from the front of the cabinet. It shall not be necessary to reach into the cavity above the controller in order to access the fuse holder for the cabinet lamps.

Cabinet Power Supply: The cabinet power supply shall meet or exceed the requirements of the Model 216EP-2412 Power supply.

The Model 216EP-2412 shall use modern switching technology and shall provide full output regulation across changes in AC Line voltage and output load over the full operating temperature range of -34C to +74C.

The Model 216EP-2412 shall provide both a 24VDC 5 Amp output and an independent 12VDC 5 Amp output.

The Model 216EP-2412 power supply shall be equipped with an output BEAU socket instead of an output BEAU plug.

One cabinet power supply shall be included with each cabinet assembly.

Cabinet Surge Protection: The cabinet shall be provided with a surge protection device (SPD) on the Service Panel Assembly. This SPD shall protect the controller and cabinet equipment from electrical surges due to lightning and utility transients.

The SPD shall meet or exceed the following requirements:

Mechanical Requirements:

- Plug-in module
- Connection Type: 1/4-20 SS Stud Base, Plug-in Module Operating
- Operating Temperature: -40Â°C to +85Â°C
- Dimensions (Inches, Module +Base): 3.5H x 3.125W x 7.125L
- Weight (Module + Base): 1 lb 11.5 oz

Electrical Requirements:

- Operating Voltage: 120 VAC
- Clamping Voltage: 340 VAC
- Operating Current: 15A
- Peak Surge Current: 26 kA/Mode, 32.5 kA/Phase, 45.5 kA/Total
- Operating Frequency: 47-63 Hz
- EMI Attenuation: 50 dB typ
- SPD Technology: MOVs w/L-C Filter
- Modes of Protection: L-N, L-G, N-G
- Remote-sensing circuitry
- Status Indication: Power On & MOVs functional

SB1/SB2 Communication Bus

This bus shall be mounted horizontally across the EIA rails and contains 10 ports.

Raw /Clean AC Power

The Raw /Clean AC Power shall contain (6) NEMA 5-15 sockets all facing the Input Termination Panel. It shall be equipped with only (1) S1 socket and (1) P1 Plug.

Fiber Optic Distribution Center: A fiber optic distribution center shall be provided in each cabinet specified for the termination and optical continuation of the fiber optic cables as required. The distribution center shall be installed on sliding tracks. Fiber Optic Distribution Center shall be manufactured by Corning. The distribution center shall be fully accessible and viewed by pulling the unit in its entirety on sliding tracks. The unit shall act as an interface between the fiber optic drop cable and the fiber optic patch cables. In addition, the distribution

center shall facilitate the reassignment of fibers within and testing of the optical fiber plant. No other substitution is allowed. The distribution center shall meet the following requirements:

The housing shall be for outdoor use.

The housings shall meet the requirements of ANSI/TIA/EIA-568 and UL 94 V-0.

Housings shall be manufactured using 16-gauge aluminum or equivalent for structural integrity and shall be finished with a textured powder coat for durability.

Each housing shall occupy one rack space and be furnished with 2 connector panels, each with a 12-fiber capacity. The connector panel shall be the SC Type. The connector panel shall be marked with numbers that assist in fiber identification. Connector panels shall be manufactured using 16 gauge cold rolled steel or equivalent or shall be made from injection molded engineering plastics.

The housings shall have a metal door. The door shall be retained by a lanyard to prevent over-extending the door in the open position. Jumpers shall route out the back of the housing.

The housings shall be supplied with installation instructions, cable strain relief hardware, housing installation hardware, and jumper routing clamps.

The front door shall be hinged and equipped with a quarter-turn fastener for quick access.

The connector housings shall have a labeling scheme that complies with TIA/EIA-606. The connector housings shall be manufactured by Corning.

Fiber Optic Patch Cable: The cabinet shall be equipped with fiber optic patch cables to provide internal distribution to all opto-electronic equipment as shown on the plans. The patch cables shall be factory terminated with LC Type connectors or approved connector compatible with the specified equipment complement. Fiber Optic Patch Cable shall be manufactured by Corning. The optical characteristics shall be compatible with the fiber optic cable specified under a separate contract item. Each patch cable shall conform to industry-published connector and cable specifications. The Contractor shall submit a record of test performances from the factory for each individual cable assembly installed.

Pullout Drawer: A pullout drawer hinged at the top and having sliding tracks shall be provided in the cabinet. The drawer shall be 45mm high, 337mm deep, 483mm wide and capable of holding 18kg in weight when the drawer is extended. This drawer should be located between the controller and the power distribution assembly. Drawers with sharp intrusions will not be accepted. All corners shall be smooth and rounded.

Police Door: Provide a switch to control the change from automatic control to flashing operation and vice versa. The controller shall continue to operate when in flash from this switch. A switch to control the change from automatic control to manual operation and vice versa shall be provided. A manual cord not less than 1.82 m/6 foot long, equipped with a rubber cover hand switch, will also be provided and be accessible from the police door. Manual Control will be accomplished by activation of the manual control enable circuit in conjunction with the interval advance circuit. Signal-on-off switch shall override all flash switches, disconnecting power to the traffic and pedestrian signals and the signal switch shall not shut off the controller power

Model 200 Solid State Switch Pack: a 3-circuit solid-state switch pack shall control signal light circuits. Each circuit shall be independent of the other two and within its own metal package. This package shall be attached to the interior wall of the switch pack to allow for heat dissipation during operation the switch pack shall plug into the switch pack rack that is modular and expandable per the functions of the Serial Interface Unit.

Model 204 Flasher Unit: The flasher shall be a solid-state device, producing 50 and 60 flashes per minute with a 50 percent duty cycle. The flasher mechanism shall be mounted on a plug-in base with a plug-in mounting. Two flashers shall be installed in the power distribution assembly.

Cabinet Monitor Unit:

This specification sets forth the minimum requirements for a rack-mountable, thirty two channel, solid state Cabinet Monitor Unit (CMUip-212). The CMUip-212 shall meet, the following minimum specifications:

- The CMUip-212 shall be capable of monitoring up to 28 physical switch pack channels (RYG) plus 4 virtual channels for a total 32 channel capacity.
- The CMUip-212 programming shall be provided by an interchangeable Datakey™ nonvolatile memory device. This rugged key shall store all CMUip-212 configuration parameters and eliminates programming using jumpers, diodes, or DIP switches. Monitor programming parameters shall be easily developed using the software wizards provided by the Datakey™ Programming Tool.
- Real-time SDLC communications with the Advanced Transportation Controller (ATC) shall provide complete monitor status to the ATC including field status, fault status, and configuration programming.
- The CMUip-212 shall maintain a nonvolatile event log recording the complete intersection status as well as previous fault events, AC Line events, configuration changes, monitor resets, cabinet temperature and true RMS voltages for all field inputs. A real time clock stamps each event with time and date.
- The Signal Sequence History Log stored in nonvolatile memory graphically shall display up to 30 seconds of signal status prior to the fault trigger event with 50ms resolution to ease diagnosing of intermittent and transient faults.
- Access to the CMUip-212 data shall be provided by the industry standard ECcom™ Windows based software for status, event log retrieval, configuration, and data archival.
- The *MonitorKey™* Programming Tool provides a simple but complete solution to programming the CMUip-212 parameters into the Datakey™. The software includes a Parameter Setup Wizard that simplifies the initial set-up of the parameter database.

Serial Interface Units

Input or Output Assembly mounted address jumpers shall program the SIU-218 configuration.

The SIU-218 shall use real-time standardized 614.4 Kbs SDLC communications with the ATC to transfer command and response data on Serial Bus #1.

The Serial Bus #2 from the ATC shall be directed to peripheral devices in the Input Assembly using the SIU-218 on-board INBUS buffers.

All outputs shall be rated at 150mA continuous sink current. Each output shall provide a 500mA typical current limit. Outputs shall be rated to 50 volts and utilize a voltage clamp for inductive transient protection.

Four optically isolated inputs shall provide isolation for Pedestrian Detector and Remote Interconnect inputs. These inputs shall be intended for direct connection to 12 Vac for Pedestrian Detector applications. They may also be connected for 'Low True' DC applications when the Opto Input Ground pin is connected to a 24Vdc supply.

A complete set of internal diagnostic self-tests shall run continuously to help ensure critical components of the SIU-218 are operating correctly.

A front panel LED indicator shall be used to report the current Input/Output assembly address assignment of the SIU-218 for cabinet configuration verification.

A Diagnostic EIA-232 port shall be available on the front panel to interface to SIU-218 functions using the *Front Panel* software, and for custom applications.

Input Assembly:

The input assembly shall be an EIA-310B rack mounted assembly providing twelve slots of 22/44pin PCB sockets. A Model 218 Serial Interface (SIU) shall be provided in its location mated to a DIN 96-pinconnector.

The Input Assembly shall be wired to accept Model 222, 224, 242 and 252 cards.

Quad Channel Detector Sensing Unit: The Inductive loop detector and all other detection devices shall be provided under other items. These units shall plug directly into the detector rack.

Preemption Phase Selector: The preemption phase selector is specified and paid under the Phase Selector item. The unit shall plug directly into the cabinet

Power Distribution Assembly:

Circuit Breakers shall be listed by UL or ETL. The trip and frame sizes shall be plainly marked (marked on the breaker by the manufacturer), and the ampere rating shall be visible from the front of the breaker. Contacts shall be silver alloy and enclosed in an arc-quenching chamber. Overload tripping shall not be influenced by an ambient air temperature range of from – 18 degrees C to 50 degrees C. The minimum Interrupting Capacity shall be 5,000 Amperes, RMS when the breaker is secondary to a UL approved fuse or primary circuit breaker and both breakers in concert provide the rated capacity.

A solid-state contactor shall be supplied and shall be rated at 75 amps. An indicator light shall be visible from the front of the unit. The DCP socket shall be replaced with a 4-foot long cable and a plug.

Model 430 Flash Transfer Relay: The Flash Transfer Relay shall be Model 430.

Door Ajar Alarm Switch: A door ajar alarm switch shall be installed on front and back doors. Each switch shall be of heavy duty, spring- loaded design with single pole normally closed contacts. Each switch circuit shall be closed whenever the corresponding door is open at an angle of 15 degrees or more. The switches shall be installed so that they will not restrict removal of the cabinet rack assembly in any way. The door ajar switches shall only be used to support the door ajar alarm function; they shall not be used to support any other function (such as cabinet illumination or conflict monitor interlocking).

Each switch shall be wired to 2-point barrier style terminal block on the input side of the cabinet. One point of the terminal block shall also be connected to logic ground and the other to cabinet door alarm input. The other point of the terminal strip shall be connected to controller logic ground.

Model 342 ITS Cabinet Configuration

The Model 342 ITS Cabinet will be Configured/Equipped with the following:

Model 342 ITS Cabinet Configuration Table

| Package Items | 342-ITS |
|--|---------|
| Housing #1 | 1 |
| Cage #1 | 1 |
| "J" Panel for Cage #1 | 2 |
| Service Panel Assembly w/ AC- & EG Bus | 1 |
| Raw / Clean AC Power Assembly (1 socket) | 1 |
| DC Power Bus Assembly | 1 |
| SB1/SB2 COMM Assembly | 1 |
| Drawer Assembly | 1 |
| Input Assembly | 2 |
| Input Termination Panel Assembly | 1 |
| Fourteen Pack Output Assembly | 2 |
| PDA ITS Assembly | 1 |
| 24/12 VDC Power Supply (216EP-2412) or equal | 1 |
| CMU-212 Aux. Display Module (CMU-ADM) or equal | 1 |
| LED- Cabinet Light Assembly | 2 |
| Manual Advance Pushbutton Cable | 1 |

The Model 342 ITS Cabinet Assembly will be loaded with the following components:

14 Pack Output Assembly:

- (14ea) Model 200 Switch Packs. Each shall have an input/output display indication.
- (6 ea) Model 205 Flash Transfer Relay Unit (These relays must be designed for continuous operation in the energized position.)
- (12 ea) Red Flash Program Blocks
- (4 ea) Yellow Flash Program Blocks
- (4 ea) White Flash Program Blocks
- (1 ea) SIU-218 must be compatible with EDI Front Panel Software
- (1 ea) AMU-214
- (1 ea) Serial Bus 3 Cable
- (1 ea) Control Serial Bus (SB1/SB2) Cable
- (1 ea) Address Block
- (7 ea) Transient Protectors

Input Assembly:

- (12 ea) Input cards
- (1 ea) SIU-218
- (1 ea) Address Block
- (1 ea) Control Serial Bus (SB1/SB2) Cable
- (24 ea) Transient Protectors

Power Distribution Assembly PDA-ITS:

- (2) Model 204 Flasher Units
- (1 ea) CMUip-212 complete with Monitor Key (Data key programming tool)
- (1 ea) Address Block
- (1 ea) CC Harness
- (1 ea) Serial Bus 3 Cable
- (1 ea) DC Power Harness (DCP)
- (1 ea) Control Serial Bus (SB1/SB2) Cable

Service Panel Assembly:

- (1 ea) EDCO SHA-1250 or approved equal

Ethernet Switch: The controller shall communicate through the Ethernet port an Ethernet switch shall be provided under item # 1108660A.

Construction Methods: The controller, mounted in the controller cabinet shall be installed at the locations shown on the plans in the following manner:

Programming: Each programmable field hardware component including, but not limited to, local controller, malfunction management unit, detector amplifier, lamp failure monitor, shall be initially programmed by the Contractor based on information contained on the plans. One hard

copy of the programming data shall be left in each control cabinet and one hard copy shall be delivered to the City.

Ducts:

All conduits in the foundation shall be completely sealed with flexible waterproof duct seal material approved by the Engineer.

Cabinet Doors:

The cabinet doors shall be perpendicular and open away from the curb as specified in the plans. If the plans do not indicate this information, the contractor shall confirm with the Engineer regarding the orientation of the cabinet.

A cabinet door alarm shall be enabled to permit monitoring from central.

Cabinet Grounding: All controllers shall be effectively grounded using a 16mm by 3 meter minimum copper clad steel rod with #8 AWG solid, bare, tinned copper wire attached to the controller cabinet and to the ground rod by a square head bolt clamp.

Maximum resistance between the grounding electrode and any point in the grounding system shall not exceed 5 ohms. If resistance is greater than 5 ohms, contractor shall increase length of ground rod and take other remedial action may be required to attain specified resistance. Temporary remedial measures (such as wetting the soil) shall not be permitted. The Contractor should document resistance of each ground rod to a reference ground. A test plan shall be submitted for review by the Engineer.

Neutral shall be bonded to ground at point of service with minimum #6 copper jumpers.

Connection of Miscellaneous Cables: All wiring connected to terminal blocks, flashers, relays, switches, radio interference suppresser, etc., shall be identified by use of insulated pre-printed tags over the wire including, but not limited to signal control wires, loop detector lead-in, etc. The wire markers shall carry the legend in plain words with sufficient details so that a translating sheet will not be required.

Cabinets shall be wired to accept and implement all of the features of the specified equipment.

Surge Protection: Cabinet shall be furnished with a radio filter and surge protection device, EDCO MODEL ACP 340 or equivalent, mounted inside the Power Distribution Assembly #2.

Cabinet Testing: The following cabinet tests shall be performed at a minimum:

1. 48 hour hot and cold for cabinet and controller - documented and certified.
2. Run STEP (Self Test Evaluation Program) on controller - documented and certified
3. Run Cabinet test on cabinet - documented and certified. It should test the following:
 - Input file wiring
 - Output file wiring
 - Timing of all possible conflict combinations
 - Watchdog error

4. Test proper brownout voltage calibration between malfunction management unit and controller. Manufacturer to submit procedure for approval. Documentation and certification to be shipped with cabinet.
5. MMU testing
 - Test all channel to channel conflicts
 - Test all voltage threshold levels
 - Test all auxiliary functions (watchdog, 24 VDC, program card ajar, etc.)
 - Test all enhanced (absence of red, sequence, etc.)
 - A printed record of each test to be provided; in particular all threshold voltages shall be documented.
 - Manufacturer to prepare and submit test procedure.

Programming:

Each programmable field hardware component including, but not limited to, local controller, malfunction management unit, detector amplifier, and video detection interface unit shall be initially programmed by the supplier based on information provided by the City of Bridgeport Traffic Engineer. One hard copy of the programming data shall be left in each control cabinet and one hard copy shall be delivered to the City.

Local Controller Software:

The Contractor shall furnish and install Local Controller Software manufactured by McCain, Inc. in each controller unit in accordance with the Contract Documents. The software shall, at a minimum, have the following minimum capabilities:

- Software shall be NTCIP (National Transportation Communications for ITS Protocol)1201/1202 compliant
 - All mandatory and optional NTCIP objects defined by 1201 and 1202 shall be supported.
- Software shall be compatible with the following controller hardware platforms:
 - ATC (Advanced Transportation Controller) 5.2b standard
 - Caltrans 2070 with ATC 5.2b CPU module
- The software shall meet the functional requirements of NEMA TS-2 2003
- Software shall be compatible with the following cabinet styles:
 - Caltrans
 - NEMA TS-2 Type 1
 - NEMA TS-2 Type 2
 - ITS Cabinet Standard v01.02.17b
 - All cabinet modes shall support the concurrent use of NEMA TS2 detector BIU's
- Phases
 - 16 volume/density vehicle phases
 - 16 pedestrian phases
 - 4 rings
 - Concurrency table defining compatible phases
 - Automatic barrier calculation based on compatible phases
 - Minimum of 16 phase sequences

- Exclusive pedestrian-phase operation
- Alternate timing for special vehicles or pedestrians
- Advance and delayed WALK operation
- 4 phase banks allow different sets of phase timing and options
- Phase Options
 - Option set selectable via scheduler
 - Minimum, maximum, and soft recall
 - Red rest by phase
 - Vehicle recall by phase
 - Detector plan
 - Pedestrian recall by phase
 - Rest in walk
 - Alternate detector configuration and diagnostics
 - Alternate overlap configuration
 - Phase omit
 - Pedestrian omit
 - Phase sequence
 - Conditional service
- Coordination
 - 253 patterns and split tables
 - Phase sequence selection by pattern
 - Max 2 phases by pattern
 - Recall mode by pattern
 - Fixed, floating, manual force off selection
 - Reference cycle to beginning or end of synch phase green
 - All phase, overlap, or detector options changeable by pattern
 - Coordination parameters such as phase split shall be validated against the selected pattern cycle length.
 - User selectable permit and omit strategies
 - User selectable offset correction modes
 - All coordination options changeable by pattern
- Inputs
 - 16 alarm inputs
 - 16 Special function inputs
- Outputs
 - 16 special function outputs
 - 8 auxiliary outputs
- Field I/O
 - All input and output functions shall be individually assignable by the user
- Detection
 - 128 local detectors
 - 32 system detectors
 - Phase assignments configurable per detector
 - Each detector shall support all NTCIP detector options including count, call, and

- extension
 - Delay and extend
 - Volume/occupancy configurable per detector
 - Detector failure monitoring (stuck on, stuck off, and erratic counts) configurable by time-of-day (TOD)
- Communications
 - NTCIP compliant communications over Serial and Ethernet
 - AB2318E compliant communications over Serial and Ethernet
 - Database upload/download, firmware upgrades, and log retrieval shall be supported using USB drives
- Preemption
 - 8 preemption sequences
 - Each sequence can be configured for railroad or emergency vehicle
 - Definable priority and “linking” of sequences
 - Flash, limited service
 - Configurable preempt entry times for minimum green and pedestrian walk
- Overlaps
 - 16 vehicle overlaps
 - 16 pedestrian overlaps
 - Negative vehicle and pedestrian phases (excluded phase and peds)
 - Flashing yellow arrow (PPLT)
- Time of Day Scheduler
 - The software shall support a minimum of 64 schedules, 64 day plans, and 128 actions. Each day plan shall support a minimum of 48 events and a unique action may be assigned to each event. The coordination pattern, special function outputs, auxiliary outputs, detector reset, detector log, speed trap log, and cycle MOE log shall be selectable by any of the 128 actions.
- Logs
 - NTCIP Global Reporting conformance group for user defined event logging
 - Extensive event log for management and diagnostic purposes
 - Ability to enable/ disable detector VOS, speed trap and cycle MOE logs via time of day scheduler
 - Ability to view and clear logs via front panel menus
 - Cycle-based measures of effectiveness
 - Programmed split
 - Actual split
 - Reason for termination
 - Pedestrian served
 - Detector volume, occupancy and speed
 - Dual detector speed traps
- Logic Gates:
 - 64 user configurable logic gates for performing logic operations on controller inputs and outputs
 - Each gate has up to 4 inputs

- All input and output functions can be mapped as logic gate inputs and outputs
- Each logic gate input and output can be configured with delay time, extension time, and inversion
- Logic gate types include And, Or, and Nor
- Logic gate output modes include Normal, Latch, One Shot, and Flash
- Database Management:
 - Database validity shall be verified using CRC check
 - Range checks shall be performed to verify that parameters are within specified range limits
 - Consistency checks shall be performed across parameter sets including phase configuration, timing and coordination
 - Database transactions shall be utilized via NTCIP and the front panel menus to ensure database validity
 - All parameter sets shall be selectable by pattern, including phase timing, phase options, vehicle detectors, pedestrian detectors, and detector diagnostics.
 - Ability to clear and reinitialize database to defaults via front panel menus
 - Ability to copy or clear selected data within the database via the front panel menus
- PC based software shall be available for remote database management and timing upload/download. This software shall be furnished under this item.
- Software must communicate to QuicNet Pro or Transparency

Construction Methods:

In accordance with the requirements of this specification, the Contractor shall be responsible for the furnishing, testing, documentation, training, and installation of the local control software. The software, when installed on the field controller and integrated into the proposed fiber optic communication system, shall be compatible with and support full functionality of the Advanced Traffic Management System specified elsewhere in these specifications.

Installation Requirements:

Prior to commencing any work specified, the Contractor should be required to submit to the Engineer for approval, a detailed work scheme outlining his proposed method of replacing the existing controllers with proposed ones. The outline shall include the Contractor's proposed work sequence and schedule for each specific intersection included under the contract. The manufacturer shall prepare and submit test procedures.

Documentation Requirements:

One (1) complete set of operation manuals describing the detailed functions of the local control software shall be delivered to the Engineer.

Testing Requirements:

The Contractor shall program and test each controller utilizing programming and timing provided by the City of Bridgeport. After verifying the operation of the controller for the specific intersection, it shall be operated for a 24-hour period in the contractors' facility. Once installed in the field it shall be tested according to Article 10.00.10.

Guarantee:

The guarantee for the equipment under this item shall be provided to the City prior to the start of 30-day test. The Contractor shall secure from the manufacturer guarantee for the equipment for a period of two (2) years, which time shall commence from the date of cabinet and controller acceptance date. If a unit is found to be defective during this 2-year period, it will be the responsibility of the manufacturer and/or representative to assume the cost of shipping the controller to and from the factory, supplying parts and making repairs at no cost to the City of Bridgeport. During this period the contractor shall provide a controller of the same type to make the intersection operational per traffic signal timing plan.

Method of Measurement: This work will be measured for payment by the number of each Model 2070ATC completed, operating, and accepted in place.

Basis of Payment: Advanced Transportation Controller, Model 2070ATC will be paid for at the contract unit price each for “Advanced Transportation Controller, Model 2070ATC”, which price shall include controller, controller cabinet, modules, assemblies, necessary fittings for mounting, miscellaneous fittings, auxiliary equipment, and all materials, equipment, tools, and labor incidental thereto.

Pay Item

Advanced Transportation Controller, Model 2070

Unit

EA

ITEM #1108660A - ETHERNET SWITCH

This item to be used only at Intersection #15-294 – James Street at Lyon Terrace – Bridgeport - Project 173-404

Description:

Ethernet Switch with Single fiber optic ports shall consist of furnishing, installing, and testing a new Ethernet Switch (ES) with fiber optic interfaces, as well as all needed accessories required for a full and complete installation, including but not limited to power adapters, Ethernet cables, and fiber optic patch cords, color coding cables and cords as described herein. The Contractor shall install Ethernet Switches at the locations shown in the plans.

Local Intersections:

The contractor shall install ES at the intersections in accordance with the following specifications and as shown on the plans. The Local Intersection Ethernet Switch shall have two (2) ports are 10/100/1000 configurable for copper or fiber media for use with multimode or single mode optical fiber or SFP's modules. The SFP's are optically (100/1000 Base-FX). The ES shall have sixteen (16) RJ-45 10/100TX Ethernet ports. All fiber optic ports shall be furnished and installed with SFP modules that have transmit and receive wavelengths of 1310nm, a minimum optical loss budget of 16 dbm with 2 fiber LC connection, (i.e., SFP-6). Ethernet Switches at local intersections shall be furnished with the required software for monitoring and updating compatible with the existing City of Bridgeport switch.

The Ethernet Switch shall meet the following minimum requirements:

- The ES shall be installed within the field cabinets as shown on the plans.
- The ES shall be environmentally hardened managed Ethernet switch
- The ES shall accept both RJ-45 Ethernet connections as well as fiber optic connections.
- The ES shall be din rail mounted with supplied hardware.
- The ES shall be a self-contained unit capable of 24-hour per day unattended operation.
- The ES shall be supplied, assembled and tested by the contractor. Test results shall be provided to the Engineer prior to the installation of ES in the cabinet.
- The ES shall be of rugged design and suitable for reliable operation when mounted in the configuration as specified in these Specifications and the Plans.
- The ES shall be configured for minimum maintenance and need for adjustment after initial set-up.
- The ES shall be configured for CCTV cameras, controller, MMU, Switch management, and video detection cameras on a separate V-LAN.
- The ES shall be configured for Auto Fail-Over.
- The ES shall be equipped with an external power supply that meets the NEMA TS2 requirements. Power input shall be 90 to 296 VAC, the output shall be 12 to 48 VDC.
- The ES shall include all software required for monitoring and updating the ES from a computer within the Traffic Operation Center in City Hall.
- The ES shall support Minimum of 8192 Media Access Control (MAC) addresses

- The ES shall support Port Mirroring
- The ES shall support MAC Based Port Trunking (up to 4 groups of 4 trunk members per group)
- The ES shall support Non-blocking, store and forward Switching
- The ES shall be configured for supporting video, controller, MMU, Switch management on separate V-LANs.
- The ES shall be configured for auto fail over using STA and RSTA.
- The ES shall support X ring II, dual homing, couple ring and multiple ring topology. Provide redundant backup feature and recovery time below 10 milliseconds. Multiple ring can be configured for up to 250 switches.
- The ES shall support full wire speed forwarding rate as follow:
 1. 14,880 pps @ 10 Mbps
 2. 148,800 pps for 100 Mbps
 3. 1,488,000 pps for 1000 Mbps

The ES shall support the following protocols:

- Institute of Electrical and Electronic Engineers (IEEE) 802.3 10 Megabit Ethernet
- IEEE 802.3u 100 Megabit Ethernet
- IEEE 801.3z 1000 Megabit Ethernet
- IEEE 802.3x Flow Control
- IEEE 802.1Q Virtual Local Area Network (VLAN) Tagging
- IEEE 802.1D Spanning Tree Algorithm
- IEEE 802.1w Rapid Spanning Tree Algorithm
- IP Multicast Filtering through Internet Group Management Protocol (IGMP snooping per RFC 2236) V1 &V2
- IEEE802.1p Class of Service
- IEEE802.1q VLAN Tag
- IEEE802.1x User Authentication (Radius)
- IEEE802.1ab LLDP
- IEEE 802.1p Quality of Service (QOS)

The ES shall support the following Port Configuration Specifications:

The ES shall have sixteen 10/100 T/TX RJ45 ports meeting the following requirements:

- RJ-45 female connector
- Automatic and user-selectable speed setting (10/100 mbps)
- Automatic and user-selectable half/full duplex setting
- Rate Controlled 2Mbps to 100Mbps @ 0.5 Mbps Increments
- Drives up to 100 meters of Category 3, 4, 5unshielded twisted-pair (UTP) cable at 10 Mbps
- Drives up to 100 meters of Category 5, 5e or 6 UTP cable at 100 Mbps

The Local Intersection ES shall have two (2) combo ports either 10/100/1000TX or single mode “100/1000 FX” fiber optic ports that accept small form pluggable optics or SFP’s meeting the following requirements:

- Nominal Transmit and Receive wavelength 1310 nm.
- LC type fiber optic connectors per port
- 16 dB minimum optical budget when connected to identical ES from the same manufacturer.

The ES shall support DMI, Support administrator to monitor the transceiver’s status by ports and set up the action when detecting the exceptional value

The ES shall support IPv6.

Support dual stack for IPv4 and IPv6 Support Plug and Play function IPv6 Logo Committee certified Perform with following RFCs:

- RFC 2460 – IPv6 Specification
- RFC 4861 – Neighbor Discovery for IPv6
- RFC 4862 – IPv6 Stateless Address Autoconfiguration
- RFC 1981 – Path MTU Discovery for IPv6

The ES shall support the following Security features:

- SSH/SSL (128-bit encryption):

Support Secure Sockets Layer to protect the data access from WEB browser, compliant with SSL V2, V3 and TLS V1.0; Support Security Shell for Telnet and compliant with SSH-V2 Perform with RFC 4252, RFC 4253 and RFC 4254

- Port Security: MAC address entries/filter

- IP Security: IP address security management to prevent unauthorized intruder

- Login Security: IEEE802.1X/RADIUS

Additional Requirements:

The ES shall provide the following Management capabilities:

- Front Panel LED indicators for port status and activity on each port
- Console port, RS232, for local management
- Hyper Text Transport Protocol (HTTP)/Web Browser device configuration interface
- HTTP interface may be disabled by management
- Telnet device configuration interface
- Telnet interface may be disabled by management
- Allow multiple simultaneous management sessions or automatically terminate existing session when a new session is requested
- Simple Network Management Protocol (SNMP) version v1, v2c, v3; Web/Telnet/CLI Management
- Remote Monitoring (RMON) network monitoring

- Trivial File Transfer Protocol (TFTP) remote firmware upgrades
- SNMP MIB Management Information Base (MIB) files RFC 1215 Trap, RFC 1213 MIBII, RFC 1157 SNMP MIB, RFC 1493 Bridge MIB, RFC 2674 VLAN MIB, RFC 1643, RFC 1757, RSTP MIB, Private MIB VLAN, & LLDP MIB

The ES shall be certified to the following regulatory standards:

- Product Safety: Underwriters Laboratories (UL) , cUL, CE/EN60950-1, Class 1 Division 2, Groups A,B,C,D, UL 508 Class 1 Division 2
- Electromagnetic Emissions: FCC Class A, CE EN61000-4-2 (ESD), CE EN61000-4-3 (RS), CE EN61000-4-4 (EFT), CE EN61000-4-5 (Surge), CE EN55022, CE EN61000-4-6 (CS), CE EN61000-4-8, CE EN61000-6-2, CE EN61000-6-4 IETF RFC
- Environmental: NEMA TS-1/TS-2

The ES shall meet the following Mechanical standard:

- The ES shall be a Metal case. IP-30, maximum dimensions shall be: 72mm (W) × 105mm (D) × 152mm (H) or 2.84” (W) × 4.13” (D) × 5.98” (H)
- All external screws, nuts and locking washers shall be stainless steel; no self-tapping screws will be used. All parts shall be made of corrosion resistant material, such as plastic, stainless steel, anodized aluminum or brass.

The ES shall be designed to operate with the following power requirements:

- 90-264VAC
- 50/60Hz
- External NEMA rated power supply
- 11 W maximum power consumption

The ES shall be designed to operate in the following environmental conditions:

- -40°C to 74°C operating temperature range
- -40°C to 85°C storage temperature range
- 10% to 95% relative humidity (non-condensing)

The Contractor shall supply, install, and test all Ethernet cables required to make all connections as shown in the Plans. All electronic components shall be new and of the latest technology being provided.

Warranty:

The ES shall be guaranteed free of design and manufacturing defects by the original equipment manufacturer for life. All warranties provided by the manufacturer shall be passed to the City of Bridgeport and shall be in force for life time.

Method of Measurement:

“ETHERNET SWITCH” shall be measured for payment by the unit “EACH” for the amount actually installed complete in place and accepted.

Basis of Payment:

“ETHERNET SWITCH” shall be paid for at the contract unit price bid per “EACH”, which price shall include furnishing, installing, connecting, configuring and testing the fiber optic switch. The price shall also include furnishing all labor, tools, materials, cabling, patch cords, documentation, equipment, storage, transportation and other incidentals necessary to complete the work.

Pay Item

Ethernet Switch

Unit

EA

ITEM #1108724A - PHASE SELECTOR

ITEM #1112410A - DETECTOR (TYPE A)

ITEM #1112470A - PRE-EMPTION SYSTEM CHASSIS

ITEM #1113550A - DETECTOR CABLE (OPTICAL)

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 activated at a minimum distance of 548.6M (1,800 feet) along an unobstructed "line of sight" path. The control shall not terminate until the vehicle is within 12.2M (40 feet) of the detector or at the intersection.

The system shall consist of the following components:

- A. Vehicle Emitter which shall be mounted on the emergency vehicle and shall transmit optical energy signals only in the forward direction. If the municipality presently uses optical pre-emption, the emitters shall be of the same manufacture currently used by the Town.
- B. Phase Selector (minimum 2 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 shall house two phase selectors.
- C. Optical Detector which shall be mounted on or near a traffic signal and shall receive the optical energy signals generated by the Vehicle Emitter.
 - 1. Detector (Type A), 1 Direction, 1 Channel
 - 2. Detector (Type B), 2 Direction, 1 Channel
 - 3. Detector (Type C), 2 Direction, 2 Channel
- D. Detector Cable (Optical).

System Operation:

- A. The operating sequence shall be initiated when the optical detector receives the required optical energy signal from the 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. Vehicle Emitter:

The emitter assembly consists of an emitter and power supply and an emitter control switch assembly. The emitter assembly is mounted on a vehicle and produces a flashing optical signal when in operation.

1. Shall operate on ten to fifteen volts DC input voltage, but shall not be damaged by input voltage surges up to twenty-five volts DC.
2. Shall be controlled by a single on/off switch that requires no other adjustments by the operator. The on/off condition shall be indicated by a light located adjacent to the switch.
3. Shall be automatically disabled or de-activated by one or a combination of the following: seat switch, emergency brake switch, door switch, transmission safety switch.
4. Shall operate over an ambient temperature range of minus 34⁰ C to plus 60⁰ C. (minus 30⁰ F. to plus 140⁰ F.)
5. Shall operate in 0 to 95 % humidity.
6. Shall be a pulsed optical energy source with a controlled repetition rate.
7. Shall not generate voltage transients on the battery input line which exceed battery voltage by more than four volts.
8. Shall produce optical energy in a cone of not more than 90 degrees horizontal and not more than 30 degrees vertical. The detectors and/or phase selector shall not sense a pre-emption signal from an emitter outside this cone.

B. 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 34⁰ C to plus 60⁰ C. (minus 30⁰ F. to plus 140⁰ F.)
3. Shall have internal circuitry potted in a semi-flexible compound to ensure moisture resistance.
4. Shall operate in 0 to 95 % 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.

C. Phase Selector:

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 activating the pre-empt input to the controller.

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 minimum 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 12M (40 feet) to 548M (1800 feet).
4. Shall have solid state indicator lights for power on and channel called.
5. Shall operate over an ambient temperature range of minus 34⁰ C to plus 60⁰ C (minus 30⁰ F. to plus 140⁰ F.)
6. Shall operate in 0 to 95 % humidity.

D. Detector Cable (Optical):

ITEM #1108724A, 1112410A,
1112470A, 1113550A

1. 3-Conductor cable with shield and ground wire.
2. AWG #20 (7x28) stranded.
3. Individually tinned copper strands.
4. Conductor insulation: 600 volt , 75 deg. C (167^o F.).
5. 1 Conductor-yellow; 1 Conductor-blue; 1 Conductor-orange.
6. Aluminized mylar shield tape or equivalent.
7. AWG #20 (7x28) stranded uninsulated drain wire
8. DC resistance not to exceed 11.0 ohms per 305M(1000 feet).
9. Capacitance from one conductor to other two conductors and shield not to exceed 157pf/M (48 pf./ft.).
10. Jacket: 600 volts, 80 deg. C (176^o F.), minimum average wall thickness - 1.14mm (.045").
11. Finished O.D.: 7.62mm (0.3") 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 Contractor shall secure from the manufacturer a guarantee for the equipment for a period of sixty (60) months, which time shall commence from the date of delivery. 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 pre-emption 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 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 contractor 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 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 that 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 548.6M (1800 feet).
 - * 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, Phase Selectors, System Chassis will be measured for payment by the number of each supplied, installed and accepted. Detector Cable (Optical) will be measured by the number of meters (linear feet) supplied, installed and accepted. Vehicle Emitters will be measured by the number of each supplied to the Town and accepted.

Basis of Payment:

Payment for Optical Detectors, Phase Selector, System Chassis and Detector Cable (Optical) 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. Payment for Vehicle Emitters will include the item unit cost only.

| <u>Pay Items</u> | <u>Pay Units</u> |
|----------------------------|------------------|
| Vehicle Emitter | Ea. |
| Detector (TYPE) | Ea. |
| Phase Selector | Ea. |
| Detector Cable (Optical) | M.(L.F.) |
| Pre-emption System Chassis | Ea. |

ITEM #1108723A - VEHICLE EMITTER (MODIFIED)

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 1,800 feet (548.6m) 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. Vehicle Emitter (3M model 596S) which shall be mounted on the emergency vehicle and shall transmit optical energy signals only in the forward direction.
- B. Phase Selector {3M model 752 (2 channel) or model 754 (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 (3M model 760) shall house one phase selector.
- C. 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 (3M model 511)

- D. Detector Cable (Optical) (3M model 138)

System Operation:

- A. The operating sequence shall be initiated when the Optical Detector receives the required optical energy signal from the 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. Vehicle Emitter:

The emitter assembly consists of an emitter and power supply and an emitter control switch assembly. The emitter assembly is mounted on a vehicle and produces a flashing optical signal when in operation.

1. Shall operate on ten to fifteen volts DC input voltage, but shall not be damaged by input voltage surges up to twenty-five volts DC.
2. Shall be controlled by a single on/off switch that requires no other adjustments by the operator. The on/off condition shall be indicated by a light located adjacent to the switch.
3. Shall be automatically disabled or de-activated by one or a combination of the following: seat switch, emergency brake switch, door switch, transmission safety switch.
4. Shall operate over an ambient temperature range of minus 30⁰ F. to plus 140⁰ F. (minus 34⁰ C to plus 60⁰ C.)
5. Shall operate in 0 to 95 % humidity.
6. Shall be a pulsed optical energy source with a controlled repetition rate and an adjustable intensity.
7. Shall not generate voltage transients on the battery input line which exceed battery voltage by more than four volts.
8. Shall produce optical energy in a cone of not more than 90 degrees horizontal and not more than 30 degrees vertical. The detectors and/or phase selector shall not sense a pre-emption signal from an emitter outside this cone.

B. 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 30⁰ F. to plus 140⁰ F. (minus 34⁰ C to plus 60⁰ C.)
3. Shall have internal circuitry potted in a semi-flexible compound to ensure moisture resistance.
4. Shall operate in 0 to 95 % 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.

C. 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 1800 feet (548m).
4. Shall have solid state indicator lights for power on and channel called.
5. Shall operate over an ambient temperature range of minus 30⁰ F. to plus 140⁰ F. (minus 34⁰ C to plus 60⁰ C)
6. Shall operate in 0 to 95 % humidity.

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, 167⁰ 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, 176⁰ 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 one year after installation. 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 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 1800 FT. (548.6m).
 - * 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, Phase Selectors, System Chassis will be measured for payment by the number of each supplied, installed and accepted. Detector Cable (Optical) will be measured by the number of linear feet (meters) supplied, installed and accepted. Vehicle Emitters will be measured by the number of each supplied to the Town and accepted.

Basis of Payment:

Payment for Optical Detectors, Phase Selector, System Chassis and Detector Cable (Optical) 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. Payment for Vehicle Emitters will include the item unit cost only.

| Pay Items ===== | Pay Units ===== |
|----------------------------|--------------------|
| Vehicle Emitter | Ea. |
| Detector (TYPE A) | Ea. |
| Phase Selector | Ea. |
| Detector Cable (Optical) | L.F. (m) |
| Pre-Emption System Chassis | Ea. |

ITEM #1111401A - LOOP VEHICLE DETECTOR

ITEM #1111451A - LOOP DETECTOR SAWCUT

Replace Section 11.11, LOOP VEHICLE DETECTOR AND SAWCUT, with the following:

11.11.01 – Description:

1. Furnish and install a loop vehicle detector amplifier.
2. Sawcut pavement. Furnish and install loop detector wire in sawcut.

11.11.02 – Materials:

Article M.16.12

M.16.12 - LOOP VEHICLE DETECTOR AND SAWCUT

1. Loop Vehicle Detector:

- Comply with National Electrical Manufacturers Association (NEMA) standards, Section 6.5, Inductive Loop Detectors.
- Comply with the current CT DOT Functional Specifications for Traffic Control Equipment, Section 3 B, Loop Vehicle Detector With Delay/Extend Option.

2. Sawcut:

(a) Wire in sawcut:

- International Municipal Signal Association (IMSA) Specification 51-7, single conductor cross-linked polyethylene insulation inside polyethylene tube.
- # 14 AWG

(b) Sealant:

(1) Polyester Resin Compound

- Two part polyester which to cure, requires a liquid hardener.
- Use of a respirator not necessary when applied in an open air environment.
- Cure time dependent on amount of hardener mixed.
- Flow characteristics to guarantee encapsulation of loop wires.
- Viscosity: 4000 CPS to 7000 CPS at 77 degrees Fahrenheit (25° C).
- Form a tack-free skin within 25 minutes and full-cure within 60 minutes at 77 degrees Fahrenheit (25° C).
- When cured, resist effects of weather, vehicular abrasion, motor oil, gasoline, antifreeze, brake fluid, de-icing chemicals, salt, acid, hydrocarbons, and normal roadway encounters.
- When cured, maintain physical characteristics throughout the ambient temperature ranges experienced within the State of Connecticut.
- When cured, bonds (adheres) to all types of road surfaces.
- Weight per Gallon (3.8 l): 11 lbs ±1 lb (5kg ± .45kg)

- Show no visible signs of shrinkage after curing.
- 12 month shelf life of unopened containers when stored under manufacturers specified conditions.
- Cured testing requirements:
 - Gel time at 77 degrees F (25° C): 15 - 20 minutes, ASTM C881, D-2471
 - Shore D Hardness at 24 hours: 55-78, ASTM D-2240
 - Tensile Strength: > 1000 psi (6895 kPa), ASTM D-638
 - Elongation: 18 - 20 %, ASTM D-638
 - Adhesion to steel: 700 - 900 psi (4826 - 6205 kPa), ASTM D-3163
 - Absorption of water, sodium chloride, oil, and gasoline: < 0.2%, ASTM D-570
- Include in the Certificate of Compliance:
 - Manufacturer's confirmation of the uncured and cured physical properties stated above.
 - Material Safety Data Sheet (MSDS) stating sealant may be applied without a respirator in an open air environment.
- Designed to allow clean-up without the use of solvent that is harmful to the workers and the environment.

(2) Elastomeric Urethane Compound:

- One part urethane which to cure, does not require a reactor initiator, or a source of thermal energy prior to or during its installation.
- Use of a respirator not necessary when applied in an open air environment.
- Cure only in the presence of moisture.
- Flow characteristics to guarantee encapsulation of loop wires.
- Viscosity such that it does not run out of the sawcut in sloped pavement during installation; 5000 CPS to 85,000 CPS.
- Form a tack-free skin within 24 hours and 0.125 inch (0.33mm) cure within 30 hours at 75 degrees Fahrenheit (24° C).
- When cured, resist effects of weather, vehicular abrasion, motor oil, gasoline, antifreeze, brake fluid, de-icing chemicals, salt, acid, hydrocarbons, and normal roadway encounters.
- When cured, maintain physical characteristics throughout the ambient temperature ranges experienced within the State of Connecticut.
- Show no visible signs of shrinkage after curing.
- Shelf life when stored under manufacturers specified conditions:
 - Caulk type cartridges: minimum 9 months
 - Five gallon containers: minimum 12 months
- Designed for application when the pavement surface temperature is between 40 and 100 degrees Fahrenheit (4° and 38° C).
- Uncured testing requirements:
 - Weight/Gallon: ASTM D-1875
 - Determination of Non-volatile Content: ASTM D-2834
 - Viscosity: ASTM D-1048B
 - Tack-free Time: ASTM D-1640
- Cured testing requirements:
 - Hardness: ASTM D-2240
 - Tensile Strength & Elongation: ASTM D-412A
- Include in the Certificate of Compliance:
 - Manufacturer's confirmation of the uncured and cured physical properties stated above.
 - Material Safety Data Sheet (MSDS) stating sealant may be applied without a respirator in an open air environment.

- Designed to allow clean-up without the use of solvent that is harmful to the workers and the environment.

3. Miscellaneous:

- (a) Liquidtight Flexible Nonmetallic Conduit
 - UL listed for direct burial
 - UL 1660
 - Smooth polyvinyl chloride inner surface
- (b) Water Resistant Pressure Type Wire Connector
 - UL listed for direct burial and wet locations
 - UL 486D

11.11.03 - Construction methods:

1. Loop Vehicle Detector

- Shelf-mount the detector amplifier in the controller cabinet.
- Terminate the harness conductors with crimped spade connectors. Connect conductors to appropriate terminals, eg, black wire to 110vac, white wire to 110vac neutral.
- Tie loop harness and conductors to controller cabinet wiring harness. Leave enough slack in loop harness so that amplifier may be moved around on cabinet shelf; ± 2 feet (0.6 meter) slack.
- Attach a loop identification tag to the harness. Record pertinent detector information on the tag with indelible ink. See example below.
 - Loop No.: *D4*
 - Phase Call: *Phase 4*
 - Field Location: *Rt. 411(West St.)*
 - *Eastbound, Left Lane*
 - Detector No.: *4*
 - Cabinet Terminals: *234, 235*

2. Loop Detector Sawcut

- Loop size, number of turns, and location is shown on the intersection plan.
- Do not cut through a patched trench, damaged or poor quality pavement without the approval of the Engineer.
- Wet-cut pavement with a power saw using a diamond blade $\frac{3}{8}$ inch (9.5mm) wide. Dry-cut is not allowed.
- Ensure slot depth is between 1 $\frac{3}{4}$ inch to 2.0 inch (45mm to 50mm).
- Overlap corners to ensure full depth of cut.
- To prevent wire kinking and insulation damage, chamfer inside of corners that are ≤ 120 degrees.
- Clean all cutting residue and moisture from slot with oil-free compressed air. Ensure slot is dry before inserting wire and sealing sawcut.
- Cut home-run, from loop to curb or edge-of-road, as shown on the typical installation sheet.
- To prevent cross-talk and minimize electrical interference, twist home-run wires, from edge of road to handhole, with at least 5 turns per foot (16 turns per meter). Tape together twisted home-run wires at 2 foot (0.6 meter) \pm intervals.
- In new or resurfaced pavement, install loops in the wearing course. If the wearing course is not scheduled for immediate placement (within 24 hours) after the base course, provide temporary detection when directed by the Engineer. Temporary detection may be sawcut

loops, preformed loops, microwave sensor, video, or other method approved by the Engineer.

- Splice(s) not allowed anywhere in loop wire either in loop or in home-run.
- Ensure wires are held in place at bottom of slot by inserting at 2 foot (0.6 m) intervals, 1 inch sections of foam backer rod or wedges formed from 1 inch (25mm) sections of the polyethylene tubing. Loop detectors with wires that have floated to the top of the sealant will not be accepted.
- To create a uniform magnetic field in the detection zone, wind adjacent loops in opposite directions.
- Use **polyester compound** as the sealant unless another type is allowed by the Engineer.
- Mix hardening agent into polyester resin with a power mixer or in an application machine designed for this type of sealant in accordance with the manufacturer's instructions.
- Apply the loop sealant in accordance with the manufacturer's instructions and the typical installation sheet. Do not apply sealant when pavement temperature is outside the manufacturers recommended application range.
- Solder splice the loop wires to the lead-in cable and install water resistant connector as shown on the typical installation sheet.
- Test the loop circuit resistance, inductance, and amplifier power-interruption as shown on the typical installation sheet. Document all test results.

3. Damaged, Patched, or Excessively Worn Pavement

- Where the existing pavement is damaged, patched or excessively worn and is found to be not suitable for reliable loop detection, notify the Engineer.
- When directed by the Engineer, remove and replace an area of pavement to allow the proper installation of the loop.
- Remove a minimum of 3 inches (75mm) depth.
- Comply with the applicable construction methods of Section 2.02 Roadway Excavation, Formation Of Embankment and Disposal of Surplus Material, and Section 4.06 Bituminous Concrete, such as:
 - Cut Bituminous Concrete
 - Material for Tack Coat
 - Bituminous Concrete Class 1

4. Re-surface/Overlay Project

- Prior to disconnecting the existing loop confirm that the amplifier is operating properly and is programmed according to plan. Document loop operation. Report any discrepancies and malfunctions to Engineer.
- Remove all abandoned sawcut home-run wire from handhole.
- Sawcut new loop according to plan.
- Solder splice new loop wires to the existing lead-in cable and install new water resistant twist connectors as shown on the typical installation sheet. Do not re-use the removed connectors.
- Test the loop circuit resistance and inductance. Document results.
- Ensure the existing loop amplifier has re-tuned to the new loop and is operating according to plan.

11.11.04 – Method of Measurement:

1. Loop Vehicle Detector is measured by the number of installed, operating, tested, and accepted vehicle detector amplifiers of the type specified.
2. Loop Detector Sawcut is measured by the number of linear feet (meters) of installed, tested, operating, and accepted sawcut only where there is loop wire. Over-cuts at corners that do not contain wire are not measured.

11.11.05 – Basis of Payment:

1. Loop Vehicle Detector is paid at the contract unit price each of the type specified.
2. Loop Detector Sawcut is paid at the contract unit price per linear foot (meter). The price includes sawcut, loop wire, sealant, liquidtight flexible nonmetallic conduit, duct seal, water resistant splice connectors, testing, incidental material, equipment, and labor.

| <u>Pay Item</u> | <u>Pay Unit</u> |
|-----------------------|-----------------|
| Loop Vehicle Detector | ea. (ea.) |
| Loop Detector Sawcut | l.f. (m) |

ITEM #1111407A - CAMERA VIDEO DETECTION SYSTEM

THIS ITEM TO BE USED ONLY FOR INTERSECTION #15-294 –JAMES STREET AT LYON TERRACE- BRIDGEPORT – PROJECT 173-404

Description: This item shall consist of furnishing and installing Camera Video Detection System equipment, including the number of camera assemblies called for on each plan, at each of the project installations as called for on the plans. These items shall also consist of furnishing and installing all equipment to support the existing City of Bridgeport data collection management software. Camera Video Detection System shall be Autoscope Encore System and the camera shall be Autoscope Encore MVP Sensor manufactured by Econolite.

This specification sets the minimum requirements for a wide-area vehicle detection system that processes video images for vehicle presence, count, speed, and other typical traffic parameters. The detection of vehicles passing through the field of view of an image sensor shall be available to a large variety of end user applications as simple contact closure outputs, data for a traffic controller, and other traffic data. This reflects the current real time detector or alarm states (on/off) or as summary traffic statistics that are reported locally or remotely. The contact closure outputs shall be provided to a traffic signal controller and comply to the NEMA (National Electrical Manufacturers Association) type C or D detector rack or a Type 170/2070 input file rack standards. The system architecture shall fully support networking of system components through a variety of industry standard and commercially available infrastructure that are used in the traffic industry. The serial data communications shall support direct connect, modem, and multi-drop interconnects.

The system shall be integrated through a client-server relationship. A communications server application shall provide the data communications interface between as few as one to as many as hundreds of Video Camera processor sensors using the industry standard TCP/IP network protocol. Communications protocol for the proposed machine vision system must be compatible with the existing machine vision system infrastructure to support current data collection processes.

Materials: All materials furnished, assembled, fabricated, or installed shall be new, corrosion resistant, and in strict accordance with the details shown in the plans and in the Special Provisions. All equipment furnished under this item shall be current production equipment, identical models of which are field operational.

Functional Requirements: The CAMERA VIDEO DETECTION SYSTEM shall consist of the following components

- Communication Interface Panel (CIP)
- Traffic Data Collection
- Cabinet Interface Module
- Video Detection System Software
- Camera Risers

- Video Camera
- Video Camera Processor including camera and enclosure
- Video Camera Cable

All Video Camera Processors and components shall be of the same type and from the same manufacturer. The Video Camera image sensor shall communicate with the cabinet interface module via the communications interface panel. The Video Camera shall be connected from the field to the communications interface panel using the camera cable. The Video Camera image sensor shall communicate to the communications interface panel, cabinet interface module and various PC applications using the industry-standard TCP/IP network protocol. Additionally, one or more PCs shall be capable of communicating directly or remotely to a Video Camera sensor network where each Video Camera image sensor has a unique Internet Protocol (IP) address. The Video Camera sensor network shall support communications over a mix of media, including PSTN, CDPD, CDMA, dedicated twisted-pair, fiber, and wireless.

The communications interface panel shall support up to eight Video Cameras processors. The communication interface panel in the cabinet shall provide electrical termination for the Video Camera sensor. The communication interface panel shall provide transient protection to electrically protect equipment in the cabinet. The communications interface panel will provide for supervisory connectivity via a RJ-45 Ethernet Port. The use of Serial to Ethernet converters will not be acceptable. The communications interface panel consists of a predefined wire termination blocks for Video Camera Broadband Over Power (BOP) communications, electrical surge protectors to isolate the modular cabinet interface unit and Video Camera, and an interface connector to cable directly to the modular cabinet interface unit. The connection from the Video Camera(s) to the communications interface panel shall be via the manufacturers supplied cable with factory molded connector to sensor. Splices between the Video Camera and the communications interface panel shall not be allowed. The interface panel shall provide power for one to eight Video Camera(s), taking local line voltage and coupling it with Ethernet protocol communications for the Broadband Over Power termination at about 15 watts.

The cabinet interface module shall communicate directly with up to eight (8) Video Camera image sensors and shall comply with the form factor and electrical characteristics of a NEMA type C or D detector rack or a 170/2070 input file detector rack card. For a contact closure interface to a traffic controller or other device, this interface shall accept sixteen (16) contact closure inputs (usually red and green control signals), and provide twenty-four (24) contact closure outputs to a traffic signal controller. For a SDLC interface to a NEMA TS2 traffic controller, this interface shall provide thirty-two (32) TS2 inputs for phase/load switch status, sixty-four (64) TS2 detector outputs and emulate up to four (4) bus interface units (BIU).

Video Camera Image Sensor and Processor including camera and enclosure: The Video Camera image sensor shall be an integrated imaging color CCD array with optics, high-speed, image processing hardware and a general purpose dual-core CPU bundled into a sealed enclosure. The CCD array shall be directly controlled by the CPU, thus providing high video quality for detection that has virtually no noise to degrade detection performance. It shall be possible for the user to zoom the lens, as required for operation. The Video Camera shall be able

to transmit MPEG-4 video streams to remote locations. This requirement is described further in the video outputs section. It shall provide a video compression co-processor so as not to interfere with detection performance while streaming video. The Video Camera shall provide direct real-time iris and shutter speed control. The Video Camera shall be equipped with an integrated auto zoom/auto focus lens that can be changed using computer software.

The Video Camera image sensor shall output MPEG-4 streaming video utilizing Broadband Over Power via a single RJ-45 Ethernet Port on the communications interface panel.

Real-time detector performance shall be observed by viewing the video output from the sensor with overlaid flashing detectors to indicate the current detection state (on/off). Real-time speeds and classifications shall also be visible through streaming video via the video player.

Video Outputs: The Video Camera image sensor shall provide MPEG-4 color video output from the interface panel for real-time display on a PC using an Ethernet cable from the communications interface panel or to a monitor over standard coax cable from the cabinet interface module. The software shall also display streaming video as part of the user software based on MPEG 4 video compression. The MPEG-4 video compression shall be accomplished internally through software. No external video encoders are allowed. The MPEG 4 video compression shall be able to be viewed for individual cameras simultaneously on a PC. The streaming video shall be recordable as a data file on the PC for later playback and editing. The Video Camera Processor including camera and enclosure shall meet the following requirements:

Lens:

- 10X continuous-focus lens
- Horizontal: 5 to 46 degrees
- Vertical: 3.8 to 34.8 degrees
- Focal Length: 0.16 in. to 1.65 in. (4mm to 42mm)

Imaging Device:

- CCD 1/4" in. diam. (4.5mm)

Video:

- Digital Streaming MPEG4 video output

Resolution:

- 470 TVL Horizontal

Effective Pixels:

- NTSC: 768(H) x 494(V) [380k]

Sensitivity - at Lens:

- Full video, AGC off, 1/60 sec, 2 lux (Color)

Signal to Noise Ratio:

- >50 dB

Communications:

- EasyLink Broadband (up to 5MB/Sec) w/ RJ45 connection from required Encore/Terra Interface Panel (TIP)

Housing & Sunshield:

- Image Sensor and Processor sealed in a waterproof and dust-tight NEMA-4 housing (IP67)
- Thermostatically controlled faceplate heater
- Weatherproof rear connector
- Adjustable weather and sunshield with drip guard

Power:

- 110/220 VAC 50/60 Hz
- 15W

Approximate Housing Enclosure Dimensions:

- 9.5" x 4.75" x 10.75" (24cm x 11cm x 27cm) (HxWxL) with Sunshield and Bracket

Approximate Weight:

- 3.7 lbs.

Ambient Temperature Operation Range Limits:

- -29°F to +140°F (-34°C to +60°C)

Humidity Operation Range Limits:

- Up to 100% relative humidity per MIL-E-5400T Paragraph 4.3.24.4

Communications Interface Panel (CIP): The communications interface panel shall provide power, high-voltage transient protection, mechanical strain relief and electrical connections to the Color Camera / Integrated Processor for communications and video. The communications interface panel shall also act as a terminal for Ethernet network communications. The communications interface panel shall contain an industry standard RJ-45 type connector for CAT-5 cable interface. A single communications interface panel shall provide for a termination of one to eight Video Cameras and a single 10/100 Base-T Ethernet network cable. The communications panel shall pass the detection information to the cabinet interface module.

The communications interface panel consists of a predefined wire termination block for Video Camera power, data and video connections, electrical surge protectors to isolate the modular cabinet interface unit and processor, and an interface connector to cable directly to the modular cabinet interface unit. In addition to the RJ-45 Ethernet port, the communications interface panel shall have at a minimum, a detector communications port, four sets of 3 compression terminals

to support up to eight video camera image processors, and a compression block for power connection.

The Communications Interface Panel (CIP) shall meet the following requirements:

General

- Auto-Sensing 10/100Base-T network interface with on-board RJ-45 connector
- Robust on-board IP Stack: TCP, UDP, DHCP, SNMP, SSL/TLS, HTTP, SMTP, ICMP, IGMP and ARP
- Secure web-based configuration (HTTP/HTTPS)
- Universal IP address assignment
- Configuration and management through SNMP (read/write)

Connectors

- Ethernet Connectivity Upstream:
 - RJ-45 Connector
- Local and Remote Supervisor Capability
 - Network Browser via Ethernet RJ-45
- Detector Communications Port
 - Single FireWire Female Connector
- Video processor Terminations
 - Four sets of 3 compression terminals
- Line Power
 - 3 Position Compression Block

Environmental

- -34°C to +74°C / -29°F to +165°F
- Up to 100% relative humidity per MIL-E-5400T per Paragraph 4.3.24.4

Cabinet Interface Module: The cabinet interface module shall provide the interface between the video processors and the traffic signal controller. The cabinet interface module shall also be referred to as the “Access Point” or the detector port master. The cabinet interface module shall be capable of supporting up to eight video processors/Cameras in a single cabinet. The cabinet interface module shall be a single card rack device that can slide easily into a detector rack or be connected as a stand-alone device using a housing with power connector. The cabinet interface module shall provide real-time detection information from the video processors to the traffic signal controller.

The cabinet interface module shall communicate directly with up to eight (8) Video Camera sensors and shall comply with the form factor and electrical characteristics of a NEMA type C or D detector rack or a 170/2070 input file detector rack card. The cabinet interface module shall be capable of emulating the functions of up to four Bus Interface Units (BIUs).

The cabinet interface module shall be capable of simultaneously providing NEMA TS 1 / 170/2070, and NEMA TS2 outputs to the traffic control cabinet.

The cabinet interface module shall meet the following requirements:

Environmental

- -34°C to +74°C / -29°F to +165°F
- 0 to 95% relative humidity

Outputs

- 24 optically-isolated NEMA TS1 outputs

Inputs

- 16 optically-isolated NEMA TS1 inputs to monitor signal controller phases or other conditions

Connectors

- Female I/O connector 44-socket metal shell D subminiature connector
- Female 15-pin metal shell D subminiature connector NEMA TS2 SDLC
- Cinch Jones 50-44A-30M edge connector
- BNC
- Two (2) USB for USB Mouse

Power

- 20 to 28 VDC, 100 milliamps, not exceeding 5 watts (Operates at 24 VDC as allowed in section 5.3.4.5 of the TS2 standard)

TS2 Capability

- 32 TS2 inputs for phase/load switch status
- 64 TS2 detector outputs
- Emulation of up to four (4) bus interface units (BIU).
- Fully comply with NEMA Publication Standard TS2-1998

Power

- 12 to 24 VDC, 100 not exceeding 11 watts .(Operates at 24VDC or at 12VDC as in section 5.3.4.5 of the TS2 standard)

Video Detection System Software: The Video Camera sensor's embedded firmware shall automatically perform a variety of diagnostic, installation, fault tolerant, and vehicle detection operations. Vehicle detection shall be reliable, consistent, and perform under all weather, lighting and traffic congestion conditions.

A software suite of client applications shall reside on the host client / server PC. The software suite shall support Microsoft Windows XP, NT, 2000 and later operating systems. Client applications shall include:

Network Browser:

Learn a network of connected modular cabinet interface units and video processors then show the topology in a logical hierarchical relationship.

Detector Editor:

Create and modify detector configurations to be executed on the Video Camera sensor.

Operation Log:

Extract the Video Camera processor run-time operation log of special events that have occurred.

Software Installer:

Reconfigure one or more Video Camera sensors with a newer release of embedded system software.

Video Player:

Play streaming color video from any or all sensors connected to network. Video player shall also have the ability to go in to a video wall option which will divide the PC screen in as many sensors that are opened giving the user optimal viewing. The video player shall also be able to record and play back any or all sensors being viewed.

Video Controller:

Control the zoom of the sensor it is controlling. Multiple sensors shall be able to be viewed or controlled at the same time. If multiple sensors are being viewed simultaneously, the video controller application shall allow the user to enlarge the screen in to a video wall option, which will split up the whole screen with the number of sensors being viewed.

Detection Types:

The Video Camera processor shall be able to be programmed with a variety of detector types that perform specific functions. The general functions performed by the detectors shall:

- Include presence/passage detection of moving and stopped vehicles.
- Enable detection based on the direction of travel or based on when a moving vehicle stops.
- Measuring vehicle speed and length and provide five (5) classes of vehicles based on length.
- Determine counts, either lane-by-lane or cumulative.
- Speed alarm detectors:
 - Output alarm on each fast vehicle, ignoring vehicles of length of less than the user defines.
 - Output alarm based on the average number of vehicles the user enters and the upper and lower speed thresholds that the user defines.
 - Output alarm based on the average speed over a user defined time frame.
 - Output alarm based on user-defined percent increase or decrease over a speed limit.

Detection Zone Programming: Placement of detection zones shall be by means of a supervisor computer (PC or laptop) operating in the Windows XP or later graphical environments, a keyboard, and a mouse. The monitor shall be able to show the detection zones superimposed on images of traffic scenes. It shall be possible to use a simple USB Mouse and

Monitor to perform the basic Detection Zone Programming in the absence of a supervisor computer locally at the traffic control cabinet.

The detection zones shall be created and/or edited by using a mouse to draw detection zones on the supervisor computer's VGA monitor. Using a mouse and the keyboard it shall be possible to place, size, and orient detection zones to provide optimal road coverage for vehicle detection. It shall be possible to download detector configurations from the supervisor computer to the Video Camera processor, to retrieve the detector configuration that is currently running in the video Camera processor, and to back up detector configurations by saving them to the supervisor computer's removable or fixed disks.

Traffic Data Collection: The Video Camera sensor shall optionally store cumulative traffic statistics, internally in non-volatile memory, for later retrieval and analysis. Video Camera sensor shall have at least 5 megabytes of memory for data storage. The following data types are available to be stored in time increments from a cycle to one-hour increments:

- Average Flow Rate
- Total Volume Count
- Arithmetic Mean Speed
- Vehicle Class Count
- Average Time Headway
- Average Time Occupancy
- Level of Service
- Space Mean Speed
- Space Density
- Density

The above data types shall also be available to be viewed real-time through a standard web browser compatible with the existing City of Bridgeport data collection and management service (DCMS). The manufacturer shall modify the existing City of Bridgeport web page interface and the GIS map to include all video detection sensors as part of this project.

This DCMS shall have the capability of polling an unlimited number of video detector sensors via the fiber optic Ethernet based communication interface. The DCMS shall then display the data real-time on the City of Bridgeport custom website. It shall be the responsibility of the manufacturer to make all necessary modifications to this website. The manufacturer shall also supply all necessary cables and hardware at the City of Bridgeport Traffic Operations Center to provide for a fully operational website displaying real-time data. In addition to displaying real-time data and color snapshots of the image sensor, the manufacturer shall archive all data for the agency to create custom data reports in Excel or HTML by simply accessing the website and filtering the dates and reporting parameters.

System Installation: The video detection system manufacturer factory certified representative shall be present during the installation, testing of the video detection system and computer equipment.

Warranty, Service and Support: The Contractor shall provide the warranty in writing to the City for review and approval prior to the start of the 30-day test. The Video Detection manufacturer shall be for a minimum of five (5) years, warrant the Video Detection System including all labor and software upgrades free of charge for duration of warranty period. The Warranty time shall commence from the date of cabinet and controller acceptance date by the City. If any unit of video camera system found to be defective during this 5-year period, it will be the responsibility of the manufacturer and/or representative to assume the cost of shipping the controller to and from the factory, supplying parts and making repairs at no cost to the City of Bridgeport. During this period the contractor shall provide a replacement of the same type to make the intersection operational per traffic signal timing plan.

Camera Riser: As called for on the plans, these camera risers to be mounted behind signal heads as shown on the plans and illustrated in the figure attached after this section. These camera risers shall be paid under this Item # 1111407A– CAMERA VIDEO DETECTION SYSTEM. The color of the Riser shall be **the same color as the Steel Mast Arm Assembly/Steel Span Pole assembly, BLACK, Federal Standard No. 27038.**

Camera Span Pole Bracket Assembly:

As called for on the plans, these camera span pole bracket assemblies shall be furnished by the video camera manufacturer to be mounted on the side of steel span poles as shown on the plans and illustrated in the figure attached after this section. These camera span pole brackets assemblies shall be paid under this Item # 1111407A– CAMERA VIDEO DETECTION SYSTEM. The color of the brackets shall be **the same color as the Steel Mast Arm Assembly/Steel Span Pole assembly, BLACK, Federal Standard No. 27038.**

Camera Extension Bracket:

As called for on the plans, these camera extension brackets to be mounted on steel span poles or mast arms as shown on the plans and illustrated in the figure attached after this section. These extension brackets shall be paid under this Item # 1111407A– CAMERA VIDEO DETECTION SYSTEM. The color of the Camera Extension bracket shall be **the same color as the Steel Mast Arm Assembly/Steel Span Pole assembly, BLACK, Federal Standard No. 27038.**

Method of Measurement: The CAMERA VIDEO DETECTION SYSTEM will be measured for payment as the number units furnished, installed, made fully operational and tested. Video Color Camera / Integrated video camera processor Cable will be measured for payment as linear feet, furnished, installed made fully operational and tested.

Basis of Payment: The bid price for each CAMERA VIDEO DETECTION SYSTEM item shall include the cost of furnishing and installing the number of Video Color Cameras / Integrated video camera processors (Video Camera Units) called for on each plan, camera cable from the controller to the Video Camera processor unit, one (1) CIP-8 (per 8 Video Camera processor Units), and one (1) cabinet interface module (detector port master) and all associated enclosures and equipment and all labor, materials, cables, tools and equipment necessary to complete the work. Payment for the video camera image processor (at Comm. server level)

configuration software, all miscellaneous hardware, cabling, connectors, documentations, test equipment, and testing shall be included under Camera Video Detection System. The bid price for each item shall also include the cost of furnishing all labor, materials, tools and equipment, and incidentals necessary to complete the work and to make the system fully operational.

| <u>Pay Item</u> | <u>Unit</u> |
|-------------------------------|--------------------|
| Camera Video Detection System | EA |

ITEM #1111416A - CAMERA VIDEO DETECTION SYSTEM TYPE 4 (4 CAMERA)

For Project 173-412 - City of Stamford –Intersection 135-259 - U.S. Route 1 at Elm Street

DESCRIPTION

The work under this item shall consist of furnishing and installing Camera Video Detection System Type 4 (4 Camera) of type as shown on the plans or as directed and in accordance with these specifications:

REQUIRED SUBMITTALS

Material Certificate of Compliance:

Submit 5 copies of material certificate of compliance for the Camera Video Detection System Type 4 (4 Camera) and all hardware accessories in accordance with the contract general requirements.

Shop Drawings:

Submit 5 copies of shop drawings for the Camera Video Detection System Type 4 (4 Camera) 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 Camera Video detection system shall be either Naztec or Traficon.

Video Processing and Display System Assembly:

- “Traficon” system shall have VIP3D video detection modules to accommodate the number cameras per system type as specified and one Viewcom/E remote monitoring module.
- “Naztec” system shall have VU1 or VU2 video detection modules and one VUCOM module.
- Enhanced welded sheet metal 10 position rack with EDI Model PS-175 power supply and output wiring. (this rack shall be supplied with all input and output cables even if the system to be installed in a TS2 cabinet)

- Mechanical 4 x 1 video switcher (Kramer Electronics Model No. 4x1VB or equal) with BNC connectors
- 14" TFT color video monitor (for outdoor cabinet use with flip style roof mount) with power supply and dual video inputs.

Video Camera Assembly:

The following items shall provide the video to the detection system:

- FC Series Traffic Cameras shall be as manufactured by Flir Systems Inc. or approved equal with a 13 mm lens.
- All exposed cables to the camera shall be outdoor and UV rated.
- 6 foot Pelco Astro-brac gusseted 1.5 inch Aluminum tube with vinyl insert, one threaded end and a Cable Mount kit.

Service connection panels for Video Detection Cameras:

This panel(s) shall have

- Coax surge suppressor EDCO - CX06-MI or HESCORLS – HE75CXR for all Coax Cables
- Terminal block wired with separate fuses for all Camera Power Cables with a master power switch
- A power surge protection device such as HESCORLS – HE300-15 or equal with Line-In, Line-out, Neutral, Main Line & Main Neutral connections shall be installed on this panel.
- A shop drawing shall be submitted with the panel design and all the components

Warranty and Training:

The video detection system shall be warranted against manufacturing defects in materials and workmanship for a period of ***three years from the date of final acceptance***. All Cameras shall have a 10 year detector and 2 year parts and labor warranty. 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. For each project a one day training shall be provided for up to 4 city employees with necessary detailed handout materials to cover the topics to install, maintain and trouble shoot each of the components and each of the software provided for this system.

CONSTRUCTION METHODS

- Mast arm installations shall be mounted at a sufficient height to prevent occlusion from cross traffic between the stop bar and the mast arm on which the camera is installed. A six- (6) ft. maximum length of internally reinforced tube shall be attached to the mast arm bracket for camera mounting above the mast arm. Camera shall be mounted to the top of the tube with the camera manufacturers recommended bracket. Camera bracket shall provide adjustments for both vertical and horizontal positioning for the camera. Camera attachments shall be designed to securely fasten the camera to prevent the extension tube from falling into the path of vehicles and/or becoming loose. Miscellaneous hardware shall be stainless steel or galvanized steel. The cameras and associated pole/arm attachment unit shall be designed to withstand a wind load of 90 MPH with a 30-second gust factor.
- Luminaire arm installations shall be installed on the luminaire arm, with the camera/video manufacturers recommended brackets. Camera luminaire brackets shall provide adjustments for both vertical and horizontal positioning of the camera. Camera attachments shall be designed to securely fasten the camera to the luminaire arm. Miscellaneous hardware shall be stainless steel or galvanized steel. The cameras and associated pole/arm attachment unit shall be designed to withstand a wind load of 90 MPH with a 30-second gust factor.

The product manufacturer or supplier of the video detection system shall supervise the installation and the testing of the video equipment. A factory or Vendor's representative and the contractor shall install, make fully operational, and test the camera video detection system as indicated in the intersection drawings and this specification. The detection equipment shall be installed either in an existing or in a new controller cabinet. 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 angle or mounting position itself may need to be modified including front fire angle to side fire angle to eliminate any fixed objects in the camera view or to correct any faulty detection after programming the cameras.

The camera angle for each camera shall be adjusted to the satisfaction of City's Traffic Signal Systems Engineer for each location. All the programming shall be done only after the approval of initial setup by the Engineer and a reprogramming may be necessary if the field conditions warrant any changes in video coverage. If the programmed detection zones are not functioning effectively prior to the final completion and acceptance of the whole project including all the intersections in the project, the contractor shall realign and/or reprogram to correct the issues.

An approved spray shall be used to seal all the field connections for video to eliminate any future degradation of video quality due to elements of the weather and dust.

METHOD OF MEASUREMENT

The quantity to be paid for under this item will be the number of completed, installed and accepted Camera Video Detection Systems of the type specified. Each of the systems shall include all the listed components, cables, and connectors. One day video detection system training shall be provided by a manufacturer’s training specialist per each project.

BASIS OF PAYMENT

This work will be paid for at the contract unit price each for “Camera Video 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 1111416A | Camera Video Detection System Type 4 (4 Camera) | EA |

ITEM #1111470A - TIME CLOCK

DESCRIPTION:

This item shall consist of furnishing and installing a Time Clock/Time Base Coordination (TC/TBC) unit within a traffic signal cabinet in conformity with these specifications.

MATERIALS:

The four circuit TC/TBC shall conform to the current requirements of the Department of Transportation Functional Specifications for Traffic Control Equipment, Four Circuit Solid State Time Clock With Time Base Coordination Option TC/TBC.

CONSTRUCTION METHODS:

The TC/TBC harness shall be connected into the controller cabinet wiring in a neat and orderly manner. Refer to the TC/TBC INSTALLATION REQUIREMENTS included in the special provisions to Item #1108115A - Full Actuated Controller 8 Phase. All connections shall be to terminals. Splices will not be allowed. The TC/TBC hookup complete with pin number, function and cabinet terminal number shall be recorded in the form of a hookup chart, on 216 mm x 280 mm (8.5"x11") paper. The location, location number, date of revision, project number, TC/TBC manufacturer and model number shall also be recorded on the hookup chart. A program card shall be completed indicating all input steps and settings. Four copies of the hookup chart and program card shall be furnished to the Engineer with one each left in the cabinet. Revise controller timings as shown on the plan.

METHOD OF MEASUREMENT:

This work will be measured for payment by the number of Time Clock/Time Base Coordinators installed; operating in a time base system as designed, and accepted.

BASIS OF PAYMENT:

This work shall be paid for at the contract price each for "Time Clock" which price shall include all materials, labor, tools, 4 copies each of the hookup chart and program card, controller timing changes, and all work incidental thereto.

S:\traffic\1406\signal specs\specs\111470A-time clock.doc

ITEM #1112241A - FIBER OPTIC CABLE SPLICE ENCLOSURE

ITEM #1113022A - 12 STRAND FIG 8. FIBER OPTIC INTERCONNECT CABLE

ITEM #1113030A - 12 STRAND FIBER OPTIC DROP CABLE

These items to be used only at Intersection #15-294 – James Street at Lyon Terrace – Bridgeport -Project 173-404

Description: Under these items, the Contractor shall furnish and install the required fiber optic cables for a complete cable plant in accordance with the contract documents and as ordered by the Engineer.

The contractor shall furnish and install fiber optic interconnect including the fiber optic drop cable, and all necessary components required to form a complete cable interconnect system and shall conduct acceptance tests for this interconnect under this specification. Fiber optic glass shall be manufactured by Corning or approved equal. No mechanical splicing is allowed under this contract.

The passive components that shall be provided under this specification include the following:

- All Fiber Optic Cable Connectors and Splices
- Fiber Optic Splice Trays
- Fiber Optic Splice Closures
- Fiber Optic Breakout Kits
- Aerial Slack Storage Racks

Other passive components that are required to form a complete communication system include (1) terminators 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 active components that the fiber cables will connect include, but are not limited to, the following:

- Fiber Optic Ethernet Switch

The active components listed above are paid for under separate contract items.

The contractor shall furnish, install, splice, and test all of the fiber optic cables. 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 in the Contract Documents or as ordered by the Engineer.

Materials:

Single Mode Fiber Optic Cable: The single mode fiber optic cable to be provided shall be a loose flexible buffer tube, gel free, cable design as specified herein. The fiber optic cable shall be Interlocking Armored Cables are flame-retardant cables designed for indoor and outdoor use; suitable for outside duct, aerial, and direct buried installations, and for indoor use. All cables shall consist of the number of fibers as specified on the plans.

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.

Single mode fiber shall meet the following Communications Cable, ICEA S-104-696.

Optical Requirements:

- Maximum Attenuation: 0.33-0.35 dB/km 1310 nm, 0.19-0.2 dB/km at 1550 nm
- Point Discontinuity: ≤ 0.05 dB at 1310 and 1550 nm.
- Cutoff Wavelength: The cabled fiber cutoff wavelength (λ_{cutoff}) shall be < 1260 nm.
- Mode-Field Diameter: 9.20 ± 0.40 μm at 1310 nm, $10.40 \pm .50$ μm at 1550 nm.
- Zero Dispersion Wavelength (λ_0): $1302 \text{ nm} \leq \lambda_0 \leq 1322 \text{ nm}$.
- Zero Dispersion Slope (S_0): ≤ 0.089 ps/(nm²•km).
- Fiber Polarization Mode Dispersion (PMD): ≤ 0.6 ps/ $\sqrt{\text{km}}$.
- Individual Fiber Polarization Mode Dispersion: 0.02 ps/ $\sqrt{\text{km}}$.
- Chromatic Dispersion: The maximum dispersion shall be ≤ 3.2 ps/(nm•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:

Fibers: All fibers in the cable must be usable fibers. All fibers within a given cable shall be from the same manufacturer (i.e., Corning), shall contain no factory splices, and conform to the following minimum requirements:

Typical Core Diameter: 8.2 μm .

Coating Diameter: 245 \pm 5 μm

Cladding Diameter: 125.0 \pm 0.7 μm .

Concentricity : <12 μm

Core-to-Cladding Offset: ≤ 0.5 μm .

Cladding Non-Circularity: $\leq 0.7\%$.

Fiber Curl: ≥ 4.0 m radius of curvature

Coating- Cladding

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.

Primary Coating: The coating shall be a dual layered, UV-curable ink applied by the fiber manufacturer. The coating shall be mechanically strippable without damaging the fiber. The coating diameter shall be $245 \pm 5 \mu\text{m}$. 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, "Optical Fiber Cable Color Coding."

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. 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. 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 contain a water swellable yarn for water blocking protection. The buffer shall be gel free.

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 may be used in the cable core to fill all unused buffer tubes, or may 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).

FIBER OPTIC CABLE - XXX - MM/YY

XXX = Number of optical fibers in the cable

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:

| <u>Indoor/Outdoor Cable O.D.</u> | <u>Figure</u> |
|----------------------------------|---------------|
| <u>8 Outdoor Cable O.D.</u> | |
| 6 Fiber - 12.9 mm (0.51 in) | 6 Fiber |
| - 12.9 mm (0.51 in) | |
| 12 Fiber - 12.9 mm (0.51 in) | 12 |
| Fiber - 12.9 mm (0.51 in) | |
| 24 Fiber - 12.9 mm (0.51 in) | 24 |
| Fiber - 12.9 mm (0.51 in) | |
| 36 Fiber - 12.9 mm (0.51 in) | 36 |
| Fiber - 12.9 mm (0.51 in) | |
| 72 Fiber – 13.3 mm (0.52 in) | 72 |
| Fiber – 13.3 mm (0.52 in) | |

Additional Requirements:

Manufacturer’s Certification: The following tests shall be performed and the test results documented for a cable meeting requirements herein. 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 drop cable: Fiber optic drop cables shall a loose flexible buffer tube, gel free, cable design as specified herein. The fiber optic cable shall be Interlocking Armored Cables are flame-retardant cables designed for indoor and outdoor use; suitable for outside duct, aerial, and direct buried installations, and for indoor use. All cables shall consist of the number of fibers as specified on the plans. Drop cables shall be installed in conduit, between the backbone cable and equipment cabinet fiber optic distribution centers as shown on the plans. They shall be spliced to the appropriate fiber within approved spliced closures in handholes or as specified in the plans.

Optical Requirements: The fiber optic drop cables shall have identical optical characteristics as the single mode fiber optic cable specified above.

Material Requirements: The drop cable shall have identical physical configuration as the single mode fiber optic cable specified above. The fiber optic drop cable shall contain six (6) or eighteen (18) fibers, as shown on the plan.

The drop cable shall be able to withstand a minimum of 100 lbs. of tensile strength during installation.

The drop cable shall be unterminated on one end and have a factory installed SC Type connector on the other end. The unterminated end shall be fusion spliced to the appropriate trunk fiber in a splice closure and the terminated end shall interface with the cabinet fiber optic distribution center specified under a separate contract item. The manufacturer shall factory test the cable assembly with the connectors and provide results to the Engineer for approval prior to field installation.

The drop cable shall be sufficient length to be installed as shown on the plans, with a minimum of 10 meters of slack provided in the handhole or as shown on the plans. The contractor shall follow the drop cable manufacturer's recommendation in the installation of the drop cables, including the individual breakout fibers.

SNAP-ON Cable Markers:

The Contractor shall install 4"X6" SNAP-ON Cable Markers on the fiber backbone cable and the drop cable in the manholes and handholes. The cable marker shall contain the following information in black on an orange background.

FIBER OPTIC CABLE
CITY OF BRIDGEPORT
ENGINEERING DEPARTMENT
(203) 576-7211

Fiber Optic Connectors and Splices: The single mode optical fiber connectors shall be SC Type meeting the specifications and performance requirements stated below:

Strain Relief: The connector shall provide a strain relief mechanism for coupling the aramid strength members to the connector.

Index Matching Material: The use of index matching material between connector end faces to enhance performance shall not be permitted.

Intermateability: The connector shall be designed in such a manner to properly mate with connector assemblies and adapters of the same type. The connector supplied shall be compliant to the applicable current version of the intermateability standard, TIA/EIA-604. Connectors shall be supplied from the same Manufacturer.

Intermateability of Angled Connectors: The connector end face for an angled connector shall be designed to have a nominal angle of 8° from perpendicular.

Connector Keying: The connectors shall be keyed to prevent rotation of the connector end faces relative to each other during installation or mating.

Product Marking: At a minimum, the connector shall have the connector type and the connector manufacturer's unique identification mark on the connector itself. These shall be permanent markings intended to last the life cycle of the product.

Additional Requirements:

Fiber Adhesive Testing: The connectors shall be mated together with a ceramic blank in an industry standard split sleeve. They shall be mated for 24 hours at 85°C, in uncontrolled humidity at an applied force of 0.9 kg. (2 lb). The blank should have a radius of curvature of 29.5 mm \pm 2.5 mm, no micro hole, and an apex offset of \pm 50 mm (as described below).

Radius of Curvature: The connector ferrule end face shall have a radius of curvature of 15 mm \pm 5 mm. The supplier shall state how this connector end face geometry parameter is achieved, measured and assured/controlled.

Apex Offset: The connector end face shall have the point of curvature apex at the geometric center of the fiber with a tolerance \pm 50 mm. This is typically measured using a non-contacting interferometer. The supplier shall state how this parameter is measured and controlled.

Fiber Undercut/Protrusion: The fiber to ferrule interface shall typically have a controlled fiber undercut or protrusion of \pm 50 nm. The supplier shall typically state how this connector endface geometry parameter is measured and controlled.

Manufacturer's Certification: The following tests shall be performed and the test results documented for a cable meeting requirements herein. The contractor shall certify that each test meets or exceeds the following specifications:

Insertion Loss: The cable assemblies shall have an insertion loss \leq 0.25dB with an individual maximum loss 0.4dB. The measurements shall be performed in accordance with FOTP-171, "Attenuation by Substitution Measurement-for Short-Length Multimode Graded-Index and Single-Mode Optical Fiber Cable Assemblies".

Reflectance: Each connector on the cable assembly shall have a reflectance of -55dB, (spherical) and -70dB (angled). This testing shall be performed in accordance with FOTP-107, "Return Loss for Fiber Optic Components".

Heat Aging: The cable assembly shall withstand thermal age testing of 85°C (185°F) for seven days. The maximum insertion loss shall not exceed 0.4dB for any reading. The maximum reflectance shall not exceed -55dB (spherical) or -70dB (angled) for any reading. This testing shall be in accordance with FOTP-4, "Fiber Optic Component Temperature Life Test".

Humidity: The intermated cable assemblies shall be subjected to high humidity testing in accordance with FOTP-5, "Humidity Test Procedure for Fiber Optic Components", type 1, steady state, for 168 hours (7 days) at a temperature of 60 C (140 F) and a relative humidity of 90 - 95%. The measurement shall be taken every 6 hours. The maximum increase in optical insertion loss at any measurement point during or at the end of the test shall not exceed 0.3 dB

from the initial reading. The maximum insertion loss shall not exceed 0.4 dB for any reading. The maximum reflectance shall not exceed -55 dB (spherical) or -70 dB (angled) for any reading.

Temperature Cycling Test: The intermated cable assemblies shall be temperature cycled from +75°C (+167°F) to -40°C (-40 F) for a minimum of 40 cycles. The maximum increase in optical insertion loss at any measurement point during or at the end of the test shall not exceed 0.3 dB from the initial reading. The maximum insertion loss shall not exceed 0.4 dB for any reading. The maximum reflectance shall not exceed -55 dB (spherical) or -70 dB (angled) for any reading. This test shall be performed in accordance with FOTP-3, “Procedure to Measure Temperature Cycling Effects on Optical Fibers”, Optical Cable, and Other Passive Fiber Optic Components, with the following modifications. The cable assembly is cycled from +23 C to +75° C to +23° C to -40° C to +23 C with a one-hour stabilization period prior to the temperature transition for a total of at least 21 cycles for at least 168 hours (14 days). Measurements are taken at -40 C, +75 C, and +23 C. The temperature transition rate between temperature extremes shall be at a rate of 1 C per minute. The initial attenuation measurement shall be followed by measurements at +75 C, +23 C, -40 C for every cycle. Upon reaching a temperature measurement point the test assembly should be allowed to stabilize for at least one-half hour before measuring the insertion loss.

Vibration Test: The cable assembly with an adapter shall withstand the vibration conditions as specified in Condition 2 of FOTP-11, “Vibration Test Procedure for Fiber Optic Components and Cables”. Specifically, the assemblies shall be tested with a vibration amplitude of 0.75 m, (or 1.5 mm peak to peak) and over a frequency range of 10 to 55 Hz at a change rate of 45 Hz per minute. The test shall be conducted for 2 hours in each of three-dimensional planes and the measurements shall be taken before and after the vibration in each plane. The maximum increase in optical insertion loss at any measurement point shall not exceed 0.3 dB from the initial reading. The maximum insertion loss shall not exceed 0.4 dB for any reading. The maximum reflectance shall not exceed -55 dB (spherical) or -70 dB (angled) for any reading.

Cable Retention: The cable assembly shall withstand a tensile load of 5 kg (20 lb) in accordance with FOTP-6, “Cable Retention Test Procedure for Fiber Optic Cable Interconnecting Devices”, without physical damage or an increase in optical loss exceeding 0.2 dB.

Flex Test: The cable assembly shall be subjected to a flex test in accordance with FOTP-1, “Cable Flexing for Fiber Optic Interconnecting Devices”, with an applicable load of 0.9 kg (2.0 lb). The angle at which the cable exits the connector is cycled between -90 C and +90 C for 100 cycles then the load is removed. The loss measurements are taken before and after the application of the load. The increase in optical insertion loss at any measurement point shall not exceed 0.3 dB from the initial reading. The maximum insertion loss shall not exceed 0.4 dB for any reading. The maximum reflectance shall not exceed -55 dB (spherical) or -70 dB (angled) for any reading.

Twist Test: The cable assembly shall be tested in accordance with FOTP-36, “Twist Test for Fiber Optic Connecting Devices”. The assembly shall be subjected to 10 cycles of 270 degrees of

rotation in both directions with a 1.5 kg (3.3 lb) load. The maximum increase in optical insertion loss at any measurement point during or at the end of the test shall not exceed 0.2 dB from the initial reading. The maximum insertion loss shall not exceed 0.4 dB for any reading. The maximum reflectance shall not exceed -55 dB (spherical) or -70 dB (angled) for any reading.

Impact Test: A cable assembly without the protective dust cap shall be subjected to eight impact cycles in accordance with FOTP-2, “Impact Test Measurements for Fiber Optic Devices”, using the test method designated "Light Service Class". The test will be conducted without the use of the pipe. The assembly shall sustain no visible physical damage and the maximum increase in optical insertion loss at any measurement point shall not exceed 0.3 dB from the initial reading. The maximum insertion loss shall not exceed 0.4 dB for any reading. The maximum reflectance shall not exceed -55 dB (spherical) or -70 dB (angled) for any reading.

Connector Durability Test: The fiber optic connector shall be capable of sustaining 500 insertions and removals from a connector adapter as specified in FOTP-21, “Mating Durability of Fiber Optic Interconnecting Devices”, using the manual method for insertions and removals. The connectors should be cleaned and inspected after every 25 mating using the manufacturer's recommended procedure. A two sided cleaning should occur after every 50 mating. The test readings should be made immediately after each cleaning. The increase in optical insertion loss at any measurement point shall not exceed 0.2 dB from the initial reading. The maximum insertion loss shall not exceed 0.2 dB for any reading. The maximum reflectance shall not exceed -55 dB (spherical) or -70 dB (angled) for any reading.

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.

12, 24 -Strand Single Mode Figure 8 Fiber Optic Cable: Figure-8 Gel-Free Interlocking Armored Cable shall be a self-supporting aerial cable.

Minimum Requirements:

- **Gel-Free Design:** Fully waterblocked using water-swallowable materials, making cable access simple and requiring no clean up
- SZ-stranded, loose tube, Gel free design isolates optical fibers from installation and environmental rigors and facilitates midspan access
- Medium-density polyethylene jacket is rugged, durable and easy to strip
- Figure-8 cable design allows for easy, one-step installation
- Central Member: Dielectric
- Maximum Fibers per Tube: 12
- Number of Tube Positions: 18
- Optical Fiber Type: Single-mode
- Wavelength: 1310/1383/1550 (nm)
- Nominal Cable Height: 1.24in (31.5mm)
- Nominal Outside Diameter: 0.78in (19.9mm)
- Storage Temperature: -40° to $+158^{\circ}$ F (-40° to $+70^{\circ}$ C)
- Common Installations: Outdoor self-supporting aerial

- Operation Temperature: -40° to +158°F (-40° to +70°C)
- Installation Temperature: -22° to +158°F (-30° to +70°C)

12-Strand Single Mode Figure 8 Fiber Optic Cable: Figure-8 Gel-Free Interlocking Armored Cable shall be a self-supporting aerial cable.

Minimum Requirements:

- **Gel-Free Design:** Fully waterblocked using water-swellaable materials, making cable access simple and requiring no clean up
- SZ-stranded, loose tube design isolates optical fibers from installation and environmental rigors and facilitates midspan access
- Medium-density polyethylene jacket is rugged, durable and easy to strip
- Figure-8 cable design allows for easy, one-step installation
- Central Member: Dielectric
- Maximum Fibers per Tube: 12
- Optical Fiber Type: Single-mode
- Wavelength: 1310/1383/1550 (nm)
- Nominal Cable Height: 1.24in (31.5mm)
- Nominal Outside Diameter: 0.78in (19.9mm)
- Storage Temperature: -40° to +158°F (-40° to +70°C)
- Common Installations: Outdoor self-supporting aerial
- Operation Temperature: -40° to +158°F (-40° to +70°C)
- Installation Temperature: -22° to +158°F (-30° to +70°C)

Splice Closures: The contractor shall furnish and install fiber optic splice closures in locations where splices require protection as shown on the plans and as ordered by the Engineer. The fiber optic closure shall be capable of accepting the specified fiber optic cable used in interoffice, outside plant, and building entrance facilities. The fiber optic splice closure shall meet all requirements stated in the following specification:

- The splice closure 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.
- 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.
- 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.

- 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.
- **Aerial splice closures** shall have available the necessary hardware to attach and secure the closure to an aerial strand.
- The splice organizer used in the closure shall accommodate splice trays suitable for single fiber splices.
- The small splice closure shall accommodate up to 72 single fiber splices. The medium sized closure shall accommodate up to 432 ribbon fiber splices or 288 single fiber splices. The large fiber optic closure shall accommodate up to 864 ribbon fiber splices or 432 single fiber splices.
- 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).
- The installation of the splice closure shall not require specialized tools or equipment, other than those normally carried by construction crews.
- The splice closure shall incorporate a mechanical compression and/or mastic tape sealing system to maintain a barrier against water penetration.

Additional Requirements: 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. No mechanical splicing is allowed.

- 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.
- 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 $1550 \text{ nm} \pm 20 \text{ nm}$.
- 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 $1550 \text{ nm} \pm 20 \text{ nm}$.
- 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 $1550 \text{ nm} \pm 20 \text{ nm}$.
- 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.

- 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.
- 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 $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ($104^{\circ}\text{F} \pm 3.6^{\circ}\text{F}$).
- 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.
- 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).
- 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.
- The splice closure shall show no evidence of water penetration following exposure to a 20-foot water-head for a period of 7 days.
- A closure shall show no evidence of corrosion following exposure to salt-fog for a period of 90 days.
- 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:

The tray shall have the capacity for 12 splices. It shall be compatible with the fusion splices specified herein and provide optimum physical protection.

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.

Slack fiber within the tray shall be placed in an oval shape along an inside wall of the tray.

Fiber Optic Breakout Kits: The fiber optic breakout kits contain all the tools and materials necessary to complete the installation of the fiber optic backbone. It shall include, as a minimum, the following equipment:

Pulling eyes with protective covering for the installation of preterminated fiber optic drop cable.

Fiber optic installer test equipment, fusion splicing devices, test cables, connector adapters, inspection tools, attenuators, tracers, continuity checkers, consumable and all ancillary equipment.

Aerial Slack Storage Rack: The contractor shall furnish and install aluminum loops to store fiber optic cable slack at locations specified on the plans, aerial splice enclosures or as ordered by the Engineer with 150' length of slack cable approved by the Engineer. The unit shall maintain the minimum bending radius of the optical cable. The size of the storage racks shall be sufficient to meet the requirements of the fiber optic cable specifications.

Quality Assurance Provision: 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 provide 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:

Shipping/Storage - -50°C to 70°C

Installation: -30°C to 70°C

Operation: -40°C to 70°C

Construction Details: 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:

- Catalog cuts and shop drawings for all cable, connectors, splice equipment, splice enclosures, splice trays and cable installation and test equipment.
- Locations of all proposed splices.

Fiber Optic Cable: The fiber optic cable installation techniques and procedures shall be specified by the cable manufacturer (i.e., Corning) 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:

- A minimum of seven (7) years experience in the installation of fiber optic cables, including fusion splicing, terminating, and testing single mode fibers.
- 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.
- 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.

- 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.
- 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 take every precaution to 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, or 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 with existing cables, the Contractor shall take every precaution to not damage the 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 Contractor. The cost to repair damages caused by the Contractor's wrongful actions shall be deducted from the money owed 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 manufacturer of the cable, breakaway swivels must be used to insure cable tensile strength not being 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 Contractor shall determine the number of pull boxes that the fiber optic trunk line can be continuously pulled through while maintaining the tension requirements. The number of pull boxes and their locations shall be submitted to the Engineer for approval. The Contractor may be required to install the cable one pull box at a time. The direction of the cable pull shall be determined by the Contractor and shall require the approval of the Engineer.

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.

Figure-8 Trunk cable shall be for attachment to existing utility poles or non figure-8 shall be lashed to existing messenger cable (as shown on Communication Interconnect plans) in accordance with the cable manufacturer's guidelines. For those locations where cable is being installed on existing messenger, or signal spans, the Contractor shall notify in advance (as noted earlier in this bid document) all other pole owners and utilities involved.

The sag of aerial cable shall match that of the next lower communication cable. In no case shall aerial communication cable be allowed to sag into or near existing cables. At aerial splice enclosures, the Contractor shall leave adequate length of slack cable, 25 meters minimum, as approved by the Engineer on each side of the splice enclosure using aerial slack storage racks paid for under the Fiber Optic Passive Components Item.

Splicing Requirements: All optical fibers shall be fusion spliced to provide continuous runs. Splices shall be allowed in locations shown on the plans.

All splices shall use the fusion technique. No mechanical splicing is allowed. 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 0.10 dB. If a splice is measured to exceed 0.10 dB during the splicing process, it shall be remade until its loss falls below 0.10 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.

Termination Requirements: Connectors shall be field mountable and shall not exceed 0.50 dB loss rating @ 1310 nm. This loss characteristic shall be maintained for a minimum of 500 connections (with periodic cleaning). Connectors will be qualified and accepted on the basis of connector-to-connector mating using similar fibers.

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:

- Complete and accurate as-built schematic diagrams showing the fiber optic cable plant and locations of all splices.
- Complete performance data of the cable plant showing the losses at each splice joint and each terminal connector.
- Installation, splicing, terminating and testing procedures.
- Complete parts list including names of vendors.
- Complete maintenance and trouble-shooting procedures.

One (1) month prior to installation, four (4) copies of the Contractors 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 cable and fiber optic drop cable to be paid will be measured for payment as the number of meters 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 meter for Single Mode Fiber Optic Cable and Fiber Optic Drop Cable shall include the cost of furnishing, installing, 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.

| <u>Pay Item</u> | <u>Unit</u> |
|--|--------------------|
| Fiber Optic Cable Splice Enclosure | EA |
| 12 Strand Fig 8 Fiber Optic Interconnect Cable | LF |
| 12 Strand Fiber Optic Drop Cable | LF |

| Pole Number | Proposed Attachment Point | Comments |
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ITEM #1111600A - EXTENSION BRACKET

ITEM #1112210A - CAMERA ASSEMBLY

ITEM #1112259A - VIDEO DETECTION PROCESSOR

ITEM #1113901A - CAMERA CABLE

Description:

Furnish and install a Video Image Detection System (VIDS) as shown on the plans or as directed by the Engineer. The VIDS consists of a Camera Assembly (CA), Video Detection Processor (VDP), Video Detection Monitor (VDM) and Camera Cable. The Training and Extension Bracket will be included on a case-by-case basis.

Materials:

All hardware shall be new, corrosion resistant. All equipment shall be current production.

Camera Assembly:

Camera:

- Monochrome (Black and White) or Full Color camera.
- Fixed mount pan and tilt unit bracket.
- Image Sensor: 0.3-inch (7.62mm) to 0.5-inch (12.7mm), charge-coupled device (CCD).
- Sensitivity: Full peak-to-peak video with 2 lux 2854 K incandescent illumination on the image sensor faceplate.
- Active picture elements (pixels): 720(H) x 480 (V), minimum.
- Resolution: Minimum 470 lines horizontal and 330 lines vertical, NTSC equivalent.
- Automatic white balance: Automatic white balance sensor through the lens for color balancing.
- Video Signal format: EIA-170 composite video output at 1 Volt peak-to-peak.
- Output impedance: 75 Ohms nominal.
- Signal to noise ratio: Greater than 50dB.
- Lens mount – standard 16 mm C-mount and compatible with the camera.

Camera Enclosure:

- Tamper proof constructed of painted or powder coated aluminum of at least 0.06-inch (1.59-mm) thickness.
- Environmentally sealed housing.
- Adequate adjustable sunshield should be provided.

- Internal Heater, window defroster, and an adjustable thermostat to control both. Turn-on point from 0° to 5° C (32° to 41° F). Metal oxide varistor (MOV), or equivalent, surge suppression connected to ground, on the switched outputs of all thermostats. Prior approval by the VDP manufacturer and the Engineer is necessary for any deviations to the above specifications.

Extension Bracket:

- Single arm [10' (3.0m) or less], or Truss type [10' (3.0m) or greater].
- Length shown on plan.
-
- Clamp-on attachment to pole shaft.
- Designed to support minimum 30 lbs. (13.6 Kg), 2 sq.ft. (.2 sq.M) end load with minimal movement from wind.
- Schedule 40, 2" IPS galvanized pipe.
- Heavy duty galvanized finish
- Refer to detail drawing contained herein.

Video Detection Processor:

Functional:

- Receive inputs from a minimum of two cameras.
- Sense vehicle activity from minimum eight detection zones per camera.
- Sense departing vehicle activity as well as approaching vehicle activity.
- Emulate minimum four (4) "contact closure" loop amplifier outputs in pulse, presence, delay, delay inhibit, and extend mode as specified in NEMA TS 1, Section 15.
- Include image stabilization that corrects for video movement caused by average wind speed of 20 mph (32 kph).
- Include automatic shadow cancellation of stationary shadows and moving shadows.
- Fail-safe in the event of loss of video from CA or loss of power to VDP.
- Accept standard analog NTSC color or monochrome video signal (1 volt peak to peak, 75 ohm) from the CA or a video recording device.
- Provide output of standard analog NTSC color or monochrome video signal through a video out female RCA/BNC style connector (1 volt peak to peak, 75 ohm) which may be switched to any video input.

Accuracy (Compared to actual vehicle observation of video over ½ hour time period).

- Occupancy: 20% true occupancy.
Example: If observed occupancy is 20%, reported occupancy must be between 16% and 24%.

- Volume: 95% true counts under normal weather conditions.
90% true counts under adverse weather conditions (rain, snow, fog).
- Demand (presence) at stop bar: 98 % under all weather conditions.
- Speed: 20% true speed as measured by radar gun.
- Maintain above accuracy throughout nighttime and day-night-day (dusk-dawn) transition.

Detection Zone Programming:

- Serial communication with the PC through front panel mounted EIA-232 port.
- Menu driven procedure on the PC, using Windows 95, 98, NT 4.0, or 2000 system.
- Configure and adjust the detection zone with the cabinet mounted Video Detection Monitor (VDM), using a standard detachable keyboard/mouse. Capable of displaying a NTSC or PAL formatted signal.
- Minimum data rate of 9600 bits/second.
- Detection zone data stored in non-volatile memory so that after recovery from power interruption, all parameters are returned to latest settings.
- Ability to upload and down load program database to notebook PC or remote desktop PC.
- Superimpose detection zone on real time video image from selected camera with time stamping capabilities.
- Ability to monitor real time video and adjust zones while VDP is actuating the traffic controller.
- Visual confirmation of detection by highlighting detection zone symbols.

Physical:

- Either shelf mounted, stand alone design or modular card rack design.
- Aluminum card rack frame capable of accepting four (4) VDP modules.
- Double row 22 pin (44 terminal) edge connector, Cinch Jones 50-44A-30M or equivalent, which mates with NEMA TS 1 detector rack system.
- Standard BNC connectors for video input and video output.
- Female metal shell connector with latching clamp for NEMA TS 1 detector outputs.
- LED indications to monitor all detector outputs.
- Side or rear mounted connectors and controls are not allowed on stand alone units.
- NEMA FR-4 glass epoxy or equivalent circuit boards.

Environmental:

- Comply with NEMA TS 2, Section 2 requirements for Controller Assembly.
- Pass following NEMA TS 2 tests and applicable test procedures.
 - Vibration: Section 3.13.3, Section 3.13.8.

- Shock: Section 3.13.4, Section 3.13.9.
- Transients, Temperature, Voltage and Humidity: Section 3.13.7.
- Power Interruption: Section 3.13.10.

Video Detection Monitor:

Physical:

- Compact and easily accessible LCD Flat Panel Display.
- Diagonal screen size minimum 9" & maximum 14".
- Weigh <10 pounds (4.5kg).
- Withstand temperatures ranging from -30 to 74 degrees Celsius (-22 - 165 °F), 90% non-condensing.
- Withstand mechanical shock of 10 G's peak acceleration (11 ms, half sine wave).
- Accept vibrations of 5 to 500 Hz at 1 G RMS random vibration.

Functional:

- Compatible with Color or Monochrome Detection systems.
- Compatible with male RCA inputs or male BNC connector from a minimum of one VDP.
- Industrial grade (grade A) video panel employing thin film transistor (TFT) technology.
- ANSI contrast ratio of 300:1 minimum.
- Minimum brightness level: 300 candelas per square meter (300 lux).
- Computer resolutions: 720 (horizontal) x 480 (vertical) minimum, 1024 (horizontal) x 768 (vertical) maximum.
- Support 16.2 million display colors.
- Support both NTSC and PAL video formats with auto-sensing.
- Pixel rise time: ≤ 2 milliseconds. Pixel fall time: ≤ 6 milliseconds.
- Minimum pixel pitch: 0.064 (horizontal) x 0.2025 (vertical) millimeters.
- Minimum viewing angle: 140 degrees horizontally, 120 degrees vertically.
- On-Screen Display (OSD) controls brightness, contrast, phase, clock, color as well as horizontal and vertical positioning.
- Compatible with processor output (VGA analog RGB, S-Video and composite video interfaces)
- Operable on 110 VAC or 220 VAC, 50 or 60 Hz.
- Battery operation capabilities but not to require use of any batteries(s).
- FCC, VCCI, EMC, and CE approved. UL listed. Energy Star efficient.
- MTBF Rating: 50,000 hours minimum.

Peripherals:

- Separable Keypad & Joystick or Computer Mouse including all necessary cables for connectivity to VDP.

Camera Cable:

- Supply the CA power and return the video signal to the VDP.
- Siamese construction RG-59/U, or as recommended by camera manufacturer.
- Coaxial:
 - 20 AWG, solid conductor.
 - Polyethylene foam dielectric.
 - Bare copper braid shield.
- Twisted pair:
 - 18 AWG, 7 strand conductor.
 - Aluminum foil shield.
 - Color code red and black.
- Polyethylene or polyvinyl chloride jacket.
- Other type cable may be substituted at the request of the VDP manufacturer.

Documentation: (VDP, VDM and CA)

Provide to the **Department of Transportation Office of Maintenance** three (3) copies of equipment manuals furnished by the manufacturer, which includes the following:

- Installation and operation procedures.
- Performance specifications (functions, electrical, mechanical and environmental) of the unit.
- Schematic diagrams.
- Pictorial of component layout on circuit board.
- List of replaceable parts including names of vendors for parts not identified by universal part numbers such as JEDEC/RETMA or EIA.
- Troubleshooting, diagnostic and maintenance procedures.

Site Survey:

Perform a site survey with the VDP manufacturer representative at all VIDS locations. The purpose of the survey is to optimize the performance from the VIDS equipment when it is installed and insure that it will meet the accuracy requirements specified previously. Submit the results of this survey to the Engineer in a report, which lists all VIDS locations with any recommended changes to camera locations, mounting adjustments, camera lens adjustments, and desired detection zone locations.

Warranties and Guarantees: (VDP and CA)

Provide warranties and guarantees to the **Department of Transportation Office of Maintenance** in accordance with Article 1.06.08 of the Standard Specifications. Warranties

for all equipment furnished as part of this Contract are to cover a period of 24 months following successful completion of the entire intersection acceptance test.

Training:

Provide a minimum of six (6) hours of training for up to eight (8) representatives from the offices of District Maintenance and Traffic Engineering. Include three (3) hours classroom and three (3) hours hands-on instruction of the VIDS.

- Theory of operation; Program and operation instructions; Circuit description.
- Troubleshooting; Preventative maintenance; field diagnostics; and field adjustments.

Training sessions will be scheduled at a mutually agreed time and location after installation of VIDS.

Construction Methods:

Install VIDS equipment in accordance with the manufacturer instructions and recommendations to achieve the detection zones as shown in the plans and accuracy as described in these specifications. The location of the CA shown on the plan may be revised as a result of the Site Survey. VDM and peripherals are to be furnished and fully installed in an easily accessible position within the controller cabinet. Leave proper clearance(s) surrounding video monitor to allow for accessible connections and space to utilize surrounding equipment.

Method of Measurement:

Training will be measured for payment at the lump sum price at the completion of the training session.

The Camera Assembly will be measured for payment as the number of cameras furnished, installed operational and accepted.

The Extension Bracket will be measured for payment as the number of brackets furnished, installed and accepted.

The Video Detection Processor will be measured for payment as the number of units including all additional work and materials listed in Basis of Payment, furnished, installed, operational and accepted.

Camera Cable will be measured for payment as linear feet (meters), furnished, installed and accepted.

Basis of Payment:

The lump sum bid price for Training includes the necessary instruction manual, maintenance manual, schematics etc. of all VIDS equipment, for all attendees of the training session.

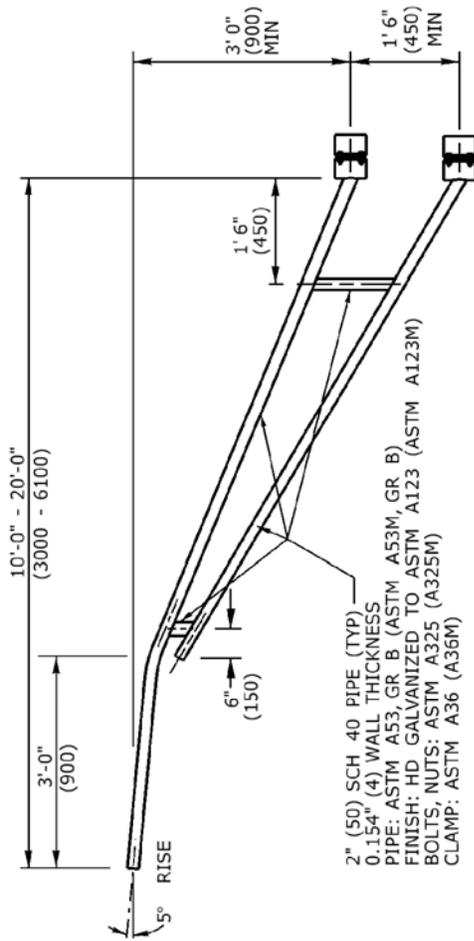
The unit bid price for Camera Assembly includes the camera, enclosure, brackets used to attach the CA to a support structure or extension bracket, documentation, warrantee, labor, tools and equipment necessary to provide the specified video signal to the VDP.

The unit bid price for Extension Bracket includes all labor, tools and equipment necessary to attach the bracket to a pole shaft.

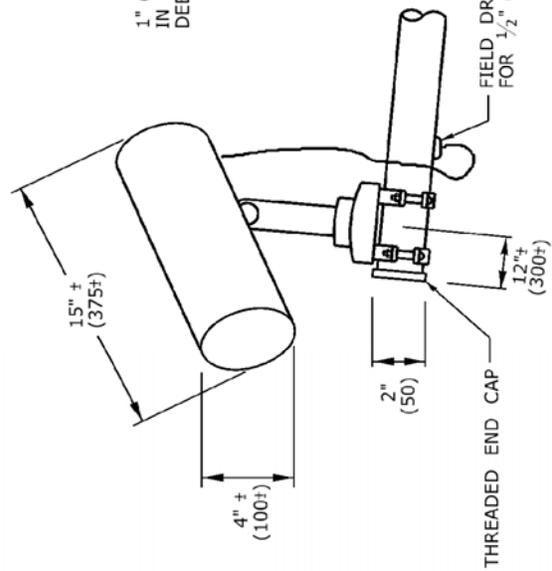
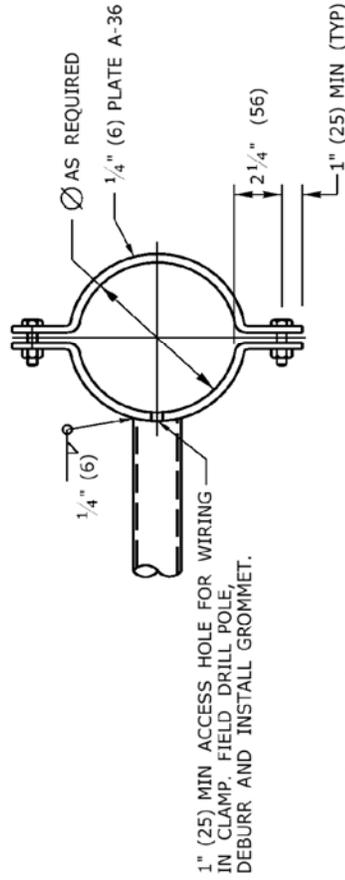
The unit bid price for Video Detection Processor includes the manufacturers' site survey, unlimited number of any necessary VIDS configuration software and license, card rack frame, power supply, all miscellaneous hardware such as PC interface cable with connectors, Cabinet Mounted Video Detection Monitor with necessary peripherals, documentation, warrantee, labor, tools and equipment necessary to make the VIDS fully operational.

The unit bid price for Camera Cable includes all connectors, labor, tools and equipment necessary to install the cable between the CA and the VDP.

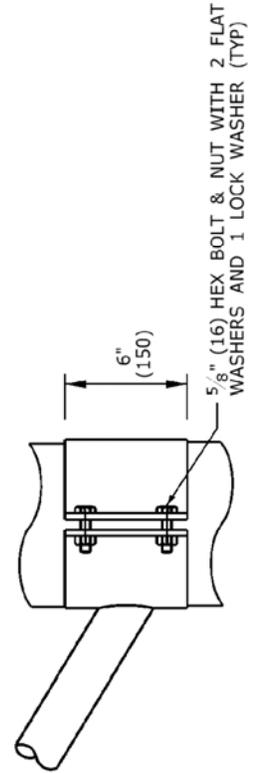
| <u>Pay Item</u> | <u>Pay Unit</u> |
|---------------------------|-----------------|
| Training | LS |
| Camera Assembly | Ea. |
| Extension Bracket | Ea. |
| Video Detection Processor | Ea. |
| Camera Cable | LF (M) |



EXTENSION BRACKET



VIDEO IMAGE DETECTION SYSTEM



ARM CLAMP DETAIL

ITEM #1113023A - 12 STRAND FIBER OPTIC INTERCONNECT CABLE

ITEM #1113622A - OPTICAL FIBERCABLE – SINGLE MODE LOOSE BUFFER TUBE CABLE, 96 FIBER

ITEM #1112241A - FIBER OPTIC CABLE SPLICE ENCLOSURE

For Project 173-412 – City of Stamford – Intersection 135-259 – U.S. Route 1 at Elm Street

Description: Under these items, the Contractor shall furnish and install the required fiber optic cables for a complete cable plant in accordance with the contract documents and as ordered by the Engineer.

The contractor shall furnish and install the fiber optic interconnect including the fiber optic trunk cable, and all necessary components required to form a complete cable interconnect system and shall conduct acceptance tests for this interconnect under this specification.

The passive components that shall be provided under this specification include the following:

- All Fiber Optic Cable Connectors and Splices
- Fiber Optic Splice Trays
- Fiber Optic Splice Closures
- Fiber Optic Breakout Kits
- Aerial Slack Storage Racks

Other passive components that are required to form a complete communication system include (1) terminators 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. 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 in the Contract Documents or as ordered by the Engineer.

Materials:

Single Mode Fiber Optic Trunk Cable:

The single mode fiber optic cable to be provided shall be a loose, flexible buffer tube cable design as specified herein. 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 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 be “ALTOS” Double Jacketed

all-Dielectric Cable as manufactured by Corning or equal. The single mode fiber shall have 10 Gigabit Ethernet performance.

Cables shall be packaged wound on wood spools or reels. All reels shall be the property of the contractor and is responsible for the return or disposal of the reels that the cable is shipped on. The diameter of the drum shall be minimum 20 times the diameter of the cable. Each reel shall contain only one continuous length of cable. Labels shall be attached to the reel showing length, cable identification name and number and date of manufacture.

The outer end of the cable shall be securely fastned to the reel head so as to prevent the cable from becoming loose during the transit. End seals shall be applied to each end of the cable to prevent the intrusion of moisture into the cable.

Documnetation shall accompany each reel documenting the tested attenuation of each cable fiber in db/km. This attenuation shall be ≤ 0.4 db/km @ 1310 nm and ≤ 0.3 db/km @ 1550 nm.

The fiber optic cable rip cords shall be made from either standard Telco nylon material or from braided Kevlar. No unbraided Kevlar shall be accepted.

Cable jacketing shall be permanently labled approximately every two feet with cable manufacturer's name, cable type, fiber count, manufacturing date and incremental cable length.

Fiber optic drop cable:

Fiber optic drop cables shall be installed in conduit, and overhead between the Interconnect cable and equipment cabinet as shown on the plans. They shall be spliced to the appropriate fiber within approved spliced closures in handholes or as specified in the plans. The jacket of drop cable shall be rated to handle the outdoor use with UV protection.

Optical Requirements: The fiber optic drop cables shall have identical optical characteristics as the single mode fiber optic cable specified above.

Material Requirements: The drop cable shall have identical physical configuration as the single mode fiber optic cable specified above. The fiber optic drop cable shall contain one buffer tube with twelve (12) fibers, as shown on the plan. The drop cable shall be able to withstand a minimum of 100 lbs. of tensile strength during installation.

The drop cable shall be fusion spliced to the appropriate trunk fiber in a splice closure and the other end shall be terminated in a fiber optic distribution enclosure supplied under a separate contract item. The manufacturer shall factory test the cable assembly with the connectors and provide results to the Engineer for approval prior to field installation.

The drop cable shall be sufficient length to be installed as shown on the plans, with a minimum of 3 meters of slack provided in the handhole or as shown on the plans.

The contractor shall follow the the drop cable manufacturer's recommendation in the installation of the drop cables, including the individuals breakout fibers.

Fiber Optic Connectors and Splices: The single mode optical fiber connectors shall be SC Type meeting the specifications and performance requirements stated below:

Strain Relief: The connector shall provide a strain relief mechanism for coupling the aramid strength members to the connector.

Index Matching Material: The use of index matching material between connector end faces to enhance performance shall not be permitted.

Intermateability: The connector shall be designed in such a manner to properly mate with connector assemblies and adapters of the same type. The connector supplied shall be compliant to the applicable current version of the intermateability standard, TIA/EIA-604. Connectors shall be supplied from the same Manufacturer.

Intermateability of Angled Connectors: The connector end face for an angled connector shall be designed to have a nominal angle of 8° from perpendicular.

Connector Keying: The connectors shall be keyed to prevent rotation of the connector end faces relative to each other during installation or mating.

Product Marking: At a minimum, the connector shall have the connector type and the connector manufacturer's unique identification mark on the connector itself. These shall be permanent markings intended to last the life cycle of the product.

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.

Aerial Weathertight Splice Closures:

The contractor shall furnish and install fiber optic splice closures where splices require protection as shown on the plans and as ordered by the Engineer. The fiber optic splice closure shall be capable of accepting the specified fiber optic cable used in interoffice, outside plant, and building entrance facilities. These splice closures shall be either LG-500-U or LG-600-U as manufactured by AFL Telecommunications. The fiber optic splice closure shall meet all requirements stated in the following specification:

- The splice closure 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.
- 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.

- 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.
- 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.
- Aerial splice closures shall have available the necessary hardware to attach and secure the closure to an aerial strand.
- The splice organizer used in the closure shall accommodate splice trays suitable for single fiber splices.
- The small splice closure shall accommodate up to 72 single fiber splices. The medium sized closure shall accommodate up to 432 ribbon fiber splices or 288 single fiber splices. The large fiber optic closure shall accommodate up to 864 ribbon fiber splices or 432 single fiber splices.
- 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).
- The installation of the splice closure shall not require specialized tools or equipment, other than those normally carried by construction crews.
- The splice closure shall incorporate a mechanical compression and/or mastic tape sealing system to maintain a barrier against water penetration.

Additional Requirements: 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.

- 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.
- 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 $1550 \text{ nm} \pm 20 \text{ nm}$.
- 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 $1550 \text{ nm} \pm 20 \text{ nm}$.

- 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 $1550 \text{ nm} \pm 20 \text{ nm}$.
- 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.
- 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.
- 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 $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ($104^{\circ}\text{F} \pm 3.6^{\circ}\text{F}$).
- 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.
- 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).
- 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.
- The splice closure shall show no evidence of water penetration following exposure to a 20-foot water-head for a period of 7 days.
- A closure shall show no evidence of corrosion following exposure to salt-fog for a period of 90 days.
- 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:

The tray shall have the capacity for 12 splices. It shall be compatible with the fusion splices specified herein and provide optimum physical protection.

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.

Slack fiber within the tray shall be placed in an oval shape along an inside wall of the tray.

Fiber Optic Breakout Kits: The fiber optic breakout kits contain all the tools and materials necessary to complete the installation of the fiber optic backbone. It shall include, as a minimum, the following equipment:

Pulling eyes with protective covering for the installation of preterminated fiber optic drop cable. Fiber optic installer test equipment, fusion splicers, test cables, connector adapters, inspection tools, attenuators, tracers, continuity checkers, consumable and all ancillary equipment.

Aerial Slack Storage Rack: The contractor shall furnish and install aluminum loops to store fiber optic cable slack at locations specified on the plans, aerial splice enclosures or as ordered by the Engineer with a length of slack cable approved by the Engineer. The unit shall maintain the minimum bending radius of the optical cable. The size of the storage racks shall be sufficient to meet the requirements of the fiber optic cable specifications.

Quality Assurance Provision: 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 provide 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:

| | |
|--------------------|---------------|
| Shipping/Storage - | -50°C to 70°C |
| Installation: | -30°C to 70°C |
| Operation: | -40°C to 70°C |

Construction Details: 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:

- Catalog cuts and shop drawings for all cable, connectors, splice equipment, splice enclosures, splice trays and cable installation and test equipment.
- Locations of all proposed splices.

Fiber Optic 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:

- A minimum of seven (7) years experience in the installation of fiber optic cables, including fusion splicing, terminating, and testing single mode fibers.
- 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.

- 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.
- 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.
- 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 take every precaution to 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 existing overhead traffic signal interconnect cables are in place, the new fiber optic cable shall be attached to this interconnect cable using a 15 to 20 year UV rated tie wraps at 18" of spacing. The contractor can also use industry approved lashing methods with a 20 year life.

When installing cable in existing conduits which already have cables within them, the Contractor shall take every precaution to not damage the 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 wrong full actions shall be deducted from the money owed 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 manufacturer of the cable, breakaway swivels must be used to insure cable tensile strength not being 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 Contractor shall determine the number of pull boxes that the fiber optic trunk line can be continuously pulled through while maintaining the tension requirements. The number of pull boxes and their locations shall be submitted to the Engineer for approval. The Contractor may be required to install the cable one pull box at a time. The direction of the cable pull shall be determined by the Contractor and shall require the approval of the Engineer.

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 30 feet shall be provided in pull boxes .

Cable shall be lashed to messenger in accordance with the cable manufacturer's guidelines. For those locations where cable is being installed on new or existing messenger, or signal spans, the Contractor shall notify in advance all other pole owners and utilities involved.

The sag of aerial cable shall match that of the next lower communication cable. In no case shall aerial communication cable be allowed to sag into or near existing cables. At each aerial splice enclosures, and at each signalized intersection along cable installation route the Contractor shall leave 75 feet of slack cable, as approved by the Engineer on each side of the splice enclosure using aerial slack storage racks.

Splicing Requirements: All optical fibers shall be spliced to provide continuous runs. Splices shall be allowed in locations shown on the plans.

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. Splicing 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 0.10 dB. If a splice is measured to exceed 0.10 dB during the splicing process, it shall be remade until its loss falls below 0.10 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.

Termination Requirements: Connectors shall be field mountable and shall not exceed 0.50 dB loss rating @ 1310 nm. This loss characteristic shall be maintained for a minimum of 500

connections (with periodic cleaning). Connectors will be qualified and accepted on the basis of connector-to-connector mating using similar fibers.

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:

- Complete and accurate as-built schematic diagrams showing the fiber optic cable plant and locations of all splices.
- Complete performance data of the cable plant showing the losses at each splice joint and each terminal connector.
- Installation, splicing, terminating and testing procedures.
- Complete parts list including names of vendors.
- Complete maintenance and trouble-shooting procedures.

One (1) month prior to installation, four (4) copies of the Contractors 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 cable and fiber optic drop cable to be paid will be measured for payment as the number of meters 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 meter for Single Mode Fiber Optic Cable and Fiber Optic Drop Cable shall include the cost of furnishing, installing, 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.

| <u>Item #</u> | <u>Pay Item</u> | <u>Pay Unit</u> |
|-----------------|---|-----------------|
| Item # 1113023A | 12 Strand Fiber Optic Single Mode Drop Cable | LF |
| Item # 1113025A | 144 Strand Fiber Optic Single Mode Interconnect Cable | LF |
| Item # 1113050A | Fiber Optic Splice Enclosure | EA |

ITEM #1113398A - CABLE CLOSURE (TYPE A)

Work under this item shall conform to the requirements of section 11.13 supplemented and amended as follows:

Article M.16.14 - Control Cable:

Subarticle M.16.14 - 5 - Cable Closure: After the only paragraph add the following: The cable closure installed on the figure 8 cable and used to terminate interconnect shall be designated as Type A. This closure shall be weather resistant, contain an inner shield bond and grounding continuity system. All external parts shall be stainless steel. The closure shall be provided with 3 or 4 entrances, dependent on the number of cables terminated in the closure. The main entrance shall accommodate cable with a diameter of 0.4"(10mm) to 1.0"(25mm) and the branch entrance shall accommodate a cable with a diameter of 0.4"(10mm) to 1.0"(25mm). The size of the closure shall be: length 17" (425mm) to 24" (610mm), width 3" (76mm) to 5" (127mm), height 5" (127mm) to 6.5" (165mm). Each closure shall be provided with a minimum of 24 terminals, either screw type or pressure type.

Article 11.13.03 - Construction Methods:

Subarticle 11.13.03 - 3 Cable Closures: After the only paragraph add the following: The Type A cable closures attached to the figure 8 cable shall be used for to provide an access for the 16/6 pair interconnect to the controller cabinet. The locations shall be as listed below and as shown on the plans.

| <u>Intersection</u> | <u>Location No.</u> | <u>Pole No.</u> |
|--|---------------------|-----------------|
| U. S. Route 1 at Scribner Avenue | Int. #102-204 | CL&P #23004 |
| U. S. Route 1 (Boston Post Rd.) at Route 77 (Church St.) | Int. #59-205 | SNET #7 |

Only the conductors designated as "Traffic Signal Interconnect Pairs" in the special provisions to the Communication Cable, shall be cut and terminated in these closures. Connection to traffic signal pairs shall be as shown in the Typical Cable Closure Illustration contained herein. The conductors designated as not used shall not be cut at these closures. The Type A Cable Closures shall be installed approximately 3 feet (0.9 m) from the indicated utility pole, unless otherwise directed by the Engineer.

S:\traffic\1406\signal specs\specs\1113398A-cable closure (type A).doc

ITEM #1113431A - #16 AWG, 6 TWISTED PAIR, COMMUNICATION CABLE

Article M.16.14 - Control Cable

3 - Cable Add the following:

The communication cable shall be solid conductor, shielded, twisted pair with 300 V polyethylene insulation and polyethylene jacket. The 6 Pair Overhead cable shall be figure 8 type with 6650 lb. test, integral messenger and shall conform in all respects to IMSA Specification 40-4. The 6 Pair cable shall conform in all respects to IMSA Specification 40-2. The Contractor shall furnish a manufacturers warranty that the cable is resistant to damage and deterioration by sustained contact with greases and oil.

Article 11.13.03 - Construction Methods Add the following:

Communication cable shall be installed in new and existing conduit, handholes, attached to utility poles or supported on messenger as shown on the plans or as directed by the Engineer. Communication cable shall be installed continuously without splices from termination point to termination point. Cable termination shall be only on an approved termination panel inside the controller cabinet and on terminal blocks inside a cable closure (type A). All cable pairs that enter a controller cabinet and the cable closure shall be terminated as shown on the typical installation plan The pair numbers and colors for traffic signal interconnect are shown on the plans.

The pair overhead cable shall be attached to utility poles indicated on the plans in accordance with the Communications Cable Attachment List. It shall be the Contractors responsibility to coordinate his activities on a continuing basis with each of the involved utility companies. A minimum of 12" (300mm) clearance shall be maintained above the highest existing communication cable (AT&T or CATV). A minimum of 40" (1000mm) clearance shall be maintained below the lowest power cable (Northeast Utilities or United Illuminating) attachment.

The sag shall match that of the next lower communication cable. In no case shall the figure 8 communication cable be allowed to sag into or near existing cables. A Chicago Grip No.1659 or equivalent shall be used to grip the jacketed messenger when pulling and tensioning the figure 8 cable. At corners and ends, the strand shall be dead-ended with strandvises. At corners, the strand shall be cut and the polyethylene jacket removed from the strand. The ends of the strand coming through the chuck of both strandvises shall be overlapped and bonded together using a bolt guy clamp (J1061) or equivalent. At cable closure locations the strand shall be cut and the jacket removed from a sufficient length of strand. A strand vise shall be installed to reattach the strands. This will provide slack in the conductors to properly connect to the terminal blocks without the use of jumpers.

At closures where there is a full cable cut but no branch circuit, bond all the cable shields together.

At branch circuit closures bond the shields of all cables that enter cable closures and ground the shield in the cabinet as shown on the typical installation plan.

Where the support strand will be connected to a vertical grounding conductor and there is no closure near the pole, only the jacket of the strand shall be removed. The jacket around the shield shall

not be cut. At the end of each workday notify the electric company to complete the connection to the vertical ground.

Provisions shall be made such that in the event of a cabinet knockdown, wherein accidental overvoltage conditions could be produced in the interconnect cable, the location experiencing the problem will be isolated. No other location shall be damaged. In addition, protective devices shall be furnished and installed by the Contractor to positively isolate and protect the system against damage from lightning.

Article 11.13.04 - Method of Measurement: Add the following:

3. The quantity of communication cable to be paid for under these items shall be the actual number of linear feet (meters) of the cable specified, installed, tested, terminated at the points specified, and accepted in place.

Article 11.13.05 - Basis of Payment: Add the following:

3. Communication Cable shall be paid for at the contract unit price per linear foot (meter) for "#16 AWG, (Type), Communication Cable" which price shall include furnishing, installing, connecting and testing the communication cable of the type specified. The price shall also include standoff brackets; grounding and bonding hardware; overvoltage and lightning protection; furnishing all labor, tools, materials, equipment, storage, transportation and other incidentals necessary to complete the work.

| <u>Pay Item</u> | <u>Pay Unit</u> |
|--------------------------------------|-----------------|
| #16 AWG, (Type), Communication Cable | L.F. (m) |

ITEM #1113725A - 23AWG, 4 TWISTED PAIR CATEGORY 6 CABLE

For Project 173-412 - City of Stamford –Intersection 135-259 - U.S. Route 1 at Elm Street

Description:

The work under this item shall consist of furnishing and installing a Video Camera Cable of type as shown on the plans or as directed and in accordance with these specifications:

Required Submittals:

Shop Drawings:

Submit 5 copies of shop drawings for the Video Camera Cable in accordance with these specifications and the contract general requirements.

Materials:

Video Camera Cable

This cable shall be outdoor rated CAT 6 cable and shall be as manufactured by Belden or Comscope or equal.

Construction Methods:

The CAT 6 Video Camera Cable shall be installed between the camera dome and the video or controller cabinet in new and existing conduit, handholes, or supported on a messenger cable or signal span as shown on the plans. All cables shall be handled with care to avoid damage to the conductors or the jacket. When pulling in conduit, the contractor shall use an approved lubricant, as required. Cable shall be looped in and out of cabinets and handholes to provide adequate slack and the least amount of stress on conductors and connectors. When installed overhead, drip loops of a minimum one foot diameter shall be provided. Camera cable shall run without splices between the camera and the cabinet. The contractor shall furnish and install all necessary end connectors as required.

Method of Measurement:

The quantity to be paid under the item “Video Camera Cable” shall be the actual number of linear feet of the size specified, measured along the center of the cable, installed, tested, operational and accepted in place

Basis of Payment:

This work shall be paid for at the contract unit price per linear foot for “Video Camera Cable”, which price shall include furnishing and installing camera cable; connectors; all labor, tools, materials, equipment, storage, transportation and other incidentals necessary to complete the work.

| <u>Pay Item</u> | <u>Description</u> | <u>Pay Unit</u> |
|-----------------|--|-----------------|
| #1113725A | 23AWG, 4 Twisted Pair Category 6 Cable | Linear Foot |

ITEM #1114201A - AUXILIARY EQUIPMENT CABINET

Description:

Furnish and install an Auxiliary Equipment Cabinet (AEC), on a traffic control cabinet at the location shown on the plans and in accordance with the conditions set forth.

Materials:

- Conform to NEMA 3R enclosure specifications
- Type 5052-H32, 3.175mm (0.125") sheet aluminum
- Finish painted in accordance with the current D.O.T. specifications of Traffic Control Cabinets
- Seams continuously welded and ground smooth
- Dimensions as shown on D.O.T. typical sheets
- Door secured with Corbin lock - Ct. # 2.
- Continuous door hinge, 2.4mm (0.093") thick aluminum with 0.64mm (0.025") stainless steel hinge pin
- Door sealed with oil resistant gasket
- Back panel approximately 330mmH X 229mmW (13"H X 9"W)
- Rust and corrosion resistant mounting hardware
- Screened Vent

Construction Methods:

Mount the AEC on the left side of the controller cabinet, when facing the door. Confirm that the inside of the cabinet wall is clear, so that the installation of the AEC will not damage any equipment inside the controller cabinet. Drill a 25mm (1") hole in the back of the AEC and through the side of the controller cabinet. Install a close nipple through the 25mm (1") hole. Apply clear silicon caulk to both ends of the close nipple. Tighten lock-nuts and fiber bushings. Apply additional caulk if necessary to prevent moisture from entering controller cabinet and auxiliary equipment cabinet.

Method of Measurement:

This item shall be measured for payment by the actual number of Auxiliary Equipment Cabinets installed and accepted on traffic control cabinets.

Basis of Payment:

This item shall be paid for at the contract unit price each for "Auxiliary Equipment Cabinet" which price shall include mounting hardware, close nipple, insulated bushings, tools, and incidentals.

ITEM #1116100A - INTERNALLY ILLUMINATED STREET NAME SIGN

For Project 173-412 - City of Stamford –Intersection 135-259 - U.S. Route 1 at Elm Street

DESCRIPTION

This item shall consist of furnishing and installing An Internally Illuminated Street Name Sign at the location and to the dimensions and details shown on the plans, or as ordered by the Engineer and in conformity with these specifications.

REQUIRED SUBMITTALS

Shop Drawings:

Submit 4 copies of shop drawings for hand holes and covers in accordance with the contract general requirements.

MATERIALS

The materials for this work shall conform to the following specifications.

The sign shall incorporate Edge Lit T8 LED Tube technology with transparent reflective sheeting. Signs shall be designed with a continuously welded aluminum frame to mount to the face of the mast arm, or free swinging, or hung from span wire. Any burn out of one LED shall not cause any failure for the remaining LEDs. No tools shall be required to change the LED tubes. These light tubes shall be one piece dimensioned to match the length of the sign. The Sign doors shall be swing down style to access the bulbs and the sign shall have water tight foam gaskets and seals.

The signs shall meet or exceed the following specifications:

Withstand 140 mph wind load

100,000 hours of continuous useful life

Thickness: Signs shall not exceed 2.25"

Height: 18", 20" and 24"

Light: 120 V T8 LED tube design with no ballasts to plug into high output fluorescent sockets on top and bottom of the sign to provide a surface luminance of an average of 600 Lux

Sign Sheeting: 1/8" White Poly Carbonate with Diamond grade reflective film and 3M EC film

Background: 1177 Green or 1175 Blue

Fonts: MUTCD Highway Gothic C (White)

Warranty: 5 year warranty for all parts and bulbs.

Operating Temperature: -40 deg. C to 60 deg. C

Photocell: One photocell shall be provided to turn ON/OFF the illuminated sign.

Mounting Brackets: Mounting brackets shall be as specified in the contract documents or as to allow the sign to be mounted to the face of the mast arm, or free swinging, or hung from the span wire.

CONSTRUCTION METHODS

The sign shall be installed with rust proof hardware. The two sided signs shall be installed with Astro-Brac connectors to align the sign vertically and horizontally. The wiring shall be installed in neat manner with UV rated sleeve and grommets.

METHOD OF MEASUREMENT

This work will be measured for payment by the number of signs specified, completed and accepted in-place.

BASIS OF PAYMENT

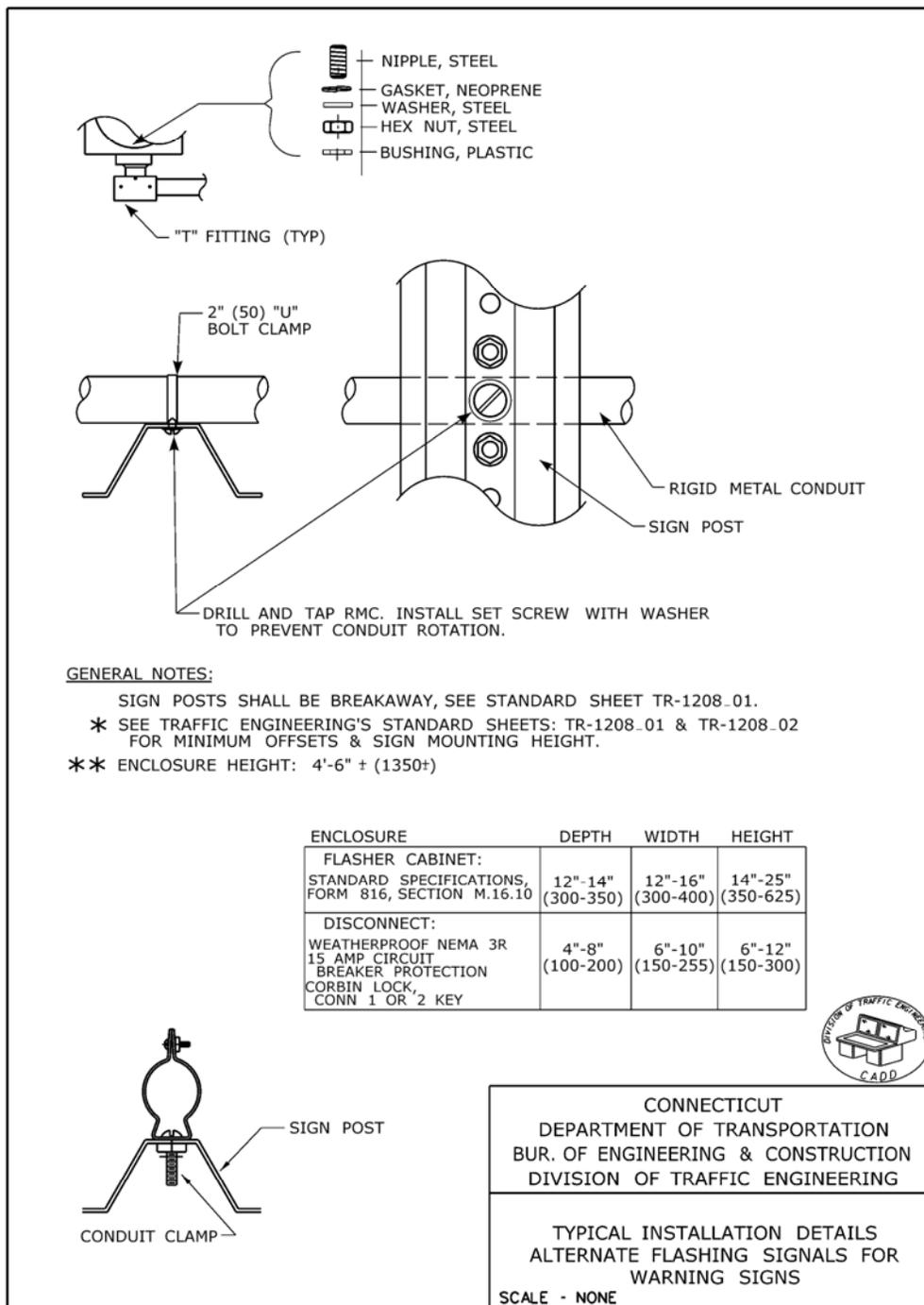
This work will be paid for at the contract price each for "INTERNALLY ILLUMINATED STREET NAME SIGNS of the type called for, complete in-place, which price shall include all connectors, wiring, photocell, brackets, signs and work incidental thereto.

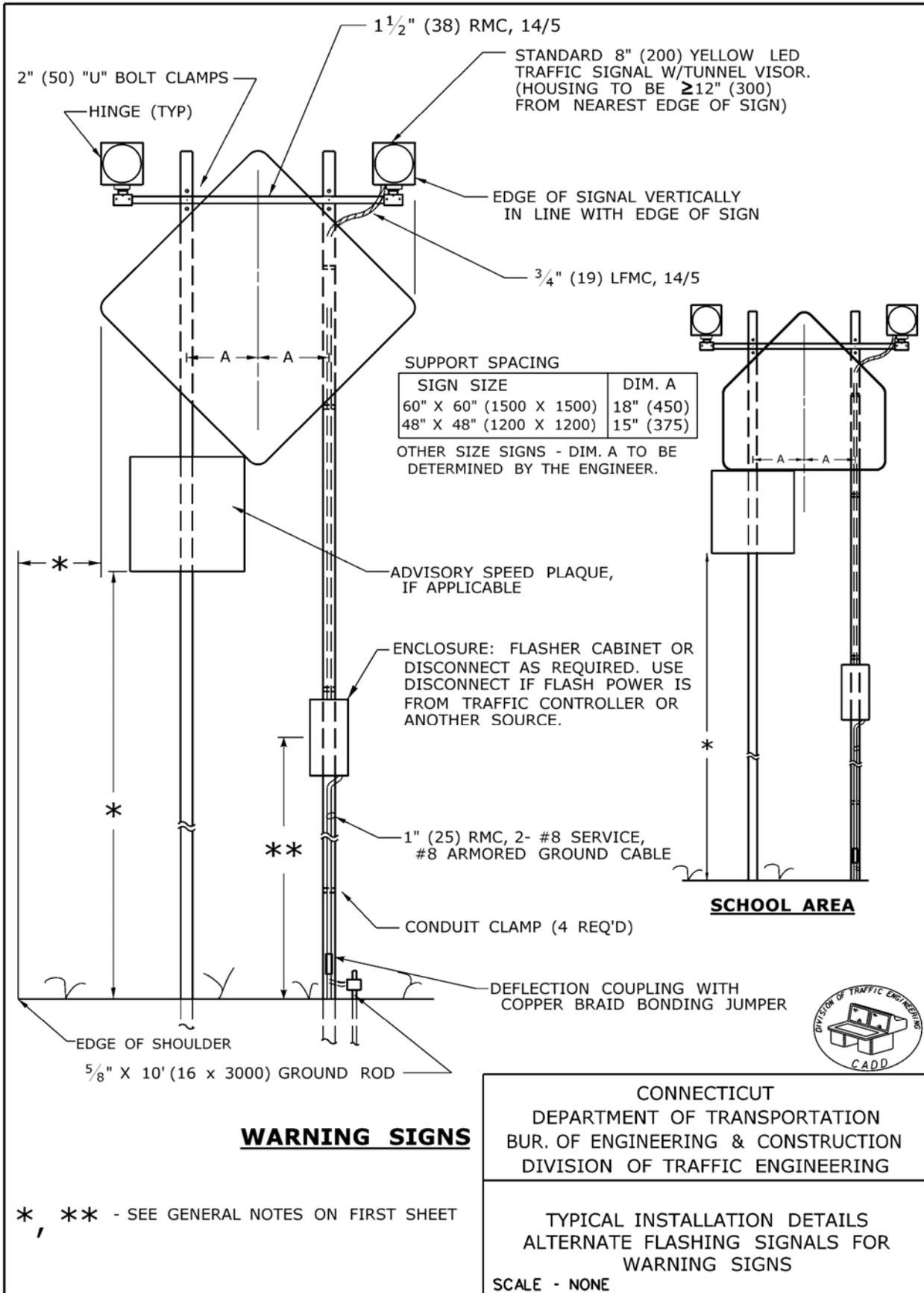
| <u>PAY ITEM</u> | <u>DESCRIPTION</u> | <u>PAY UNIT</u> |
|------------------------|---|------------------------|
| #1116100 A | Internally Illuminated Street Name Sign | EA |

ITEM #1117101A - ALTERNATE FLASHING SIGNALS FOR WARNING SIGNS

The details contained here supersede the detail for Typical Alternate Flashing Signals for Warning Signs, included on Standard Sheet, TR-1103_01-Span Pole, Alternate Flashing Signals for Warning Signs

Construction Methods: is supplemented with the following details.





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

Only traffic signal equipment in Project No. 172-386 is to be salvaged.

| 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) *see below | 330-16-7050 | \$ 250.00 |
| Steel Span Pole, all other lengths *see below | 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.

*The following is a list of intersections where the span poles will be salvaged:

Int. #075-207 – Madison – Rte. 1 at SSR 450 (Hamonnasset Connector)
Int. #102-218 – Norwalk – Rte. 1 at Vollmer Avenue & Walter Avenue

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.) |

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ITEM #1118051A - TEMPORARY SIGNALIZATION (SITE NO. 1)

ITEM #1118052A - TEMPORARY SIGNALIZATION (SITE NO. 2)

ITEM #1118053A - TEMPORARY SIGNALIZATION (SITE NO. 3)

ITEM #1118054A - TEMPORARY SIGNALIZATION (SITE NO. 4)

ITEM #1118055A - TEMPORARY SIGNALIZATION (SITE NO. 5)

ITEM #1118056A - TEMPORARY SIGNALIZATION (SITE NO. 6)

ITEM #1118057A - TEMPORARY SIGNALIZATION (SITE NO. 7)

ITEM #1118058A - TEMPORARY SIGNALIZATION (SITE NO. 8)

ITEM #1118059A - TEMPORARY SIGNALIZATION (SITE NO. 9)

ITEM #1118060A - TEMPORARY SIGNALIZATION (SITE NO. 10)

ITEM #1118071A - TEMPORARY SIGNALIZATION (SITE NO. 11)

ITEM #1118072A - TEMPORARY SIGNALIZATION (SITE NO. 12)

ITEM #1118073A - TEMPORARY SIGNALIZATION (SITE NO. 13)

ITEM #1118074A - TEMPORARY SIGNALIZATION (SITE NO. 14)

ITEM #1118075A - TEMPORARY SIGNALIZATION (SITE NO. 15)

Description:

The Contractor shall keep each traffic signal in the project limits operational at all times during construction through the use of the existing signal, the temporary signal, the revised signal or any combination thereof. The Contractor shall furnish, install, maintain, relocate, and remove existing, temporary, and proposed traffic signal equipment and all necessary hardware as needed throughout the duration of construction and in conformance with the applicable specifications.

ITEM # 1118051A, 1118052A, 1118053A, 1118054A, 1118055A,
1118056A, 1118057A, 1118058A, 1118059A, 1118060A,
1118071A, 1118072A, 1118073A, 1118074A, 1118075A

The Contractor shall relocate the existing and temporary traffic signal heads and appurtenances (span poles, mast arms, span wire, pedestrian push buttons, pedestrian walk signals, etc.) and revise the signal phasing and timing as many times as deemed necessary during construction to maintain and protect traffic and pedestrian movements where shown on the plans or as proposed by the Contractor and approved by the Engineer.

The Contractor shall make modifications to the controller as necessary to maintain temporary signalization during each phase/stage of construction.

Throughout the duration of construction, the Contractor shall provide detection on the existing, temporary, and/or new roadway alignment for all intersection approaches that have existing detection. The Contractor shall furnish, install, maintain, relocate and revise the necessary equipment (loop detectors, preformed loop detectors, microwave detectors, cable, conduit, amplifiers, pushbuttons, handholes, etc.) to provide proper vehicle detection and pedestrian detection during each phase of construction. During construction, if a detector becomes non-operational, the associated phase shall be put on max recall and the Contractor shall provide detection within 24 hours.

Throughout the duration of construction, the Contractor shall furnish, install, maintain, relocate, and remove the equipment necessary to maintain existing emergency vehicle pre-emption and the equipment necessary to maintain existing interconnect to adjacent signals.

The Contractor shall furnish, install, maintain, relocate, and remove signal-related signing (lane-use, signal ahead, NTOR, etc.) and pavement markings as needed throughout the duration of construction.

Materials:

All materials used for Temporary Signalization shall conform to the pertinent articles of the Standard Specifications, the Supplemental Specifications, and the Special Provisions contained in this contract, or as approved by the Engineer.

Construction Methods:

In the presence of the Engineer and a representative from the DOT Electrical Maintenance Office, the Electrical Contractor shall inspect the existing controller and verify its working condition prior to Temporary Signalization.

The Contractor shall submit a traffic signal plan to the Engineer for approval showing the signal phasing, timing, and the location of the signal supports, signal heads, detectors, pedestrian

ITEM # 1118051A, 1118052A, 1118053A, 1118054A, 1118055A,
1118056A, 1118057A, 1118058A, 1118059A, 1118060A,
1118071A, 1118072A, 1118073A, 1118074A, 1118075A

push buttons, pedestrian signals, and pavement markings at least 30 days prior to each phase/stage change.

Temporary Signalization will begin when the Contractor revises or relocates the existing signal or installs temporary traffic signal equipment. The Contractor shall be responsible for maintenance of all equipment during Temporary Signalization. The Engineer shall record the date Temporary Signalization begins for each site and shall notify the DOT Electrical Maintenance Office and the Local Police Department that maintenance responsibility has been transferred to the Contractor.

The Contractor shall provide to the Engineer a list of telephone numbers of personnel who will be responsible for the maintenance of the traffic signals during Temporary Signalization. The Contractor shall respond to traffic signal malfunctions by having a representative at the site within three hours and the Contractor shall have the traffic signal back in operation within 24 hours.

If the Engineer determines that the nature of a malfunction requires immediate attention and the Contractor does not respond within three hours following the initial contact, then DOT personnel will be called to repair the signal. The State will deduct all expenses incurred by the State, with a minimum deduction of \$1,000. for each service call, from money due or to due to the contractor.

For intersections with a State furnished controller, Temporary Signalization shall terminate when the signal inspection is complete and is accepted by the Engineer. For intersections with a Contractor furnished controller, Temporary Signalization shall terminate at the beginning of the 30 day test period. For locations that will not be permanently signalized, Temporary Signalization shall terminate when construction is complete and the temporary signal equipment is removed from the project as approved by the Engineer.

All equipment shall be relocated and/or removed in such a manner as to cause no hazard to pedestrians, traffic or property. When the Contractor is performing signal work, the Contractor shall maintain traffic as specified in the Special Provisions "Prosecution and Progress" and "Maintenance and Protection of Traffic."

During Temporary Signalization, all existing equipment shall remain the property of the owner. Temporary equipment supplied by the Contractor for Temporary Signalization will remain the Contractor's property unless noted otherwise. All existing equipment that is removed and designated as salvage shall be returned to the owner.

The Contractor shall be responsible for obtaining secondary service required for continuous operation of the traffic signals during Temporary Signalization. The party previously responsible for payment of electricity shall continue to be responsible during Temporary Signalization.

ITEM # 1118051A, 1118052A, 1118053A, 1118054A, 1118055A,
1118056A, 1118057A, 1118058A, 1118059A, 1118060A,
1118071A, 1118072A, 1118073A, 1118074A, 1118075A

The Contractor shall be responsible for the cost of electricity at unsignalized intersections that require Temporary Signalization due to construction activities. Locations where the temporary signal equipment will be removed when no longer needed shall have a metered service.

Method of Measurement:

Temporary Signalization shall be paid for only once per site on a percentage of the contract Lump Sum price. Fifty percent (50%) shall be paid when Temporary Signalization begins and fifty percent (50%) shall be paid when Temporary Signalization terminates.

Basis of Payment:

This work shall be paid at the contract Lump Sum price for “Temporary Signalization (Site No.)” for each site. This item shall consist of furnishing, installing, maintaining, relocating, revising, and removing existing, temporary, and proposed traffic signal equipment (except for the items identified below), signing and all necessary hardware, materials, labor and work incidental thereto. This price shall also include any modifications to the controller including timing and phasing changes. 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 will not be paid for under this item. The following established contract items, if used for Temporary Signalization, will be paid for at the contract unit price: Loop Detector Amplifiers, Trenching and Backfilling, Handholes, Rigid Metal Conduit (Type), Loop Detector Sawcut, Cable, Removal of Pavement Markings, and temporary pavement marking items.

| <u>Pay Item</u> | <u>Pay Unit</u> |
|-------------------------------------|-----------------|
| Temporary Signalization (Site No.) | L.S. |

ITEM # 1118051A, 1118052A, 1118053A, 1118054A, 1118055A,
1118056A, 1118057A, 1118058A, 1118059A, 1118060A,
1118071A, 1118072A, 1118073A, 1118074A, 1118075A

ITEM #1118111A - OVERHEAD ILLUMINATED "STOP AHEAD" SIGN

Description:

This item shall consist of furnishing and installing an overhead illuminated sign, of the type specified, at the location shown on the plans or as directed by the engineer and in conformity with these specifications.

Materials:

The sign shall be a blanket type which shall display the type of message specified, "through the use of light-transmitting fiber optic bundles. The legend displayed shall consist of letters with the dimensions as shown on the plans, formed by fiber-optic bundles. The message shall be clearly legible and attract attention under any lighting condition without the need for a visor or hood and shall be visible, at full intensity, anywhere within a 20 degree cone centered about the optical axis. The entire front face of the sign shall be protected by sheet of clear polycarbonate mounted in the doorframe. When not illuminated, the message shall be effectively unreadable.

A weatherproof housing with hinged front-access door shall be provided to enclose the fiber optic module assembly with bifurcated output fiber bundles, color filters, light sources and transformers. There shall be a separate fiber bundle, from each of the light sources, displayed in a row along the bottom of the sign to indicate lamp outage. The sign housing shall be manufactured from extruded aluminum, 6061-T6, ASTM B-221.

The blankout sign assembly shall display the message in "Lunar White". Type ENL or EPT quartz-halogen lamps shall be used to illuminate the message. These lamps shall operate between 10.5 and 10.8 volts via the supplied step-down transformers.

Average lamp life shall be not less than 8,000 hours. The lamps shall be mounted horizontally. Power consumption for the message shall be less than 600 watts.

The lensed bundles shall be bifurcated. The sign shall be supplied completely assembled and ready for checkout in natural finish aluminum. The aluminum front panel shall be colored flat black. The complete sign assembly shall not weigh more than 68 Kgs.

The electrical connection shall be provided by an internal barrier-type strip for connecting the electrical service wires. All fiber optics, transformers and lamps shall be mounted on the hinged front door of the unit. All external hardware including hinges shall be stainless steel, internal hardware shall be corrosion resistant.

Construction Methods:

Erection of the sign shall be accomplished in a manner so as not to cause twisting, bending or deforming of the sign or scratching of the sign face. Any sign panel damaged shall be repaired or replaced at the contractor's expense. They shall be level, correctly aligned as indicated on the plans and shall be properly fastened to the structure or supports with the necessary hardware as indicated on the plans.

Method of Measurement:

This work will be measured for payment by the number of Overhead Illuminated signs of the type and size specified, completed in place, accepted and operating.

Basis of Payment:

This work will be paid for at the contract unit price each for "Overhead Illuminated 'Stop Ahead' Sign" complete in place, which price shall include mounting brackets, hardware, fittings, disconnect switch, all materials, equipment, labor, paint and painting, tools, labor and work incidental thereto. Cable to the sign shall be paid under Article 11.13.

| Pay Item | Pay Unit |
|--|----------|
| Overhead Illuminated "Stop Ahead" sign | EA. |

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ITEM #1118122A - INTERNALLY ILLUMINATED SIGN

Description:

This item shall consist of furnishing and installing an Internally Illuminated Sign, of the type specified, at the location shown on the plans or as directed by the Engineer, and in conformity with these specifications.

Materials:

The sign shall be a blank-out type which shall display the type of message specified, through the use of light-transmitting fiber optic bundles.

The non-lensed bundles shall be fully bifurcated for burnout protection with minimum 4 lamps. The diameter of the fiber bundles shall be as shown on the plans.

The legend displayed shall consist of single row style letters, and shall be furnished with a visor. Shop drawings of the front panel showing the lettering, and the type of visor shall be submitted for approval.

The message shall be clearly legible and attract attention under any lighting condition and shall be visible at full intensity, anywhere within a 50 degree cone centered about the optical axis. The entire front face of the sign shall be protected by sheet of clear polycarbonate mounted in the doorframe. When not illuminated, the message shall be effectively unreadable.

A weatherproof housing of the dimensions and lettering size specified shall be provided to enclose the fiber optic module assembly. This assembly shall be provided with a hinged access door. The hinge shall be stainless steel piano type hinge mounted on the left side of the door.

There shall be a separate fiber bundle, from each of the light sources, displayed in a row along the bottom of the sign to indicate lamp outage.

There shall be a minimum of 4 screened drainage holes.

The sign housing frame shall be manufactured from extruded aluminum, 6061-T6, ASTM B-221.

The blank-out sign assembly shall display the message in "Lunar White". Type "ENL" quartz-halogen lamps shall be used to illuminate the message. These lamps shall operate between 10.5 and 10.8 volts via the supplied step-down transformers. Average lamp life shall be not less than 8,000 hours. The lamps shall be mounted horizontally. Power consumption for the message shall be less than 500 watts.

The sign shall be supplied completely assembled and ready to be checked out. The housing shall be DARK GREEN exterior baking enamel and shall comply with Federal Specifications A-A 2962. The color shall be No. 14056, Federal Standard No. 595.

There shall be a 15 amp A.C. snap switch mounted in a utility box on the inside of the sign, enabling the sign to be shut off during maintenance.

The electrical connection shall be provided by an internal barrier- type strip for connecting the electrical service wires. All fiber optics, transformers and lamps shall be mounted on the hinged door of the unit. All external hardware including hinges shall be stainless steel, internal hardware shall be corrosion resistant.

Construction Methods:

Erection of the sign shall be accomplished in a manner so as not to cause twisting bending or deforming of the sign or scratching of the sign face. Any sign panel damaged shall be repaired at the contractor's expense. They shall be level, correctly aligned as indicated on the plans and shall be properly fastened to the structure of supports with the necessary hardware as indicated on the plans.

Method of Measurement:

This work will be measured for payment by the number of Internally Illuminated Signs of the type and size specified, completed in place, accepted and operating.

Basis of Payment:

This work will be paid for at the contract unit price each for "Internally Illuminated Sign" complete in place, which price shall include mounting brackets, hardware, snap switch, fittings, and all materials.

| Pay Item | Pay Unit |
|-----------------------------|----------|
| Internally Illuminated Sign | Ea. |

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ITEM #1118301A - RELOCATE PRE-EMPTION SYSTEM (SITE NO. 1)

ITEM #1118302A - RELOCATE PRE-EMPTION SYSTEM (SITE NO. 2)

ITEM #1118303A - RELOCATE PRE-EMPTION SYSTEM (SITE NO. 3)

ITEM #1118307A - RELOCATE PRE-EMPTION SYSTEM (SITE NO. 7)

ITEM #1118311A - RELOCATE PRE-EMPTION SYSTEM (SITE NO. 11)

ITEM #1118312A - RELOCATE PRE-EMPTION SYSTEM (SITE NO. 12)

ITEM #1118313A - RELOCATE PRE-EMPTION SYSTEM (SITE NO. 13)

ITEM #1118314A - RELOCATE PRE-EMPTION SYSTEM (SITE NO. 14)

Description:

Relocate existing town owned emergency vehicle pre-emption system (EVPS) (either optical or siren) as shown on the plan or as directed by the Engineer. The EVPS equipment includes but is not limited to the following material:

- Optical Detectors
- Siren Detectors
- Phase Selectors
- System Chassis
- Auxiliary Equipment Cabinets (AEC)
- Confirmation Light
- Detector Cable (where practical)

Install new cable from the controller to the pre-emption detectors where the existing cable cannot be practically relocated.

Material:

All material is existing except for miscellaneous hardware necessary for reinstallation (e.g. changing detector attachment from span wire to mast arm) and the Detector Cable.

Miscellaneous Hardware:

1. Mounting hardware designed and manufactured specifically for use with the existing EVPS.
2. Corrosion and rust resistant.

Detector Cable (Optical):

1. 3-Conductor cable with shield and ground wire.
2. AWG #20 (7x28) stranded.
3. Individually tinned copper strands.
4. Conductor insulation: 600 volt, 167^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 157pf/M (48 pf./ft.).
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.

Detector Cable (Audio):

1. 2-Conductor cable with shield and ground wire.
2. AWG #14.
3. IMSA Spec 50-2 Detector Lead-In.

Construction Methods:

Conduct an initial evaluation test before removal and a final test after reinstallation. Thirty days prior to disconnection and removal of the existing pre-emption equipment, test and verify that the system is operational as shown on the plan. The thirty days is intended to provide the EVPS owner an opportunity to correct and resolve any deficiencies identified during the test. If during the thirty days the owner repairs, replaces, or corrects any malfunctioning, disconnected, or missing components, re-test that feature prior to removal. The contractor is not responsible to correct any part of the EVPS that is found to be malfunctioning, disconnected, or missing during the initial test. If the contractor is to assume maintenance responsibility of the traffic signal during Temporary Signalization, the EVPS equipment will not be included. Maintenance responsibility remains with the owner.

EVPS Test Procedure

1. Notify the system owner/user, such as the municipal fire chief or public works director, of the scheduled inspection.
2. Request a fire department representative and an emergency vehicle, which has an activation device to conduct the test. If not available, the contractor shall provide an activation device.
3. In the presence of the Engineer and the municipal representative, test each pre-empted approach with the emergency vehicle. Test the following items of the system:
 - * Confirm that the emitter or siren activates the phase selector and the phase selector activates the correct pre-emption input to the controller.
 - * Confirm adequate range. The traffic signal must be pre-empted to green sufficiently in advance of the emergency vehicle arrival. The vehicle emitter or siren shall initiate pre-emption at a minimum distance of 548.6M (1800 feet).
Exception: An obstructed line-of-sight may reduce the minimum distance. Town concurrence is required.
 - * Confirm there are no false calls. Keep the emitter or siren active as the emergency vehicle passes through the intersection. No other detectors shall activate.
4. Document the test. Provide the Engineer and the municipality copies of the test results. Attached is a sample test procedure form.

Keep the appropriate fire department official apprised of when (day and time) the system is disconnected and taken out of operation.

Store all pre-emption equipment intended for re-installation in a suitable location to prevent damage from elements and construction activities. Return all pre-emption equipment not intended for re-installation to the Town.

Mount the AEC on the left side of the controller cabinet, when facing the door. Confirm that the inside of the cabinet wall is clear, so that the installation of the AEC will not damage any equipment inside the controller cabinet. Drill a 25mm (1") hole through the side of the controller cabinet. Install a close nipple through the 25mm (1") hole. Apply clear silicon caulk to both ends of the close nipple. Tighten lock-nuts and fiber bushings. Apply additional caulk if necessary to prevent moisture from entering the controller cabinet and the AEC.

Re-install and wire the pre-emption equipment in a neat and orderly manner, as shown on the plan or as directed by the Engineer. Pre-emption detector locations shown on the plan are for illustration purposes only. Field locate the detectors for the best possible line-of-sight. Install the detector cables continuous with no splices between the optical detector and the AEC. Make all connections from the phase selector to the "D" harness and to the cabinet wiring at the pre-emption termination panel.

Conduct a final test, identical to the initial test, to verify that the EVPS is as operational as before removal. If the initial test was not conducted, it is assumed the EVPS was fully operational as shown on the plan. The Contractor is then responsible for all damaged; faulty; missing; and replacement material necessary to restore the EVPS to fully operational.

If a malfunction is found other than identified during the initial test, or the system needs adjustment (such as range, emitter intensity, or detector location), schedule a follow-up test. Repeat the test procedure for all approaches that did not pass.

Notify the appropriate fire department official that the EVPS has been re-installed and is operational.

If not present in an existing traffic controller cabinet install a pre-emption disconnect switch. When switched off, the traffic controller shall not be affected by EVPS calls.

Method of Measurement:

Work under this item is measured as Lump-Sum per site. Detector Cable shall be measured by the number of linear feet (meters) supplied and installed.

Basis of Payment:

This work shall be paid at the contract Lump Sum price for "Relocate Pre-Emption System (Site No.)" for each site. This item shall include all prior testing, removal, storage, re-installation, final testing, any corrective adjustments, replacement components if necessary, documentation, disconnect switch if necessary, and all necessary hardware, materials, labor and work incidental thereto.

| <u>Pay Item</u> | <u>Pay Unit</u> |
|---|-----------------|
| Relocate Pre-emption System (Site No._) | L.S. |

EVPS TEST PROCEDURE

| | |
|---|--|
| Confirm that the emitter or siren activates the phase selector and the phase selector activates the correct pre-emption input to the controller. | |
| | |
| Confirm adequate range. | |
| | |
| Confirm there are no false calls. | |

ITEM #1206013A - REMOVAL OF EXISTING SIGNING

Section 12.06 is supplemented as follows:

Article 12.06.03 – Construction Methods is supplemented as follows:

Extruded and sheet aluminum signs, sign posts, and sign supports designated for removal shall be returned to the Department for scrap. Scrap signs shall be cut to be no larger than 4' by 8'. Scrap steel shall be separated from scrap aluminum and delivered to the Department. The Contractor shall confirm intended delivery of the scrap material at least seven days in advance and shall deliver the scrap material to the following address:

Connecticut Department of Transportation
Division of Purchasing and Materials Management
Stores Central Warehouse
660 Brook Street
Rocky Hill, CT 06067
Attention: Fred Connors (Phone # (860) 258-1976)

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.

Signs and posts at the following locations are not to be salvaged or scrapped:

Project No. 173-412

Bridgeport – Route 130 (State Street) at Park Avenue

Derby – SR 727 (Pershing Drive) at SR 853 (Division Street) and Division Street

Norwalk - Route 1 (Connecticut Avenue) at Scribner Avenue

Stamford – Route 1 (Tresser Boulevard) at Route 1 (East Main Street) and Elm Street

Article 12.06.04 – Method of Measurement is supplemented with the following:

Payment under Removal of Existing Signing shall be at the contract lump sum price which shall include all 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 of Existing Signing” which price shall include 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 sign posts, and sign supports designated for scrap and all equipment, material, tools and labor incidental thereto.

ITEM #1206023A - REMOVAL AND RELOCATION OF EXISTING SIGNS

Section 12.06 is supplemented as follows:

Article 12.06.01 – Description is supplemented with the following:

Work under this item shall consist of the removal and/or relocation of designated side-mounted extruded aluminum and sheet aluminum signs, sign posts, sign supports, and foundations where indicated on the plans or as directed by the Engineer. Work under this item shall also include furnishing and installing new sign posts and associated hardware for signs designated for relocation.

Article 12.06.03 – Construction Methods is supplemented with the following:

The Contractor shall take care during the removal and relocation of existing signs, sign posts, and sign supports that are to be relocated so that they are not damaged. Any material that is damaged shall be replaced by the Contractor at no cost to the State.

Foundations and other materials designated for removal shall be removed and disposed of by the Contractor as directed by the Engineer and in accordance with existing standards for Removal of Existing Signing.

Sheet aluminum signs designated for relocation are to be re-installed on new sign posts.

Article 12.06.04 – Method of Measurement is supplemented with the following:

Payment under Removal and Relocation of Existing Signs shall be at the contract lump sum price which shall include all extruded aluminum and sheet aluminum signs, sign posts, and sign supports designated for relocation, all new sign posts and associated hardware for signs designated for relocation, all extruded aluminum signs, sheet aluminum signs, sign posts and sign supports designated for scrap, and foundations and other materials designated for removal and disposal, and all work and equipment required.

Article 12.06.05 – Basis of Payment is supplemented with the following:

This work will be paid for at the contract lump sum price for “Removal and Relocation of Existing Signs” which price shall include relocating designated extruded aluminum and sheet aluminum signs, sign posts, and sign supports, providing new posts and associated hardware for relocated signs, removing and disposing of foundations and other materials, and all equipment, material, tools and labor incidental thereto. This price shall also include removing, loading, transporting, and unloading of extruded aluminum signs, sheet aluminum signs, sign posts, and sign supports designated for scrap and all equipment, material, tools and labor incidental thereto.

| <u>Pay Item</u> | <u>Pay Unit</u> |
|--|-----------------|
| Removal and Relocation of Existing Signs | L.S. |

ITEM #1210101A - 4" (100mm) WHITE EPOXY RESIN PAVEMENT MARKINGS

ITEM #1210102A - 4" (100mm) YELLOW EPOXY RESIN PAVEMENT MARKINGS

ITEM #1210103A - 6" (150mm) WHITE EPOXY RESIN PAVEMENT MARKINGS

ITEM #1210104A - 8" (200mm) WHITE EPOXY RESIN PAVEMENT MARKINGS

ITEM #1210105A - EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS

SECTION 12.10 – EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS is amended as follows:

Delete “SYMBOLS AND LEGENDS” from the title of the section.

SECTION 12.10.03 – Construction Methods is amended as follows:

*Delete the entire section titled “WARRANTY” under item number 3. **Performance and Warranty.***

It was determined by the Office of Construction that the *First Year* warranty requirement is not necessary because early test results generally depict the outcome of pavement markings.

ITEM #1220013A - CONSTRUCTION SIGNS - BRIGHT FLUORESCENT SHEETING

Article 12.20.01 – Description: 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.

Article 12.20.02 – Materials: Prior to using the construction signs and their portable supports, the Contractor shall submit to the Engineer a copy of the Letter of Acceptance issued by the FHWA to the manufacturer documenting that the devices (both sign and portable support tested together) conform to NCHRP Report 350 (TL-3).

Portable sign supports shall be designed and fabricated so as to prevent signs from being blown over or displaced by the wind from passing vehicles. Portable sign supports shall be approved by the Engineer before they are used. Mounting height of signs on portable sign supports shall be a minimum of 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 B_1) 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 Labsan 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.

Article 12.20.03 – Construction Methods: Ineffective signs, as determined by the Engineer and in accordance with the ATSSA guidelines contained in "Quality Standards for Work Zone Traffic Control Devices", shall be replaced by the Contractor at no cost to the State.

Signs and their portable sign supports or metal posts that are no longer required shall be removed from the project and shall remain the property of the Contractor.

Article 12.20.04 – Method of Measurement: Construction Signs - 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.

Article 12.20.05 – 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. This price shall include the furnishing and maintenance of the signs, portable sign supports, metal sign posts and all hardware. Each sign and support or posts will be paid for once, regardless of the number of times it is used.

Pay Item

Construction Signs – Bright Fluorescent Sheeting

Pay Unit

S.F.

PERMITS

FLOOD MANAGEMENT GENERAL CERTIFICATION

Project No.: 173-404

Description: Traffic Control Signal Revisions

Towns: District 3 Various Locations

Date: December 6, 2011

memorandum

to: Mr. Michael E. Masayda
Trans. Principal Engineer
Hydraulics and Drainage
Bureau of Engineering and Construction

from: Barbara B. Rizzozi
Trans. Principal Engineer
Bureau of Engineering and Construction

Please review this request for Flood Management General Certification and indicate your concurrence below.

Certification (to be completed by designer)

I have read the Flood Management General Certification and the descriptions for the approved DOT minor activities. This project qualifies for the Flood Management General Certification under:

- Minor Safety Improvements and Streetscape Projects
- Roadway Repaving, Maintenance & Underground Utilities
- Minor Stormwater Drainage Improvements
- Removal of Sediment from a Floodplain
- Wetland Creation or Enhancement
- Scour Repairs at Structures; *(Must acquire another State permit to be eligible)*
- Guide Rail Installation
- Deck and Superstructure Replacements
- Minor Bridge Repairs
- Fisheries Enhancements
- Surveying and Testing

The following required documentation is attached in support of this certification:

- Project description
- Location plan
- Description of Floodplain involvement and how project qualifies for general certification
- 8-1/2" by 11" excerpt copy of the FEMA Flood Insurance Rate Map (FIRM) and Floodway Boundary Map (if applicable)

Print Name : Anna S. Mermelstein (Project Engineer)

Title: Transportation Engineer 2

Signature

Date

12/6/11

Attachment

Anna S. Mermelstein S:\traffic\Mermelstein\173-404\Flood Management Form.doc

cc: Mark W. Alexander

Timothy M. Wilson-Barbara B. Rizzozi- Joseph P. Ouellette

Concurrence (to be completed by Hydraulics and Drainage)

Based on the documentation submitted, I hereby concur that the project qualifies for Flood Management General Certification.

If there are any changes to the proposed activities within the floodplain or floodway, the project must be re-submitted for review and approval.

Signature

Date

12-7-11

Rev. 5/11

Section 4, Water Resources and Permits, of the Environmental Review Form dated December 2, 2011, from Mr. Mark W. Alexander to Ms. Barbara B. Ricozzi regarding the subject project indicated that the "Project may qualify as a Flood Management General Certification. Please contact the DOT Hydraulics and Drainage Unit x3234."

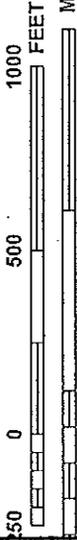
DESCRIPTION: Project 173-404 will revise traffic control signals at various locations in District 3. The signal revisions are primarily replacing and/or upgrading antiquated equipment. Location plans and FEMA Flood Insurance Rate Maps (FIRM) at locations that are within flood zones have been attached.

- Bridgeport - James Street at Lyon Terrace
- * East Haven - Route 142 (Hemingway Avenue) at Dodge Avenue
- East Haven - Route 142 (Hemingway Avenue) at Route 100 (Main Street)
- Fairfield - Route 1 (Post Road) at Thorp Street, Mill Plain Road and Carter-Henry Drive
- Guilford - Route 1 (Boston Post Road) at Route 77 (Church Street)
- Guilford - Route 1 (Boston Post Road) at State Street
- * Madison - Route 1 (Boston Post Road) at SSR 450 (Hammonasset Connector)
- New Canaan - Route 123 (New Norwalk Road) at Route 106 (East Avenue)
- North Haven - Route 103 (Washington Avenue and Church Street) at SR 729 (Broadway) and Saint John Street
- Norwalk - Route 1 (Westport Avenue) at Vollmer Avenue and Walter Avenue
- Norwalk - Route 123 (New Canaan Avenue and Main Street) at SR 719 (Main Avenue)
- Shelton - SR 714 (Bridgeport Avenue) at Driveways to Shelton Square (southerly) and Duchess Restaurant
- * Stratford - Route 113 (Lordship Boulevard) at Railroad Crossing
- Trumbull - Route 127 (White Plains Road and Church Hill Road) at SR 734 (Daniels Farm Road), Tait's Mill Road and Brinsmade Associate Drive
- Trumbull - Route 127 (White Plains Road) at Drives to Trumbull Center and to Trumbull Center Development
- Trumbull - Route 108 (Nichols Avenue) at SR 711 (Huntington Turnpike), Route 15 Northbound Exit 51 Off-Ramp and Access Drive
- Westport - Route 1 (West Post Road) at Drives to Playhouse Square Shopping Center and to Mobil Gas Station

“*” Denotes intersections located within a flood zone



MAP SCALE 1" = 500'



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0442F

FIRM
 FLOOD INSURANCE RATE MAP
 FAIRFIELD COUNTY,
 CONNECTICUT
 (ALL JURISDICTIONS)

PANEL 442 OF 626
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:
 COMMUNITY BRIDGEPORT, CITY OF 00000C 0442 F
 STRATFORD, TOWN OF 000016 0442 F

NOTE:
 THIS MAP INCLUDES BOUNDARIES OF THE COASTAL BARRIER RESOURCES SYSTEM ESTABLISHED UNDER THE COASTAL BARRIER RESOURCES ACT OF 1982 AND/OR SUBSEQUENT AMENDING LEGISLATION.

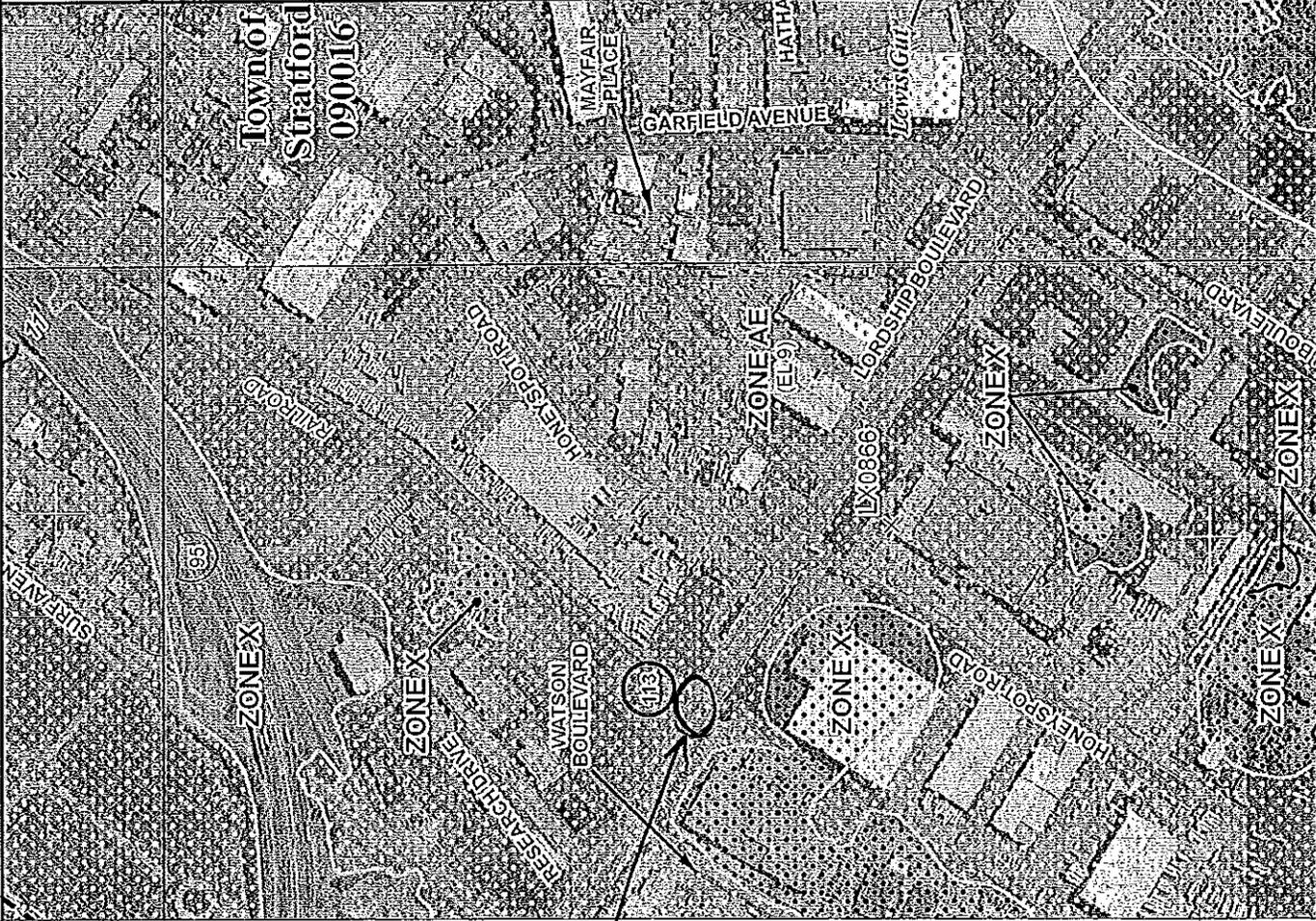
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurer applications for the subject community.

MAP NUMBER 09001C0442F
 EFFECTIVE DATE JUNE 18, 2010

Federal Emergency Management Agency



This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



625000 FT

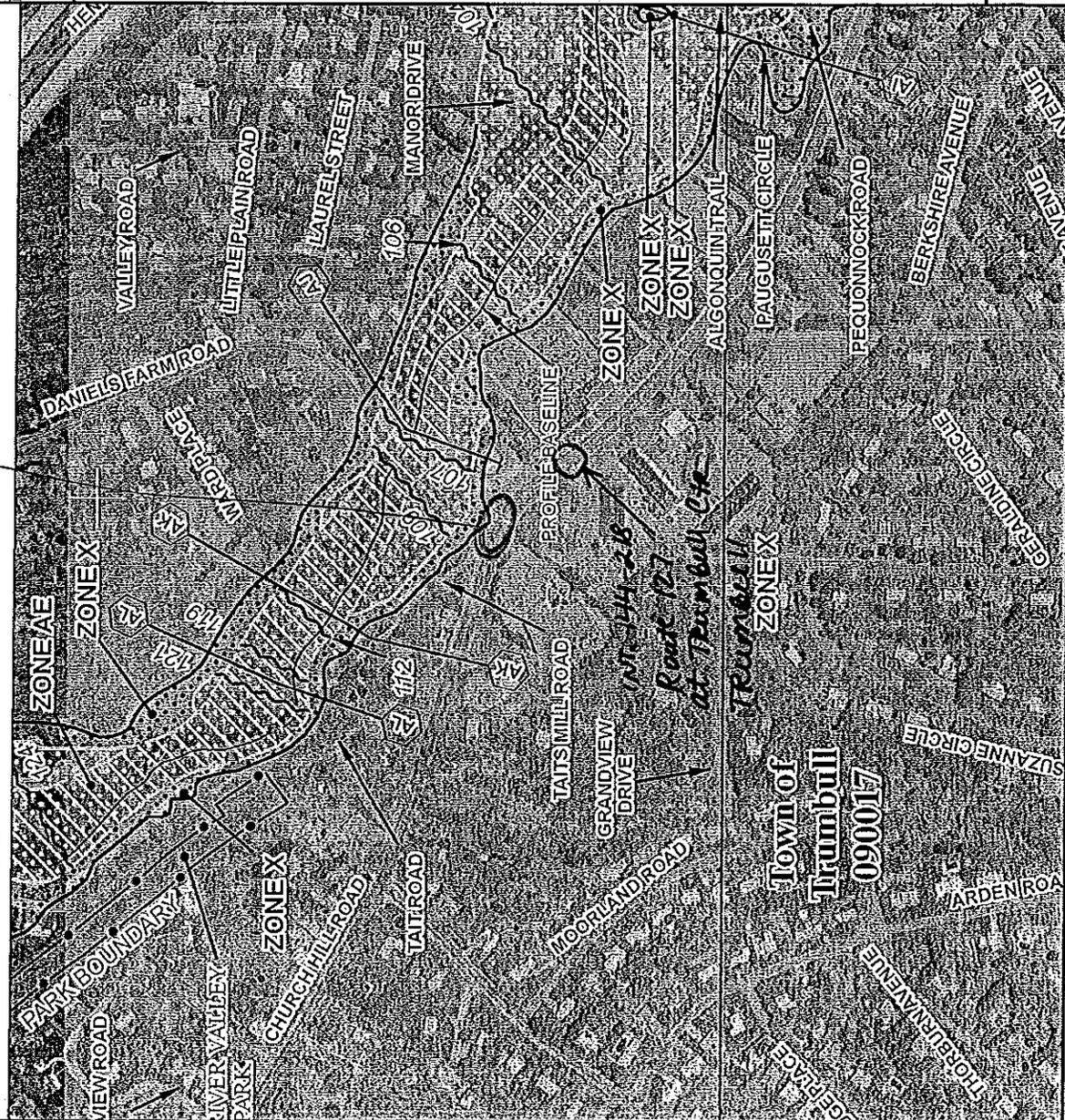
INT # 138-269
Route 113
at Railroad
crossing
Stratford

JOINS PANEL 0441

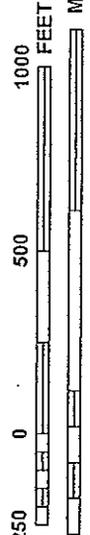
within Zone X, but not in Flood Zone

INT. 144-217
Route 127 at SR 734
Trumbull

100 FT JOINS PANEL 0289



MAP SCALE 1" = 500'



FIRM
FLOOD INSURANCE RATE MAP
FAIRFIELD COUNTY,
CONNECTICUT
(ALL JURISDICTIONS)

PANEL 427 OF 626
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

PANEL 0427F

CONTAINS:
NUMBER: 090002
COMMUNITY: TRUMBULL, CT
TOWN OF: 090017

MAP NUMBER: 09001C0427F
EFFECTIVE DATE: JUNE 18, 2010

Federal Emergency Management Agency

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

FEDERAL BUREAU OF SURVEY

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.fema.gov

PERMITS AND/OR SUPPLEMENTAL TO FORM 816 AND REQUIRED PROVISIONS

The following Permits and/or Supplemental to Form 816 and Required Provisions follow this page and are hereby made part of this Contract.

- **PERMITS AND/OR PERMIT APPLICATIONS**

Flood Management General Certification

Approved on December 7, 2011

- **SUPPLEMENTAL SPECIFICATIONS TO STANDARD SPECIFICATIONS FORM 816**

- **Construction Contracts - Required Contract Provisions (FHWA Funded Contracts)**

State of Connecticut

Department of Transportation

SUPPLEMENTAL SPECIFICATIONS

TO

THE STANDARD SPECIFICATIONS

FOR

ROADS, BRIDGES AND INCIDENTAL CONSTRUCTION

FORM 816

2004

JULY 2012

July 2012

DIVISION I
GENERAL REQUIREMENTS AND COVENANTS

| <u>SECTION</u> | | <u>SPECIFICATION NUMBER</u> |
|----------------|---|---------------------------------|
| 1.01 | Definition of Terms and Permissible Abbreviations | 101 |
| 1.05 | Control of the Work | 105 |
| 1.08 | Prosecution and Progress | 108 |
| 1.09 | Measurement and Payment | 109 |
| 1.10 | Environmental Compliance | 110 |
| 1.11 | Claims | 111 |
| 1.20 | General Clauses for Facilities Construction | 120 |

DIVISION II
CONSTRUCTION DETAILS

| <u>SECTION</u> | | <u>SPECIFICATION NUMBER</u> |
|----------------|--|---------------------------------|
| 2.02 | Roadway Excavation, Formation of Embankment and Disposal of Surplus Material | 202 |
| 2.05 | Trench Excavation | 205 |
| 3.04 | Processed Aggregate Base | 304 |
| 4.01 | Concrete Pavement | 401 |
| 5.14 | Prestressed Concrete Members | 514 |
| 6.01 | Concrete for Structures | 601 |
| 6.03 | Structural Steel | 603 |
| 6.12 | Concrete Cylinder Curing Box | 612 |
| 6.51 | Culverts | 651 |
| 7.02 | Piles | 702 |
| 8.22 | Temporary Precast Concrete Barrier Curb | 822 |
| 9.10 | Metal Beam Rail | 910 |
| 9.18 | Three-Cable Guide Railing (I-Beam Post) and Anchorages | 918 |
| 9.22 | Bituminous Concrete Sidewalk | |
| | Bituminous Concrete Driveway | 922 |
| 9.44 | Topsoil | 944 |
| 9.49 | Furnishing, Planting and Mulching Trees, Shrubs, Vines and Ground Cover Plants | 949 |
| 9.75 | Mobilization | 975 |
| 10.01 | Trenching and Backfilling | 1001 |
| 10.10 | Concrete Handhole | 1010 |
| 11.13 | Control Cable | 1113 |
| 12.10 | Epoxy Resin Pavement Markings, Symbols and Legends | 1210 |

July 2012

DIVISION III
MATERIALS SECTION

SECTION

**SPECIFICATION
NUMBER**

| | | |
|------|-------------------------|-----|
| M.06 | Metals | M06 |
| M.13 | Roadside Development | M13 |
| M.16 | Traffic Control Signals | M16 |
| M.17 | Elastomeric Materials | M17 |
| M.18 | Signing | M18 |

July 2012
STANDARD SPECIFICATIONS
FOR
ROADS, BRIDGES AND INCIDENTAL CONSTRUCTION
FORM 816

ERRATA

| <u>PG.</u> | <u>ARTICLE OR SUBARTICLE</u> | <u>LINE NO.</u> | <u>CORRECTION</u> |
|------------|------------------------------|-----------------|--|
| iv | Table of Contents | 11 | Change "Guild" to "Guide" |
| 4 | 1.01.01 | 8 | After the end of the definition for "Plans," insert as a subset, "A. Standard Sheets – Standardized plans containing details approved by the Department and the FHWA, for construction of a given type on any project, included in contracts on an as-needed basis." |
| 6 | 1.01.02 | 41 | Change "Aluminum Association" to "Aluminum Association, Inc. (The)" |
| 6 | 1.01.02 | 42 | Delete "AAA – Aluminum Alloy Association" |
| 7 | 1.01.02 | 1 | Insert "AABC – Associated Air Balance Council" |
| 7 | 1.01.02 | 1 | Insert "AAMA – American Architectural Manufacturers Association" |
| 7 | 1.01.02 | 12 | Insert "ABMA – American Bearing Manufacturers Association" |
| 7 | 1.01.02 | 12 | Insert "ACGIH – American Council of Government Industrial Hygienists" |
| 7 | 1.01.02 | 12 | Change "American Concrete Institute" to "ACI International (American Concrete Institute)" |
| 7 | 1.01.02 | 14 | Insert "ADAAG – Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities" |
| 7 | 1.01.02 | 16 | Change "Associated General Contractors of America" to "Associated General Contractors of America (The)" |
| 7 | 1.01.02 | 19 | Insert "AI – Asphalt Institute" |
| 7 | 1.01.02 | 19 | Change "American Institute of Architects" to "American Institute of Architects (The)" |
| 7 | 1.01.02 | 20 | Delete "AIEE – American Institute of Electrical Engineers " |
| 7 | 1.01.02 | 24 | Delete "ALI – Associated Laboratories, Inc." |
| 7 | 1.01.02 | 26 | Change "American Lumber Standard Committee" to "American Lumber Standards Committee, Incorporated" |
| 7 | 1.01.02 | 27 | Change "Air Movement and Control Association" to "Air Movement and Control Association International, Inc." |
| 7 | 1.01.02 | 31 | Delete "AOEC – Area of Environmental Concern" |
| 7 | 1.01.02 | 33 | Change "The Engineered Wood Association" to "APA-The Engineered Wood Association" |
| 7 | 1.01.02 | 37 | Change "Air Conditioning" to "Air-Conditioning" |
| 8 | 1.01.02 | 7 | Change "Air Conditioning" to "Air-Conditioning" |
| 8 | 1.01.02 | 8 | Change "American Society of Mechanical Engineers" to "ASME International (The American Society of Mechanical Engineers International)" |
| 8 | 1.01.02 | 18 | Delete "ATA – American Transit Association" |
| 8 | 1.01.02 | 20 | Delete "AWG – American Wire Gauge" |
| 8 | 1.01.02 | 22 | Change "Wood-Preservers" to "Wood-Preservers' " |
| 8 | 1.01.02 | 33 | Delete "AZI – American Zinc Institute" |
| 8 | 1.01.02 | 35 | Change "Building Officials and Code Administrators International" to "BOCA International, Inc." |

| <u>PG.</u> | <u>ARTICLE OR SUBARTICLE</u> | <u>LINE NO.</u> | <u>CORRECTION</u> |
|------------|------------------------------|-----------------|---|
| 8 | 1.01.02 | 38 | Change "Library" to "Laboratory" |
| 9 | 1.01.02 | 2 | Change "CONNDOT" to "ConnDOT" |
| 9 | 1.01.02 | 6 | Delete "CPI – Clay Pipe Institute" |
| 9 | 1.01.02 | 9 | Delete "CS – Commercial Standard" |
| 9 | 1.01.02 | 10 | Change "Construction Specifications Institute" to "Construction Specifications Institute (The)" |
| 9 | 1.01.02 | 12 | Change "Tower" to "Technology" |
| 9 | 1.01.02 | 17 | Delete "DFPA – Douglas Fir Plywood Association" |
| 9 | 1.01.02 | 19 | Change "Department of Defense" to "Department of Defense Military Specifications and Standards" |
| 9 | 1.01.02 | 21 | Change "Association" to "Alliance" |
| 9 | 1.01.02 | 23 | Delete "U.S. Department of Transportation" |
| 9 | 1.01.02 | 28 | Delete "U.S. Department of Transportation" |
| 9 | 1.01.02 | 30 | Insert "FMG – FM Global" |
| 9 | 1.01.02 | 31 | Delete "U.S. Department of Transportation" |
| 10 | 1.01.02 | 2 | Delete "HASP – Health and Safety Plan" |
| 10 | 1.01.02 | 3 | Delete "HMA – Hot Mix Asphalt or Bituminous Concrete" |
| 10 | 1.01.02 | 4 | Delete "HPMA – Hardwood Plywood Manufacturers Association" |
| 10 | 1.01.02 | 5 | Insert "HPVA – Hardwood Plywood & Veneer Association" |
| 10 | 1.01.02 | 9 | Insert "ICC – International Code Council" |
| 10 | 1.01.02 | 9 | Change "Insulated Cable Engineers Association" to "Insulated Cable Engineers Association, Inc." |
| 10 | 1.01.02 | 10 | Change "Institute of Electrical and Electronics Engineers" to "Institute of Electrical and Electronics Engineers, Inc. (The)" |
| 10 | 1.01.02 | 21 | Change "Military Standardization Documents, U.S. Department of Defense" to "(MILSPEC) Military Specification and Standards" |
| 10 | 1.01.02 | 24 | Delete "MS – Military Specifications" |
| 10 | 1.01.02 | 26 | Change "Manufacturers Standardization Society of the Valve and Fittings Industry Inc." to "Manufacturers Standardization Society of The Valve and Fittings the Valve Industry Inc." |
| 10 | 1.01.02 | 29 | Change "National Association of Architectural Metal Manufacturers (The)" to "National Association of Architectural Metal Manufacturers" |
| 10 | 1.01.02 | 31 | Insert "NADCA – National Air Duct Cleaners Association" |
| 10 | 1.01.02 | 34 | Delete "NBS – National Bureau of Standards" |
| 10 | 1.01.02 | 35 | Delete "NC – National Course" |
| 11 | 1.01.02 | 3 | Delete "NCPRC – National Clay Pipe Research Corporation" |
| 11 | 1.01.02 | 10 | Change "International Electrical Testing Association" to "InterNational Testing Association" |
| 11 | 1.01.02 | 12 | Delete "NFS – NFS International" |
| 11 | 1.01.02 | 13 | Insert "NHLA – National Hardwood Lumber Association" |
| 11 | 1.01.02 | 18 | Insert "NLGA – National Lumber Grades Authority" |
| 11 | 1.01.02 | 18 | Delete "NLMA – National Lumber Manufacturers Association" |
| 11 | 1.01.02 | 21 | Insert "NSF – NSF International" |
| 11 | 1.01.02 | 21 | Change "National Terrazzo and Mosaic Association (The)" to "National Terrazzo and Mosaic Association, Inc." |
| 11 | 1.01.02 | 26 | Delete "PCC – Portland Cement Concrete" |
| 11 | 1.01.02 | 28 | Delete "PLP – Plastic Laminate Producers" |
| 11 | 1.01.02 | 29 | Delete "PS – Product Standard of NBS, U.S. Department of Commerce" |
| 11 | 1.01.02 | 32 | Delete "RLMI – Reflector and Lamp Manufacturers' Institute" |

| <u>PG.</u> | <u>ARTICLE OR SUBARTICLE</u> | <u>LINE NO.</u> | <u>CORRECTION</u> |
|------------|------------------------------|-----------------|---|
| 11 | 1.01.02 | 35 | Delete "SAWP – Society of American Wood Preservers" |
| 11 | 1.01.02 | 36 | Insert "SDI – Steel Deck Institute" |
| 11 | 1.01.02 | 36 | Insert "S.D.I. – Steel Door Institute" |
| 11 | 1.01.02 | 37 | Insert "SJI – Steel Joist Institute" |
| 11 | 1.01.02 | 37 | Insert "SMACNA – Sheet Metal and Air Conditioning Contractors' National Association" |
| 11 | 1.01.02 | 37 | Change "Southern Pine Inspection Bureau" to "Southern Pine Inspection Bureau (The)" |
| 12 | 1.01.02 | 9 | Change "Tile Council of America" to "Tile Council of America, Inc." |
| 12 | 1.01.02 | 10 | Insert "TIA – Telecommunications Industry Association" |
| 12 | 1.01.02 | 10 | Insert "TPI – Truss Plate Institute, Inc." |
| 12 | 1.01.02 | 10 | Delete "UBC – Uniform Building Code" |
| 12 | 1.01.02 | 11 | Change "Underwriters Laboratories, Inc." to "Underwriters Laboratories Inc." |
| 12 | 1.01.02 | 12 | Delete "UMTA – Urban Mass Transportation Administration, U.S. Department of Transportation" |
| 12 | 1.01.02 | 14 | Delete "UPC – Uniform Plumbing Code" |
| 12 | 1.01.02 | 15 | Insert "USGBC – U.S. Green Building Council" |
| 12 | 1.01.02 | 16 | Delete "USS – United States Standard" |
| 12 | 1.01.02 | 17 | Delete "VOC – Volatile Synthetic Organic Chemicals" |
| 12 | 1.01.02 | 19 | Delete "WCLA – West Coast Lumberman's Association" |
| 12 | 1.01.02 | 20 | Insert "WCSC – Window Covering Safety Council" |
| 12 | 1.01.02 | 20 | Delete "WSA – Temporary Waste Stockpile Area" |
| 12 | 1.01.03 | 31 | Insert "AOEC – Area of Environmental Concern" |
| 12 | 1.01.03 | 31 | Insert "AWG – American Wire Gauge" |
| 13 | 1.01.03 | 16 | Insert "HASP – Health and Safety Plan" |
| 13 | 1.01.03 | 29 | Insert "PCC – Portland Cement Concrete" |
| 14 | 1.01.03 | 25 | Insert "VOC – Volatile Organic Compound" |
| 14 | 1.01.03 | 26 | Insert "WSA – Temporary Waste Stockpile Area" |
| 22 | 1.03.07 | 23 | Change " \$1,000,000 " to " \$2,000,000 " |
| 32 | 1.05.01 | 38 | Change "Connecticut General Statutes" to "CGS" |
| 45 | 1.05.15 | 29 | Change "Department of Public Utility Control" to "DPUC" |
| 105 | 1.20 | 29 | Change "Workmen and Equipment" to "Personnel and Equipment" |
| 105 | 1.20 | 31 | Delete "Completion of Construction Work and" |
| 107 | 1.20-1.02.13 | 15 | Change "Americans with Disabilities Act Accessibility Guidelines" to "ADAAG" |
| 108 | 1.20-1.04.01 | 26 | Change "othewise" to "otherwise" |
| 119 | 1.20-1.05.25 | 4 | Change "Certificate of Compliance" to "C.O.C." |
| 122 | 1.20-1.06.08 | 3 | Change "Certificate of Compliance" to "C.O.C." |
| 131 | 1.20-1.08.05 | 34 | Change "Workmen and Equipment" to "Personnel and Equipment" |
| 132 | 1.20-1.08.11 | 12 | Change "Certificate of Compliance" to "C.O.C." |
| 133 | 1.20-1.08.13 | 7 | Delete "Completion of Construction Work and" |
| 133 | 1.20-1.08.13 | 9 | Change "Certificate of Compliance" to "C.O.C." |
| 133 | 1.20-1.08.11 | 15 | Change "Certificate of Compliance" to "C.O.C." |
| 133 | 1.20-1.08.11 | 20 | Change "Certificate of Compliance" to "C.O.C." |
| 143 | 2.02.01 | 28 | Insert ", swales" after "channels" |
| 245 | 4.06.04 | 11 | Change " Over weight (mass) Adjustments - " and replace with indented "Over weight (mass) Adjustments -" as a subsection of " 1. Bituminous Concrete Class () ". |

| <u>PG.</u> | <u>ARTICLE OR SUBARTICLE</u> | <u>LINE NO.</u> | <u>CORRECTION</u> |
|------------|------------------------------|-----------------|---|
| 259 | 5.03.03 | 24 | Change "Such requirements of Article 5.02.03 as are pertinent shall apply equally to this construction." To "All such plans prepared by the Contractor shall be considered working drawings and shall be submitted with engineering calculations to the Engineer for review in accordance with the requirements of Article 1.05.02." |
| 270 | 5.08.02 | 4 | Change "M.06.02-12" to "M.06.02-4 Welded Stud Shear Connectors" |
| 271 | 5.09.02 | 39 | Change "M.06.02-12" to "M.06.02-4 Welded Stud Shear Connectors" |
| 284 | 5.14.03-12 | 12 | Change "Article M.06.02-13" to "Subarticle 6.03.03 (a) Shop Fabrication Notice" |
| 351 | 6.03.03 | 8 | Change "MS MIL-C-11796B" to "MIL-C-11796B" |
| 434 | 9.04.02 | 14 | Change "Subarticle M.06.02-1" to "Article 6.03.02" |
| 434 | 9.04.02 | 15 | Change "M.06.02-9(d) for metal bridge rail (cast post—aluminum)." to "Malleable castings shall conform to the requirements of the specifications for malleable iron castings, ASTM A 47, Grade No. 32510 (22010). Ductile iron castings shall conform to the Specifications for Ductile Iron Castings, ASTM A 536, Grade 60-40-18 (414-276-18) unless otherwise specified. In addition to the specified test coupons, test specimens from parts integral with the castings, such as risers, shall be tested for castings having a weight (mass) of more than 1000 pounds (455 kilograms) to determine that the required quality is obtained in the castings in the finished condition." |
| 452 | 9.14.02 | 2 | Change "Subarticle M.06.02-8" to "ASTM A 53, Type E or S, Grade A, Schedule 40 Black Finish." |
| 452 | 9.14.02 | 4 | Change "Subarticle M.06.02-9(d) except that the grade shall be 32510" to "the specifications for malleable iron castings, ASTM A 47, Grade No. 32510 (22010). Ductile iron castings shall conform to the Specifications for Ductile Iron Castings, ASTM A 536, Grade 60-40-18 (414-276-18) unless otherwise specified. In addition to the specified test coupons, test specimens from parts integral with the castings, such as risers, shall be tested for castings having a weight (mass) of more than 1000 pounds (455 kilograms) to determine that the required quality is obtained in the castings in the finished condition." |
| 496 | 9.70.01 | 37 | Change "CDOT" to "ConnDOT" |
| 569 | 11.14.05 | 19 | Change "Span Wire" to "Span Wire (Type)" |
| 577 | 12.01.03 | 7 | Change "6.03.03-19" to "6.03.03-4 (f) High Strength Bolted Connections" |
| 577 | 12.01.03 | 23 | Change "Article 6.03.03-15" to "Subarticle 6.03.03-4(c) Bearings" |
| 577 | 12.01.03 | 27 | Change "Article 6.03.03-19 (c)(3)" to "Subarticle 6.03.03-4 (f) High Strength Bolted Connections Turn-of-Nut Installation Method" |
| 604 | 18.00.02 | 7 | Change "National Cooperative Highway Research Program (NCHRP)" to "NCHRP" |
| 623 | M.03.01 | 9 | Change "Cement and Concrete Reference Laboratory" to "CCRL" |
| 623 | M.03.01 | 13 | Change "Cement and Concrete Reference Laboratory" to "CCRL" |
| 626 | M.03.01 | 2 | Change "Cement and Concrete Reference Laboratory" to "CCRL" |

| <u>PG.</u> | <u>ARTICLE OR SUBARTICLE</u> | <u>LINE NO.</u> | <u>CORRECTION</u> |
|------------|------------------------------|-----------------|--|
| 626 | M.03.01 | 3 | Change "NBS" to "NIST" |
| 632 | M.03.01 | 18 | Change "Cement and Concrete Reference Laboratory" to "CCRL" |
| 638 | M.04.02 | 37 | Change "Asphalt Institute's" to "AI's" |
| 711 | M.10.02-1 | 17 | Change "Subarticle M.06.02-1(b)" to "Article M.06.02" |
| 720 | M.10.08-3 | 2 | Change "Subarticle M.06.02-1(b)" to "Article M.06.02" |
| 735 | M.13.03 | 22 | Change "AOAC International" to "AOAC" |
| 760 | M.15.15 | 21 | Change "non-fusible" to "fused" |
| 780 | M.16.08 | 41 | Change "Americans With Disabilities Act (ADA)" to "ADA" |
| 790 | M.16.10 | 24 | Change "Underwriter's Laboratory" to "UL" |
| 800 | M.17.01 | 19 | Change "AAA 6061-T6" to "AA 6061-T6" |
| 837 | Pay Items | 24 | Change "Span Wire" to "Span Wire (Type)" |
| 845 | Index | 6 | Add page 133 to "Acceptance of Project" |
| 846 | Index | 13 | Add page 107 to "Bids: Consideration of" |
| 847 | Index | 28 | Add page 132 to "Cleaning Up, Final" |
| 849 | Index | 25 | Add page 107 to "Consideration of Bids" |
| 849 | Index | 39 | Add page 108 to "Contract: Intent of" |
| 850 | Index | 3 | Add page 133 to "Contractor's: Responsibility, Termination of the" |
| 850 | Index | 13 | Add page 114 to "Cooperation by Contractor" |
| 850 | Index | 15 | Add page 114 to "Coordination of Special Provisions, Plans, Supplemental Specifications and Standard Specifications and Other Contract Requirements" |
| 850 | Index | 40 | Add page 128 to "Cutting and Patching:" |
| 852 | Index | 16 | Add page 106 to "Examination of Plans, Specifications, Special Provisions and Site of Work" |
| 852 | Index | 38 | Insert "Facilities, Temporary...126" |
| 853 | Index | 7 | Add page 132 to "Final: Cleaning Up" |
| 854 | Index | 35 | Add page 115 to "Inspection" |
| 855 | Index | 11 | Add page 108 to "Intent of Contract" |
| 855 | Index | 22 | Add page 106 to "Knowledge of Applicable Laws" |
| 855 | Index | 25 | Add page 106 to "Laws: Knowledge of Applicable" |
| 856 | Index | 27 | Add page 120 to "Materials: Source of Supply and Quality" |
| 856 | Index | 28 | Add page 121 to "Materials: Storage of" |
| 857 | Index | 33 | Add page 133 to "Operation and Maintenance Manuals:" |
| 857 | Index | 34 | Change page 133 to 136 for "Equipment and Systems Maintenance Manual" |
| 859 | Index | 2 | Add page 131 to "Personnel and Equipment" |
| 860 | Index | 6 | Add page 114 to "Plans: Coordination of Special Provisions, Supplemental Specifications and Standard Specifications and Other Contract Requirements" |
| 860 | Index | 7 | Add page 106 to "Plans: Examination of" |
| 860 | Index | 30 | Change page 108 to 112 for "Product Data" |
| 860 | Index | 31 | Change page 108 to 112 for "Product Samples " |
| 860 | Index | 32 | Add page 124 to "Product Selection:" |
| 861 | Index | 12 | Add page 126 to "Prosecution of Work" |
| 861 | Index | 38 | Change page 115 to 135 for "Record Drawings" |
| 863 | Index | 3 | Add page 125 to "Sanitary Provisions" |
| 863 | Index | 18 | Insert "Services, Temporary...126" |
| 863 | Index | 23 | Add page 111 to "Shop Drawings" |
| 864 | Index | 4 | Add page 106 to "Site of Work, Examination of" |

| <u>PG.</u> | <u>ARTICLE OR SUBARTICLE</u> | <u>LINE NO.</u> | <u>CORRECTION</u> |
|------------|----------------------------------|---------------------|--|
| 864 | Index | 12 | Add page 120 to "Source of Supply and Quality" |
| 864 | Index | 19 | Add page 114 to "Special Provisions: Coordination of Plans, Supplemental Specifications and Standard Specifications and Other Contract Requirements" |
| 864 | Index | 20 | Add page 106 to "Special Provisions: Examination of" |
| 864 | Index | 26 | Add page 114 to "Specifications: Coordination of Plans, Special Provisions and Other Contract Requirements" |
| 864 | Index | 27 | Add page 106 to "Specifications: Examination of" |
| 864 | Index | 43 | Add page 121 to "Storage" |
| 865 | Index | 27 | Delete page 108 from "Submittals: Shop Drawings" |
| 865 | Index | 45 | Insert "Temporary Utilities, Services, and Facilities...126" |
| 866 | Index | 2 | Add page 133 to "Termination of Contractor's Responsibility" |
| 866 | Index | 23 | Insert "Training...137" |
| 866 | Index | 45 | Add page 133 to "Utility Services" |
| 867 | Index | 8 | Insert "Warranties...121" |
| 867 | Index | 24 | Add page 126 to "Work: Prosecution of" |

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.01
DEFINITIONS OF TERMS AND
PERMISSIBLE ABBREVIATIONS**

1.01.01 — Definitions:

Add the following definition:

SUBSTANTIAL COMPLETION: The date at which the performance of all work on the Project has been completed except minor or incidental items, final cleanup, work required under a warranty, and repair of unacceptable work, and provided the Engineer has determined that:

- A. The Project is safe and convenient for use by the public, and
- B. All traffic lanes including all safety appurtenances are in their final configuration, and
- C. Failure to complete the work and repairs excepted above does not result in the deterioration of other completed work; and provided further, that the value of work remaining to be performed, repairs, and cleanup is less than one percent (1%) of the estimated final Contract amount, and
- D. If applicable a Certificate of Compliance has been issued.

1.01.02 — Abbreviations, Publications, and Standards:

Delete the like-named abbreviations and replace it with the following abbreviations:

“**AA** – Aluminum Association, Inc. (The)
ALSC – American Lumber Standard Committee, Incorporated
AMCA – Air Movement and Control Association International, Inc.
AOSA – Association of Official Seed Analysts, Inc.
ASME – ASME International (The American Society of Mechanical Engineers International)
CTI – Cooling Technology Institute
EIA – Electronic Industries Alliance
ICEA – Insulated Cable Engineers Association, Inc.
IEEE – Institute of Electrical and Electronics Engineers, Inc. (The)
NTMA – National Terrazzo & Mosaic Association, Inc. (The)
TCA – Tile Council of America, Inc.”

Delete the Following abbreviations:

“**ADA** – Americans with Disabilities Act
AFPA – American Forest and Paper Association

BOCA – Building Officials and Code Administrators International
FM – Factory Mutual System
ICBO – International Conference of Building Officials
MIL – Military Standardization Documents, U.S Department of Defense
MS – Military Specifications
NWWDA – National Wood Window and Door Association
NFS – NFS International”

Add the following abbreviations:

“**ADAAG** – Americans with Disabilities Act (ADA)
AABC – Associated Air Balance Council
AAMA – American Architectural Manufacturers Association
ABMA – American Bearing Manufacturers Association
AF&PA – American Forest & Paper Association
AI – Asphalt Institute
BIA – Brick Industry Association (The)
CDA – Copper Development Association Inc.
CGA – Compressed Gas Association
FMG – FM Global
HI – Hydraulic Institute
HPVA – Hardwood Plywood & Veneer Association
ICC – International Code Council
ICC-ES – ICC Evaluation Service, Inc.
IEC – International Electrotechnical Commission
IGMA – Insulating Glass Manufacturers Alliance
ISO – International Organization for Standardization
MILSPEC – Military Specification and Standards
NADCA –National Air Duct Cleaners Association
NFRC – National Fenestration Rating Council
NHLA – National Hardwood Lumber Association
NSF – NSF International (National Sanitation Foundation International)
PDI – Plumbing & Drainage Institute
SDI – Steel Deck Institute *or*
- Steel Door Institute
SJI – Steel Joist Institute
SMACNA – Sheet Metal and Air Conditioning Contractors’ National Association
SPRI – Single Ply Roofing Industry
SWRI – Sealant, Waterproofing, & Restoration Institute
TIA/EIA – Telecommunications Industry Association/Electronic Industries Alliance
TRB – Transportation Research Board
UFAS – Uniform Federal Accessibility Standards
USGBC – U.S. Green Building Council
WDMA – Window & Door Manufacturers Association”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.05
CONTROL OF THE WORK**

Replace Article 1.05.08 – Vacant with the following:

1.05.08—SCHEDULES AND REPORTS:

When a project coordinator is not required by the Contract the following shall apply:

Baseline Bar Chart Construction Schedule: Within 20 calendar days after contract award the Contractor shall develop a comprehensive bar chart as a baseline schedule for the project. The bar chart schedule shall be submitted to the Engineer for approval and shall be based on the following guidelines:

1. The bar chart schedule shall contain a list of activities that represents the major activities of the project. At a minimum, this list should include a breakdown by individual structure or stage, including major components of each. The bar chart schedule shall contain sufficient detail to describe the progression of the work in a comprehensive manner. As a guide, 10 to 15 bar chart activities should be provided for each \$1 million of contract value. The following list is provided as an example only and is not meant to be all-inclusive or all-applicable:

General Activities Applicable to all projects

Project Constraints

- Winter shutdowns
- Environmental permits/application time of year restrictions
- Milestones
- Third Party approvals
- Long lead time items (procurement and fabrication of major elements)
- Adjacent Projects or work by others

Award

Notice to Proceed

Signing (Construction, temporary, permanent by location)

Mobilization

Permits as required

Field Office

Utility Relocations

Submittals/shop drawings/working drawings/product data

Construction of Waste Stock pile area

Clearing and Grubbing

Earthwork (Borrow, earth ex, rock ex etc.)

Traffic control items (including illumination and signalization)

Pavement markings

Roadway Construction (Breakdown into components)

Drainage (Breakdown into components)

Culverts
Plantings (including turf establishment)
Semi-final inspection
Final Cleanup

As required the following may supplement the activities listed above for the specific project types indicated:

a. For bridges and other structures, include major components such as abutments, wingwalls, piers, decks and retaining walls; further breakdown by footings, wall sections, parapets etc.

Temporary Earth Retention Systems
Cofferdam and Dewatering
Structure Excavation
Piles/test piles
Temporary Structures
Removal of Superstructure
Bearing Pads
Structural Steel (Breakdown by fabrication, delivery, installation, painting etc.)
Bridge deck

b. Multiple location projects such as traffic signal, incident management, lighting, planting and guiderail projects will be broken down first by location and then by operation. Other major activities of these types of projects should include, but are not limited to:

Installation of anchors
Driving posts
Foundations
Trenching and Backfilling
Installation of Span poles/mast arms
Installation of luminaries
Installation of cameras
Installation of VMS
Hanging heads
Sawcut loops
Energizing equipment

c. Facility Projects – Facilities construction shall reflect the same breakdown of the project as the schedule of values:

Division 2 – Existing Conditions
Division 3 – Concrete
Division 4 – Masonry
Division 5 – Metals

Division 6 – Wood, Plastic, and Composites
Division 7 – Thermal and Moisture Protection
Division 8 – Openings
Division 9 – Finishes
Division 10 – Specialties
Division 11 – Equipment
Division 12 - Furnishings
Division 13 – Special Construction
Division 14 – Conveying Equipment
Division 21 – Fire Suppression
Division 22 – Plumbing
Division 23 – Heating, Ventilating, and Air Conditioning
Division 26 – Electrical
Division 27 – Communications
Division 28 – Electronic Safety and Security
Division 31 – Earthwork
Division 32 – Exterior Improvements
Division 33 - Utilities

2. If the Engineer determines that additional detail is necessary, the Contractor shall provide it.
 3. Each activity shall have a separate schedule bar. The schedule timeline shall be broken into weekly time periods with a vertical line to identify the first working day of each week.
 4. The bar chart schedule shall show relationships among activities. The critical path for the Project shall be clearly defined on the schedule. The schedule shall show milestones for major elements of work, and shall be prepared on a sheet, or series of sheets of sufficient width to show data for the entire construction period.
 5. If scheduling software is used to create the bar chart schedule, related reports such as a predecessor and successor report, a sort by total float, and a sort by early start shall also be submitted.
 6. Project activities shall be scheduled to demonstrate that the construction completion date for the Project will occur prior to expiration of the Contract time. In addition, the schedule shall demonstrate conformance with any other dates stipulated in the Contract.
 7. The Contractor is responsible to inform its subcontractor(s) and supplier(s) of the project schedule and any relevant updates.
 8. There will be no direct payment for furnishing schedules, the cost thereof shall be considered as included in the general cost of the work.
 9. For projects without a Mobilization item, 5% of the contract value will be withheld until such time as the Baseline Schedule is approved.
- Monthly Updates:** No later than the 10th day of each month, unless directed otherwise by the Engineer, the Contractor shall deliver to the Engineer three copies of the schedule to show the work actually accomplished during the preceding month, the actual time spent on each activity, and the estimated time needed to complete any

activity which has been started but not completed. Each time bar shall indicate, in 10% increments, the estimated percentage of that activity which remains to be completed. As the Project progresses, the Contractor shall place a contrasting mark in each bar to indicate the actual percentage of the activity that has been completed.

The monthly update shall include revisions of the schedule necessitated by revisions to the Project directed by the Engineer (including, but not limited to extra work), during the month preceding the update. Similarly, any changes of the schedule required due to changes in the Contractor's planning or progress shall also be included. The Engineer reserves the right to reject any such revisions. If the schedule revisions extend the contract completion date, due to extra or added work or delays beyond the control of the Contractor, the Contractor shall submit a request in writing for an extension of time in accordance with Article 1.08.08. This request shall be supported by an analysis of the schedules submitted previously.

Any schedule revisions shall be identified and explained in a cover letter accompanying the monthly update. The letter shall also describe in general terms the progress of the Project since the last schedule update and shall identify any items of special interest.

If the Contractor fails to provide monthly schedule updates, the Engineer has the right to hold 10% of the monthly estimated payment, or \$5,000, whichever is less, until such time as an update has been provided in accordance with this provision.

Biweekly Schedules: Each week, the Contractor shall submit to the Engineer a two week look-ahead schedule. This short-term schedule may be handwritten but shall clearly indicate all work planned for the following two week period.

Recovery Schedules: If the updated schedule indicates that the Project has fallen behind schedule, the Contractor shall either submit a time extension request in accordance with 1.08.08 or immediately institute steps acceptable to the Engineer to improve its progress of the Project. In such a case, the Contractor shall submit a recovery plan, as may be deemed necessary by the Engineer, to demonstrate the manner in which an acceptable rate of progress will be regained.

Replace the first paragraph of Article 1.05.12 – Payrolls with the following:

For each week of the Project from the first week during which an employee of the Contractor does Project work to which prevailing wage requirements apply, until the last week on which such an employee does such work, the Contractor shall furnish to the Engineer certified copies of payrolls showing (a) the names of the employees who worked on the Project and whose work is subject to prevailing wage requirements, (b) the specific days and hours and numbers of hours that each such employee worked on the Project, and (c) the amount of money paid to each such employee for Project work. Each such payroll shall include the statement(s) of compliance with prevailing wage laws required by the State of Connecticut and, if applicable, by the Federal government.

Said payrolls must contain all information required by Connecticut General Statutes Section 31-53 (as it may be revised). For contracts subject to Federal prevailing wage requirements, each payroll shall also contain the information required by the Davis Bacon and Related Acts (DBR). All of the payroll requirements in this Article shall also apply to the work of any subcontractor or other party that performs work on the Project site, and the Contractor shall be responsible for ensuring that each such party meets said requirements.

Add the following Article:

1.05.17 - WELDING

The Contractor shall ensure that all welding of materials permanently incorporated into the work, and welding of materials used temporarily during construction of the work is performed in accordance with the following codes:

- American Welding Society (AWS) Structural Welding Code – Steel – ANSI/AWS D1.1: Miscellaneous steel items that are statically loaded including but not limited to columns, and floor beams in buildings, railings, sign supports, cofferdams, tubular items, and modifications to existing statically loaded structures.
- AWS Structural Welding Code – Aluminum – AWS D1.2/D1.2M: Any aluminum structure or member including but not limited to brackets, light standards, and poles.
- AWS Structural Welding Code – Sheet Steel – AWS D1.3/D1.3M: Sheet steel and cold-formed members 0.18 in.(4.6 mm) or less in thickness used as, but not limited, to decking and stay-in-place forms.
- AWS Structural Welding Code – Reinforcing Steel – AWS D1.4/D1.4M: Steel material used in the reinforcement of cast-in-place or pre-cast Portland cement concrete elements including but not limited to bridge decks, catch basin components, walls, beams, deck units, and girders.
- AASHTO/AWS – Bridge Welding Code, AASHTO/AWS D1.5/D1.5M: Steel highway bridges and other dynamically loaded steel structures. Also includes sign supports, and any other fracture critical structure.

The edition governing the work shall be in effect on the date the Contract was advertised for solicitation of bids.

The Contractor is responsible to provide a Certified Welding Inspector in accordance with the above noted codes. The cost for this service is included in the general cost of the work.

All welders shall be certified by the Engineer in accordance with Section 6.03.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.08
PROSECUTION AND PROGRESS**

Article 1.08.01 – Transfer of Work or Contract:

Replace the last paragraph with the following:

The Contractor shall not sublet, sell, transfer, assign, or otherwise dispose of the Contract or any portion thereof, or of the work provided for therein, or of its right, title, or interest therein, to any individual or entity without the written consent of the Commissioner. No payment will be made for such work until written consent is provided by the Commissioner.

Article 1.08.07 – Determination of Contract Time:

Replace the fifth paragraph with the following:

The total elapsed time in calendar days, computed as described above, from the commencement date specified in the Engineer's "Notice to Proceed" to the "Substantial Completion" date specified in the Engineer's "Notice of Substantial Completion" shall be considered as the time used in the performance of the Contract work.

Article 1.08.09 – Failure to Complete Work on Time:

Replace the second paragraph with the following:

If the last day of the initial Contract time or the initial Contract date determined for Substantial Completion is before December 1 in the given year, liquidated damages as specified in the Contract shall be assessed against the Contractor per calendar day (including any days during a winter shutdown period) from that day until the date on which the Project is substantially completed.

1.08.12—Final Inspection:

Replace the first paragraph with the following:

If the Engineer determines that the work may be substantially complete, a Semi Final Inspection will be held as soon as practical. After the Semi Final Inspection is held and the Engineer determines that the requirements for Substantial Completion have been satisfied the Engineer will prepare a "Notice of Substantial Completion".

When the Contractor has completed all work listed in the “Notice of Substantial Completion” the Contractor shall prepare a written notice requesting a Final Inspection and a “Certificate of Acceptance of Work”. The Engineer will hold an Inspection of the Project as soon as practical after the Engineer determines that the Project may be completed. If the Engineer deems the Project complete, said inspection shall constitute the Final Inspection, and the Engineer will notify the Contractor in writing that the Final Inspection has been performed.

1.08.13 – Acceptance of Work and Termination of the Contractor’s Responsibility:

Replace the only paragraph with the following:

The Contractor’s responsibility for non-administrative Project work will be considered terminated when the final inspection has been held, any required additional work and final cleaning-up have been completed, all final operation and maintenance manuals have been submitted, and all of the Contractor’s equipment and construction signs have been removed from the Project site. When these requirements have been met to the satisfaction of the Engineer, the Commissioner will accept the work by certifying in writing to the Contractor that the non-administrative Project work has been completed.

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.09
MEASUREMENT AND PAYMENT

Article 1.09.04 – Extra and Cost-Plus Work

Delete the word “bonding” under section (a) Labor, (3).

Delete existing section (e) and replace with the following:

(e) Administrative Expense: When extra work on a cost-plus basis is performed by an authorized subcontractor, the Department will pay the Contractor an additional 7.5% for that work; such payment will be in addition to the percentage payments described in (a), (b), (c) and (d) above, as a reimbursement for the Contractor's administrative expense in connection with such work. Approval of such additional payments will be given only after the Contractor provides to the Engineer receipted invoices for all relevant costs.

Change Section designation for Miscellaneous from:

(f) Miscellaneous to: **(g) Miscellaneous**

Add the following as (f):

(f) Bonding Costs: For bonding on the total cost of the cost-plus work including administrative expenses as outlined in (e) above, the Contractor shall receive its actual cost. The Contractor shall provide to the Engineer documentation, satisfactory to the Engineer in form and substance, of all such costs.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.10
ENVIRONMENTAL COMPLIANCE**

Add the following Article:

1.10.08 – VEHICLE EMISSIONS

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

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

Idling of delivery trucks, dump trucks, and other equipment shall not be permitted in excess of 3 minutes during periods of non-activity except as allowed by the Regulations of Connecticut State Agencies Section 22a-174-18(b)(3)(c):

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

- (i) When a mobile source is forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control,
- (ii) When it is necessary to operate defrosting, heating or cooling equipment to ensure the safety or health of the driver or passengers,
- (iii) When it is necessary to operate auxiliary equipment that is located in or on the mobile source to accomplish the intended use of the mobile source,
- (iv) To bring the mobile source to the manufacturer’s recommended operating temperature,
- (v) When the outdoor temperature is below twenty degrees Fahrenheit (20 degrees F) [negative seven degrees Celsius (-7 degrees C)],
- (vi) When the mobile source is undergoing maintenance that requires such mobile source be operated for more than three (3) consecutive minutes, or
- (vii) When a mobile source is in queue to be inspected by U.S. military personnel prior to gaining access to a U.S. military installation.”

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

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

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

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.11
CLAIMS**

Add the following Section:

1.11.01 – General: When filing a formal claim under Section 4-61 (referred to as “Section 4-61” below) of the C.G.S. (as revised), either as a lawsuit in the Superior Court or as a demand for arbitration, the Contractor must follow the procedures and comply with the requirements set forth in this Section of the Specifications. This Section does not, unless so specified, govern informal claims for additional compensation which the Contractor may bring before the Department. The Contractor should understand, however, that the Department may need, before the Department can resolve such a claim, the same kinds of documentation and other substantiation that it requires under this Section. It is the intent of the Department to compensate the Contractor for actual increased costs caused by or arising from acts or omissions on the part of the Department that violate legal or contractual duties owed to the Contractor by the Department.

1.11.02 – Notice of Claim: Whenever the Contractor intends to file a formal claim against the Department under Section 4-61, seeking compensation for additional costs, the Contractor shall notify the Commissioner in writing (in strict compliance with Section 4-61) of the details of said claim. Such written notice shall contain all pertinent information described in Article 1.11.05 below.

Once formal notice of a claim under C.G.S. Section 4-61 (b) (as revised) has been given to the Commissioner, the claimant may not change the claim in any way, in either concept or monetary amount, (1) without filing a new notice of claim and demand for arbitration to reflect any such change and (2) without the minimum period of six months after filing of the new demand commencing again and running before any hearing on the merits of the claim may be held. The only exception to this limitation will be for damages that continue to accrue after submission of the notice, in ways described and anticipated in the notice.

1.11.03 – Record Keeping: The Contractor shall keep daily records of all costs incurred in connection with its construction-related activities on behalf of the Department. These daily records shall identify each aspect of the Project affected by matters related to any claim for additional compensation that the Contractor has filed, intends to file, or has reason to believe that it may file against the Department; the specific Project locations where Project work has been so affected; the number of people working on the affected aspects of the Project at the pertinent time(s); and the types and number of pieces of equipment on the Project site at the pertinent time(s). If possible, any potential or anticipated effect on the Project’s progress or schedule which may result in a claim by the Contractor should also be noted contemporaneously with the cause of the effect, or as soon thereafter as possible.

1.11.04 – Claim Compensation: The payment of any claim, or any portion thereof, that is deemed valid by the Engineer shall be made in accordance with the following provisions of this Article:

(a) Compensable Items: The liability of the Department for claims will be limited to the following specifically-identified items of cost, insofar as they have not otherwise been paid for by the Department, and insofar as they were caused solely by the actions or omissions of the Department or its agents (except that with regard to payment for extra work, the Department will pay to the Contractor the mark-ups provided for in Article 1.04.05.):

- (1) Additional Project-site labor expenses.
- (2) Additional costs for materials.
- (3) Additional, unabsorbed Project-site overhead (**e.g.**, for mobilization and demobilization).
- (4) Additional costs for active equipment.
- (5) For each day of Project delay or suspension caused solely by actions or omissions of the Department, either
 - (i) an additional ten percent (10%) of the total amount of the costs identified in Subarticles (1) through (4) above; except that if the delay or suspension period prevented the Contractor from incurring enough Project costs under Subarticles (1) through (4) during that period to require a payment by the Department that would be greater than the payment described in subparagraph (ii) below, then the payment for affected home office overhead and profit shall instead be made in the following *per diem* amount:
 - (ii) six percent (6%) of the original total Contract amount divided by the original number of days of Contract time.Payment under either (i) or (ii) hereof shall be deemed to be complete and mutually-satisfactory compensation for any unabsorbed home office overhead and any profit related to the period of delay or suspension.
- (6) Additional equipment costs. Only actual equipment costs shall be used in the calculation of any compensation to be made in response to claims for additional Project compensation. Actual equipment costs shall be based upon records kept in the normal course of business and in accordance with generally-accepted accounting principles. Under no circumstances shall Blue Book or other guide or rental rates be used for this purpose (unless the Contractor had to rent the equipment from an unrelated party, in which case the actual rental charges paid by the Contractor, so long as they are reasonable, shall be used). Idle equipment, for instance, shall be paid for based only on its actual cost to the Contractor.
- (7) Subcontractor costs limited to, and determined in accordance with, Subarticles (1), (2), (3), (4), and (5) above and applicable statutory and case law. Such subcontractor costs may be paid for by the Department only (a) in the context of an informal claims settlement or (b) if the Contractor has itself paid or legally-assumed, present unconditional liability for those subcontractor costs.

(b) Non-Compensable Items: The Department will have no liability for the following specifically-identified non-compensable items:

- (1) Profit, in excess of that provided for herein.
- (2) Loss of anticipated profit.
- (3) Loss of bidding opportunities.
- (4) Reduction of bidding capacity.
- (5) Home office overhead in excess of that provided for in Article 1.11.04(a)(5) hereof.
- (6) Attorneys fees, claims preparation expenses, or other costs of claims proceedings or resolution.
- (7) Any other consequential or indirect expenses or costs, such as tort damages, or any other form of expense or damages not provided for in these Specifications or elsewhere in the Contract.

1.11.05 – Required Claim Documentation: All claims shall be submitted in writing to the Commissioner, and shall be sufficient in detail to enable the Engineer to ascertain the basis and the amount of each claim, and to investigate and evaluate each claim in detail. As a minimum, the Contractor must provide the following information for each and every claim and sub-claim asserted:

- (a) A detailed factual statement of the claim, with all dates, locations and items of work pertinent to the claim.
- (b) A statement of whether each requested additional amount of compensation or extension of time is based on provisions of the Contract or on an alleged breach of the Contract. Each supporting or breached Contract provision and a statement of the reasons why each such provision supports the claim, must be specifically identified or explained.
- (c) Excerpts from manuals or other texts which are standard in the industry, if available, that support the Contractor's claim.
- (d) The details of the circumstances that gave rise to the claim.
- (e) The date(s) on which any and all events resulting in the claim occurred, and the date(s) on which conditions resulting in the claim first became evident to the Contractor.
- (f) Specific identification of any pertinent document, and detailed description of the substance of any material oral communication, relating to the substance of such claim.
- (g) If an extension of time is sought, the specific dates and number of days for which it is sought, and the basis or bases for the extension sought. A critical path method, bar chart, or other type of graphical schedule that supports the extension must be submitted.

- (h) When submitting any claim over \$50,000, the Contractor shall certify in writing, under oath and in accordance with the formalities required by the contract, as to the following:
- (1) That supporting data is accurate and complete to the Contractors best knowledge and belief;
 - (2) That the amount of the dispute and the dispute itself accurately reflects what the Contractor in good faith believes to be the Departments liability;
 - (3) The certification shall be executed by:
 - a. If the Contractor is an individual, the certification shall be executed by that individual.
 - b. If the Contractor is not an individual, the certification shall be executed by a senior company official in charge at the Contractor's plant or location involved or an officer or general partner of the Contractor having overall responsibility for the conduct of the Contractors affairs.

1.11.06 – Auditing of Claims: All claims filed against the Department shall be subject to audit by the Department or its agents at any time following the filing of such claim. The Contractor and its subcontractors and suppliers shall cooperate fully with the Department's auditors. Failure of the Contractor, its subcontractors, or its suppliers to maintain and retain sufficient records to allow the Department or its agents to fully evaluate the claim shall constitute a waiver of any portion of such claim that cannot be verified by specific, adequate, contemporaneous records, and shall bar recovery on any claim or any portion of a claim for which such verification is not produced. Without limiting the foregoing requirements, and as a minimum, the Contractor shall make available to the Department and its agents the following documents in connection with any claim that the Contractor submits:

- (1) Daily time sheets and foreman's daily reports.
- (2) Union agreements, if any.
- (3) Insurance, welfare, and benefits records.
- (4) Payroll register.
- (5) Earnings records.
- (6) Payroll tax returns.
- (7) Records of property tax payments.
- (8) Material invoices, purchase orders, and all material and supply acquisition contracts.
- (9) Materials cost distribution worksheets.
- (10) Equipment records (list of company equipment, rates, etc.).
- (11) Vendor rental agreements
- (12) Subcontractor invoices to the Contractor, and the Contractor's certificates of payments to subcontractors.
- (13) Subcontractor payment certificates.
- (14) Canceled checks (payroll and vendors).
- (15) Job cost reports.
- (16) Job payroll ledger.

- (17) General ledger, general journal (if used), and all subsidiary ledgers and journals, together with all supporting documentation pertinent to entries made in these ledgers and journals.
- (18) Cash disbursements journals.
- (19) Financial statements for all years reflecting the operations on the Project.
- (20) Income tax returns for all years reflecting the operations on the Project.
- (21) Depreciation records on all company equipment, whether such records are maintained by the company involved, its accountant, or others.
- (22) If a source other than depreciation records is used to develop costs for the Contractor's internal purposes in establishing the actual cost of owning and operating equipment, all such other source documents.
- (23) All documents which reflect the Contractor's actual profit and overhead during the years that the Project was being performed, and for each of the five years prior to the commencement of the Project.
- (24) All documents related to the preparation of the Contractor's bid, including the final calculations on which the bid was based.
- (25) All documents which relate to the claim or to any sub-claim, together with all documents that support the amount of damages as to each claim or sub-claim.
- (26) Worksheets used to prepare the claim, which indicate the cost components of each item of the claim, including but not limited to the pertinent costs of labor, benefits and insurance, materials, equipment, and subcontractors' damages, as well as all documents which establish the relevant time periods, individuals involved, and the Project hours and the rates for the individuals.
- (27) The name, function, and pertinent activity of each Contractor's or subcontractor's official, or employee involved in or knowledgeable about events that give rise to, or facts that relate to, the claim.
- (28) The amount(s) of additional compensation sought and a break-down of the amount(s) into the categories specified as payable under Article 1.11.04 above.
- (29) The name, function, and pertinent activity of each Department official, employee or agent involved in or knowledgeable about events that give rise to, or facts that relate to, the claim.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.20
GENERAL CLAUSES FOR FACILITIES CONSTRUCTION**

1.20-1.00 – General:

Delete the last sentence of the first paragraph and replace with the following:

“Facilities Construction is defined as the type of construction that requires the issuance of a Certificate of Compliance (C.O.C.) by the State Building Inspector or his authorized representative at the completion of a project, and includes site work considered ancillary to this type of construction.”

Add the following article:

1.20-1.01.01—Definitions:

OWNER: Where used herein, it is synonymous with Department or State.

1.20-1.02.04 – Examination of Plans, Specifications, Special Provisions and Site of Work:

Delete the first sentence of the first paragraph and replace with the following:

“CSI-formatted specifications are organized into Divisions and Sections based on the CSI’s “MasterFormat” numbering system.”

1.20-1.02.13 – Knowledge of Applicable Laws:

Delete Items 1 through 9 in their entirety and replace with the following:

1. “The 2003 International Building Code with the State Building Code, including latest Connecticut Supplement and Amendments.
2. The 2003 International Plumbing Code.
3. The 2003 International Mechanical Code.
4. The 2003 International Existing Building Code.
5. The 2006 International Energy Conservation Code.
6. The 2005 NFPA 70 National Electrical Code.
7. The 2003 ICC/ANSI A117.1.

8. The Fire Safety Code, including latest Connecticut Supplement and Amendments.
9. The 2003 International Fire Code.
10. The 2003 NFPA 1 Uniform Fire Code.
11. The 2003 NFPA 101 Life Safety Code.”

Add the following as the new last paragraph:

“All work to be performed by the Contractor shall comply with the “Americans with Disabilities Act Accessibility Guidelines.”

1.20-1.03.01 – Consideration of Bids:

Delete the entire article and replace with the following:

“The apparent low bidder shall submit to the Manager of Contracts a Schedule of Values within 14 days after bid opening. Any other Contractor that the Department may subsequently designate as the apparent lowest bidder shall make the aforesaid submission within 14 days from the date on which the Department notifies said Contractor that it has become the apparent lowest bidder. If, however, the Department deems it necessary for such a subsequently designated Contractor to make said submission within a shorter period of time, the Contractor shall make the submission within the time designated by the Department.

The total in the Schedule of Values shall equal the bid dollar amount for the Major Lump Sum Item (MLSI).

The Schedule of Values shall be divided into “Line Items” listed separately for each CSI Section of the Special Provisions. An additional line item for “Mobilization” may be incorporated into the Schedule of Values; however, this item may not exceed 10% of the value of the MLSI. The “Mobilization” line item will also include costs associated with “General Conditions” and “Insurance/Bonding.” Where requested by the Department, the Contractor shall break down the line items further into more specific line items.

In the event that this Contract is terminated or a portion of this Contract is deleted for any reason or in any way allowable by law under this Contract after the apparent low bidder has been awarded the Contract, the Schedule of Values will not be used for estimating payment due the Contractor for work completed prior to such termination of the Contract or deletion of work thereunder. In the case of Contract termination, payment shall be made in accordance with Article 1.05.14.”

1.20-1.05.02--Shop Drawings, Product Data, Product Samples and Quality Assurance Submittals

Delete the last sentence of the first paragraph and replace with the following:

“All facsimiles or other electronic documents from the Contractor shall be followed by an official transmittal.”

Delete the third paragraph and replace with the following:

“The Contractor shall number each submittal consecutively: When resubmitting a “Revise and Resubmit” or “Rejected” submittal, the Contractor shall label the transmittal with the original submittal number followed by a letter to designate the additional submission. All submittals shall be numbered conforming to the following examples:”

In column B of line 001, line 001a, and line 001b of the table in subsection 1, replace “07511” with “075110.”

Add the following to the end of the first paragraph of subsection 2:

“The Department reserves the right to return partial submittals unreviewed to the Contractor.”

Revise the third paragraph of subsection 2 to read:

“The Contractor shall allow at least 60 calendar days for review of any submittal requiring approval by FAA, FTA, any railroad, DEP, U.S. Coast Guard, Army Corps of Engineers, or any other outside agency.”

Delete the third and fourth paragraphs of subsection 3 and replace with the following:

“The Designer will not review submittals and the Engineer will not process payment estimates until the initial submittal schedule has been provided. Any delays in construction due to the Contractor's failure to provide a submittal schedule shall be the responsibility of the Contractor.

The Contractor must update its submittal schedule at least once a month, and distribute and post each updated schedule in the manner described above. The Engineer reserves the right not to process payment estimates without a recently updated submittal schedule on file.”

Replace the first sentence of the first paragraph of subsection 4 with the following:

“Shop Drawings consist of fabrication and installation drawings, roughing-in and setting drawings, schedules, patterns, templates and similar drawings, and wiring diagrams showing field-installed wiring, including power, signal, and control wiring.”

Replace the second paragraph of subsection 4 with the following:

“Shop drawings shall include the following information: Contract number, Project description, number and title of the drawing, date of drawing, revision number, name of Contractor and subcontractor submitting drawings, dimensions, identification of products, shopwork manufacturing instructions, design calculations, statement of compliance with Contractual standards, notation of dimensions established by field measurement, relationship to adjoining construction clearly indicated, seal and signature of a professional engineer if specified, and any other information required by individual Contract provisions.”

Replace the first sentence of the first paragraph of subsection 5 with the following:

“Product data consist of printed information such as manufacturer’s product specifications, manufacturer’s installation instructions, manufacturer’s catalog cuts, standard color charts, wiring diagrams showing factory-installed wiring, printed performance curves, operational range diagrams, and mill reports.”

Replace the first sentence of the first paragraph of subsection 7 with the following:

“Quality assurance submittals consist of qualification data, design data, certifications, manufacturer’s instructions, manufacturer’s field reports, test reports, Material Safety Data Sheets (MSDSs), and other quality assurance information required by individual Contract provisions.”

1.20-1.05.04—Coordination of Special Provisions, Plans, Supplemental Specifications and Standard Specifications and Other Contract Requirements:

Delete the first and second paragraphs and replace with the following:

“Industry Standards: Each entity engaged in construction of the Contract shall be familiar with industry standards applicable to that entity's construction activities. If printed standards have been established by organizations referenced in Article 1.01.02 or in the Contract, the Contractor shall obtain copies of said standards directly from the publication source.

Unless the Special Provisions include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Special Provisions to the extent referenced. Such standards are made a part of the Contract by reference.”

Add the following article:

1.20-1.05.08—Schedules and Reports:

Daily Construction Reports: The Contractor shall assist the Engineer in the preparation of a daily construction report, by ensuring that each of the Contractor's employees and subcontractors working on the Project site on a given day signs the Engineer's sign-in sheet for that day; and by keeping and providing to the Engineer its own daily list of employees and subcontractors who worked on the Project site on that day.

Add the following article:

1.20-1.05.23—Requests for Information (RFIs):

The Contractor shall forward all RFIs to the Engineer in writing (facsimile or other electronic document) for review. The Engineer will forward the RFI to the Designer for review. Upon receipt of an RFI, the Designer will attempt to determine if additional information is required from the Contractor to respond to the RFI, and request said information from the Engineer.

All other RFIs will be responded to within 10 calendar days of receipt by the Designer.

1.20-1.05.24--Project Meetings:

Delete the third paragraph under subsection 1.

Delete the second paragraph under subsection 2 and replace with the following:

"The meeting participants shall review progress of other construction activities and preparations for the particular activity under consideration, including requirements of Contract documents, related requests for interpretations, related construction orders, purchases, deliveries, submittals, review of mockups, possible conflicts, compatibility problems, time schedules, weather limitations, manufacturer's written recommendations, warranty requirements, compatibility of materials, acceptability of substrates, temporary facilities and controls, space and access limitations, regulations of authorities having jurisdiction, testing and inspecting requirements, installation procedures coordination with other work, required performance results, protection of adjacent work, and protection of construction and personnel."

Delete the second, third and fourth paragraph under subsection 3 and replace with the following:

"The Contractor shall provide the Engineer with a detailed agenda for the proposed

meeting, specifying what topics will be covered. In addition to representatives of the Engineer, each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall attend these meetings. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Project.

At each progress meeting, the participants shall (1) review items of significance that could affect progress; (2) discuss topics appropriate to the current status of the Project; (3) review progress since the last meeting; (4) determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to the Contractor's Construction Schedule; (5) determine how to expedite any Project work that may be behind schedule; (6) discuss whether or not schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract time; and (7) review the present and future needs of each entity represented at the meeting, including such items as interface requirements, time, sequences, deliveries, off-site fabrication problems, access, site utilization, temporary facilities and controls, hours of work, hazards and risks, housekeeping, quality and work standards, status of correction of deficient items, field observations, requests for interpretations, status of proposal requests, pending changes, status of construction orders, and documentation of information for payment requests. The Engineer will distribute copies of minutes of the meeting to the Designer and the Contractor. The Contractor shall distribute copies to parties who were or should have been at the meeting.”

Delete article 1.20-1.05.25—Schedules and Reports in its entirety

1.20-1.06.08 - Warranties:

Delete the eighth and ninth paragraph and replace with the following:

“The Contractor shall:

(a) Bind warranties in heavy-duty, commercial-quality, durable 3-ring vinyl-covered loose-leaf binders, thick enough to accommodate the contents, and sized to receive 8 1/2-inch x 11-inch paper (216-millimeter x 279-millimeter) paper.

(b) Identify the binder's contents on the binder's front and spine with the typed or printed title “WARRANTIES,” the Project title or name, and the name of the Contractor.

(c) Provide a heavy paper divider with a tab for each separate warranty.

(d) Mark the tab to identify the related product or installation.

(e) Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the Contractor or pertinent subcontractor.

(f) Furnish to the Department a written warranty for all Project work accompanied by a cover letter with the following contents:

[Addressed to:]

Commissioner of Transportation
Department of Transportation
P.O. Box 317546
Newington, Connecticut 06131-7546

Project Title and Number

[We] hereby warrant all materials and workmanship for all work performed under this Contract for a period of one (1) year from [date of issuance of C.O.C.] against failures of workmanship and materials in accordance with the Contract. Furthermore, as a condition of this warranty, [we] agree to have in place all insurance coverage identified in the Contract for the performance of any warranty work.

[Signature:] [Name of authorized signatory]
[Title]

(g) Submit to the Engineer, upon completion of installation of materials or assemblies that are required to have either a flame-rating or a fire-endurance hourly rating, a detailed letter certifying that the required rating has been attained.

Upon determination by the Engineer that Project work covered by a warranty has failed, the Contractor shall replace or rebuild the work to an acceptable condition complying with Contract requirements. The Contractor is responsible for the cost of replacing or rebuilding defective construction or components and those which may have needed to be damaged or removed in order to cure the defective work including costs of material, equipment, labor, and material disposal, regardless of whether or not the State has benefited from use of the work through a portion of its anticipated useful service life. The Contractor shall respond to the Project Site when Project work covered by a warranty has failed within 3 calendar days, unless in the Engineer's opinion said failure is deemed to be an emergency, in which case the Contractor shall respond to the Project Site as directed by the Engineer."

1.20-1.08.03—Prosecution of Work:

Under subsection '3. Cutting and Patching,' delete the heading 'B. Protection of Structural Elements' and replace with the following:

"B. Protection:"

Move the existing first and second paragraphs to under the following subparagraph:

"1. Structural Elements:"

Add the following after the first paragraph under B:

“2. Operational Elements: The Contractor shall not cut and patch operating elements and related components in a manner that results in their reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

3. Miscellaneous Elements: The Contractor shall not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.”

Add the following after subsection 3:

“4. Selective Demolition:

A. Definitions:

Remove: The Contractor shall detach materials from existing construction and legally dispose or recycle them off-site, unless indicated to be removed and salvaged or removed and reinstalled. Except for materials indicated to be reused, salvaged,

reinstalled, or otherwise indicated to remain Engineer's property, demolished materials shall become Contractor's property and shall be removed from the Project Site.

Remove and Salvage: The Contractor shall detach materials from existing construction and deliver them to Engineer. The Engineer reserves the right to identify other materials for salvage during the course of demolition.

Remove and Reinstall: The Contractor shall detach materials from existing construction, prepare them for reuse, and reinstall them where indicated.

Existing to Remain: Existing materials of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

B. Approval Process:

The Contractor shall submit pre-demolition photographs to the Engineer prior to the commencement of Project work to show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations.

Well in advance of performing any selective demolition on the Project, the Contractor shall submit to the Engineer a proposal describing the procedures that the Contractor intends to use for same.

The Contractor shall include the following information, as applicable, in its proposal: (1) detailed sequence of selective demolition and removal work with starting and ending dates for each activity while ensuring that the Engineer's on-site operations are not disrupted; (2) interruption of utility services; (3) coordination for shutoff, capping, and continuation of utility services; (4) use of elevators and stairs; (5) locations of temporary partitions and means of egress; (6) coordination of Engineer's continuing occupancy of

portions of existing building and of Engineer's partial occupancy of completed Project work; and (7) means of protection for items to remain and items in path of waste removal from building.

The Contractor shall comply with (1) governing EPA notification regulations before beginning selective demolition; (2) hauling and disposal regulations of authorities having jurisdiction; (3) ANSI A10.6; and (4) NFPA 241.

The Engineer will conduct a Pre-Demolition Meeting at the Project site in accordance with Article 1.20-1.05.24. Said meeting will review the methods and procedures related to selective demolition including, but not limited to, the following: (1) an inspection and discussion of the condition of construction to be selectively demolished; (2) a review of the structural load limitations of the existing structure; (3) a review and finalization of the

selective demolition schedule and a verification of the availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays; (4) a review of requirements of Project work performed by other trades that rely on substrates exposed by selective demolition operations; and (5) a review of areas where existing construction is to remain and requires protection.

C. Repair Materials:

The Contractor shall comply with Article 1.20-1.08.03 subsection 3E for repair materials and shall comply with material and installation requirements specified in other Contract provisions.

D. Examination:

The Contractor shall (1) verify that utilities have been disconnected and capped; (2) survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required; (3) inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged; (4) investigate and measure the nature and extent of unanticipated mechanical, electrical, or structural elements that conflict with intended function or design and submit a written report to

Engineer; and (5) perform surveys as the Project work progresses to detect hazards resulting from selective demolition activities.

E. Utility Services:

The Contractor shall (1) maintain existing utility services indicated to remain and protect them against damage during selective demolition operations; (2) not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by the Engineer; (3) provide temporary services during interruptions to existing utilities, as acceptable to Engineer; (4) provide at least 3 calendar days notice to the Engineer if shutdown of service is required during changeover; and (5) locate, identify, disconnect,

and seal or cap off indicated utilities serving areas to be selectively demolished. The Contractor shall arrange to shut off indicated utilities with utility companies. If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition the Contractor shall provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building. The Contractor shall cut off pipe or conduit in walls or partitions to be removed and shall cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

The Contractor shall refer to other Contract provisions for shutting off, disconnecting, removing, and sealing or capping utilities. The Contractor shall not start selective demolition work until utility disconnecting and sealing have been completed and verified by the Engineer in writing.

F. Preparation:

The Contractor shall conduct selective demolition and debris-removal operations to ensure minimum interference with adjacent occupied and used facilities on the Project site. The Contractor shall not disrupt the Owner's operations without the Engineer's permission. The Contractor shall protect existing site improvements, appurtenances, and landscaping to remain.

The Contractor shall provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain. The Contractor shall provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas. The Contractor shall protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations. The Contractor shall cover and protect furniture, furnishings, and equipment that have not been removed.

The Contractor shall provide temporary enclosures for protection of existing building

and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. The Contractor shall provide temporary weathertight enclosure for building exterior. Where heating is needed and permanent enclosure is not complete, the Contractor shall provide insulated temporary enclosures and shall coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.

The Contractor shall erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

The Contractor shall provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished. The Contractor shall strengthen or add new supports when required during progress of selective demolition.

G. Pollution Controls:

The Contractor shall comply with governing regulations pertaining to environmental protection.

The Contractor shall not use water when it may create a hazardous or objectionable condition such as ice, flooding, or pollution.

The Contractor shall remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas. The Contractor shall remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

The Contractor shall clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. The Contractor shall return adjacent areas to condition existing before selective demolition operations began.

H. Performance:

The Contractor shall not use explosives for demolition purposes.

The Contractor shall demolish and remove existing construction only to the extent required by new construction and as indicated. The Contractor shall (1) proceed with selective demolition systematically; (2) neatly cut openings and holes plumb, square, and true to dimensions required; (3) use cutting methods least likely to damage

remaining or adjoining construction; (4) use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces; (5) temporarily cover openings to remain; (6) cut or drill from the

exposed or finished side into concealed surfaces to avoid marring existing finished surfaces; (7) not use cutting torches until work area is cleared of flammable materials; (8) verify condition and contents of concealed spaces such as duct and pipe interiors before starting flame-cutting operations; (9) maintain fire watch and portable fire-suppression devices during flame-cutting operations; (10) maintain adequate ventilation when using cutting torches; (11) remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site; (12) remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation; (13) locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing; and (14) dispose of demolished items and materials promptly.

The Contractor shall comply with the Engineer's requirements for using and protecting walkways, building entries, and other building facilities during selective demolition operations.

The Contractor shall demolish and remove foundations and other below grade structures completely unless otherwise indicated on the plans. The Contractor shall fill below grade areas and voids resulting from demolition of structures with granular fill materials. Prior to placement of fill materials, the Contractor shall ensure that the areas to be filled are free of standing water, frost, frozen material, trash, and debris. After fill placement and compaction, grade surface to meet adjacent contours and provide flow

to surface drainage structures. Backfilling and grading related to demolition is included in the Major Lump Sum Item (MLSI) for the Project. There will be no separate payment for this backfilling and grading.

The Contractor shall (1) demolish concrete in sections; (2) cut concrete at junctures with construction to remain to the depth shown on the Contract plans and at regular intervals using power-driven saw; and (3) remove concrete between saw cuts.

The Contractor shall (1) demolish masonry in small sections; (2) cut masonry at junctures with construction to remain using power-driven saw; and (3) remove masonry between saw cuts.

The Contractor shall (1) saw-cut perimeter of concrete slabs-on-grade to be demolished as shown on the Contract plans; and (2) break up and remove concrete slabs-on-grade.

The Contractor shall (1) remove floor coverings and adhesive according to recommendations in RFCI-WP and its Addendum; and (2) remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.

The Contractor shall (1) only remove existing roofing in one day to the extent that it can

be covered by new roofing; and (2) refer to other Contract provisions for new roofing requirements.

The Contractor shall remove air conditioning equipment without releasing refrigerants.

I. Reuse of Building Elements:

The Contractor shall not demolish building elements beyond what is indicated on the plans without the Engineer's approval.

J. Removed and Salvaged Materials:

Unless otherwise directed by the Engineer, the Contractor shall (1) store materials in a secure area until delivery to the owner; (2) transport materials to the owner's storage area off-site; and (3) protect materials from damage during transport and storage.

K. Removed and Reinstalled Materials:

Unless otherwise directed by the Engineer, the Contractor shall (1) clean and repair materials to functional condition adequate for intended reuse; (2) paint equipment to match the color of new equipment; (3) protect materials from damage during transport and storage; and (4) reinstall items in locations indicated complying with installation requirements for new materials and equipment and providing connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

L. Existing Materials to Remain:

The Contractor shall protect construction indicated to remain against damage and soiling during selective demolition.

The Contractor shall drain piping and cap or plug piping with the same or a compatible piping material for piping to be abandoned in place.

The Contractor shall cap or plug ducts with the same or a compatible ductwork material for ducts to be abandoned in place.

The Contractor shall cut and remove concealed conduits and wiring to be abandoned in place 2-inches (50-mm) below the surface of the adjacent construction, cap the conduit end, and patch the surface to match the existing finish. The Contractor shall cut existing conduits installed in concrete slabs to be abandoned in place flush with the top of the slab and fill conduit end with a minimum of 4-inches (100-mm) of concrete.

M. Patching and Repairing:

The Contractor shall comply with Article 1.20-1.08.03 subsection 3H for patching and

repairing damage to adjacent construction caused by selective demolition operations.

N. Disposal of Demolished Materials:

The Contractor shall (1) not allow demolished materials to accumulate or be sold on the Project Site; (2) not burn demolished materials on the Project Site; and (3) promptly and legally dispose or recycle demolished materials off the Project Site.”

1.20-1.08.05--Personnel and Equipment:

Replace “FM with “FMG” in subsection (a)

Add the following article:

“1.20-1.08.12--Semi-Final and Final Inspections:

1. Semi-Final Inspection: Before requesting the Semi-Final Inspection, the Contractor shall show 100% completion for all Project work claimed as complete. The Contractor shall submit final test/adjust/balance records including the final air and water balance report. For all incomplete Project work, the Contractor shall prepare its own “Punch List” of the incomplete items and reasons the work is not complete. The Contractor shall submit final test/adjust/balance records including the final air and water balance report.

On receipt of a Contractor request for inspection, the Engineer will proceed with inspection or notify the Contractor of unfulfilled requirements. The Engineer will prepare a “Punch List” of unfilled, substandard, or incomplete items. During this inspection, the Contractor shall have all technicians necessary to demonstrate the complete operation of all systems on-site. Examples of such systems include, but are not limited to, the following: boiler, HVAC, fire alarm, and building automation. The Engineer will advise the Contractor of the construction that must be completed or corrected before the issuance of the C.O.C. Results of the completed inspection will form the basis of requirements for the Final Inspection. The Engineer reserves the right to issue the C.O.C. after the Semi-Final Inspection if there are no Building Code or Fire Code compliance issues or any major “Punch List” items.

2. Final Inspection: Before requesting Final Inspection for issuance of the C.O.C., the Contractor shall: (1) submit specific warranties, maintenance service agreements, final certifications and similar documents; (2) submit Record Drawings, Record Specifications, operations and maintenance manuals, final project photographs, property surveys, and similar final record information; (3) deliver spare parts; (4) make final changeover of permanent locks and deliver the keys to the Engineer; (5) complete start-up testing of systems; (6) train the owner's operation and maintenance personnel; (7) discontinue or change over and remove temporary facilities from the Project Site, along with construction tools, mock-ups, and similar elements; (8) complete final

cleaning requirements, including touch-up painting; (9) touch-up and otherwise repair and restore marred exposed finishes to eliminate visual defects; (10) submit a certified copy of the Engineer's "Punch List" of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Engineer; (11) submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Final Inspection, or when the Engineer took possession of and responsibility for corresponding elements of the Project work; and (12) install permanent electrical service. The Contractor shall

install permanent electrical service prior to Semi-Final Inspection if requested by the Engineer, or if necessary for the Engineer or Contractor to perform testing of building and other related systems and equipment to certify acceptance and completion of Project work. The Contractor shall submit all outstanding items or unacceptable submissions from the Semi-Final Inspection, or other outstanding items required for submittal, prior to the Final Inspection.

On receipt of a Contractor request for inspection, the Engineer will proceed with inspection and notify the Contractor of unfulfilled requirements."

1.20 – 1.08.13 – Termination of the Contractor's Responsibility:

Add subsection 3 as follows:

"3. Insurance Coverage: The Contractor shall have in place all insurance coverage identified in Article 1.03.07 for the performance of any warranty work."

1.20-1.08.14--Acceptance of Project:

Add the following to subsection 2 under the heading "Equipment and Systems Maintenance Manual:"

"(j) Copies of maintenance agreements with service agent name and telephone number."

Add the following paragraph in subsection 3 after the second paragraph:

"The Contractor shall provide a syllabus prior to the training to ensure that the appropriate owner's operation and maintenance personnel are in attendance."

Delete the last paragraph and replace with the following:

The Contractor shall submit to the Engineer for approval, a qualified commercial videographer to videotape the training sessions. The videographer shall be a firm or an individual of established reputation that has been regularly engaged as a professional videographer for not less than 3 years.

The Contractor shall video record each training session and provide said video in DVD format to the Engineer for the owner's future use."

Add the following section:

"1.20-1.09.06—Partial Payments:

With each payment request under the MLSI, the Contractor shall submit AIA Form G702 (Application and Certificate of Payment) and Form G703 (Continuation Sheet). The Contractor is not required to obtain the Architect's signature on Form G702. Once approved by the Engineer, the Forms G702 and G703 become the basis of payment under the MLSI."

Add the following section:

"1.20-9.75.04—Method of Measurement:

Mobilization as defined in Article 1.20-1.03.01 will be paid in the manner described hereinafter; however, the determination of the total contract price earned shall not include the amount of mobilization earned during the period covered by the current monthly estimate – but shall include amounts previously earned and certified for payment:

1. When the first payment estimate is made, 25 percent of the "Mobilization" line item will be certified for payment.
2. When the Baseline Schedule, as specified under Section 1.05.08, is accepted, 50 percent of the "Mobilization" line item, minus any previous payments, will be certified for payment.
3. When 10 percent of the total original contract price is earned and the Baseline Schedule, as specified under Section 1.05.08, is accepted, 75 percent of the "Mobilization" line item, minus any previous payments, will be certified for payment.
4. When 30 percent of the total original contract price is earned and the Baseline Schedule, as specified under Section 1.05.08, is accepted, 100 percent of the "Mobilization" line item, minus any previous payments, will be certified for payment."

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 2.02
ROADWAY EXCAVATION, FORMATION OF
EMBANKMENT AND DISPOSAL OF
SURPLUS MATERIAL**

2.02.04 – Method of Measurement:

Second to last Paragraph - replace the last sentence with the following:

“Bituminous parking areas are considered as bituminous concrete pavement.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 2.05
TRENCH EXCAVATION**

Delete the entire Section and replace with the following:

2.05.01--Description:

Paragraph 2 - Delete the only sentence and replace with the following:

2) The removal of stormwater drainage structures, stormwater pipes and appurtenances beyond the limits of the roadway and structure excavation.

Sub article 2 - Rock in Trench - Delete the only sentence and replace with the following:

(2) Rock, insofar as it applies to trench excavation, shall be defined as rock in definite ledge formation, boulders, or portions of boulders, cement masonry structures, concrete structures, reinforced concrete pipe, Portland cement concrete pavement or base, of 1/2 cubic yard (0.5 cubic meters) or more in volume, removed as indicated or directed from within the payment lines for trench excavation.

2.05.05 -Basis of Payment

Paragraph 13 - Delete the entire sentence "There will be no direct payment for the plugging of existing pipes....." and replace with the following:

There will be no direct Payment for the plugging of existing pipes, removal and disposal of metal or plastic pipes or for the breaking up of floors in drainage structures being abandoned. The cost shall be included in the contract unit prices of the drainage and excavation items.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 3.04
PROCESSED AGGREGATE BASE**

Delete the entire Section and replace with the following:

3.04.01--Description: The base shall consist of a foundation constructed on the prepared subbase or subgrade in accordance with these specifications and in conformity with the lines, grades, compacted thickness and typical cross-section as shown on the plans.

3.04.02--Materials: All materials for this work shall conform to the requirements of Article M.05.01.

3.04.03--Construction Methods: Only one type of coarse aggregate shall be used on a project unless otherwise permitted by the Engineer.

Prior to placing the processed aggregate base, the prepared subbase or subgrade shall be maintained true to line and grade, for a minimum distance of 200 feet (60 meters) in advance of the work. None of the aggregate courses shall be placed more than 500 feet (150 meters) ahead of the compaction and binding operation on that particular course.

The processed aggregate base shall be spread uniformly by a method approved by the Engineer. The thickness of each course shall not be more than 4 inches (100 millimeters) after compaction, unless otherwise ordered.

After the aggregate is spread, it shall be thoroughly compacted and bound by use of equipment specifically manufactured for that purpose. Rollers shall deliver a ground pressure of not less than 300 pounds per lineal inch (52.5 newtons/millimeter) of contact width and shall have a weight (mass) not less than 10 tons (9100 kilograms). Vibratory units shall have a static weight (mass) of not less than 4 tons (3650 kilograms). Water may be used during the compaction and binding operation and shall be applied from an approved watering device. The compacting and binding operation shall begin at the outside edges, overlapping the shoulders for a distance of not less than 6 inches (150 millimeters) and progress towards the middle, parallel with the centerline of the pavement. The work shall cover the entire surface of the course with uniform overlapping of each preceding track or pass. Areas of super-elevation and special cross slope shall be compacted by beginning at the lowest edge and proceeding towards the higher edge, unless otherwise directed by the Engineer. The compacting and binding operation shall be continued until the voids in the aggregates have been reduced to provide a firm and uniform surface satisfactory to the Engineer. The amount of compactive effort shall in no case shall be less than four (4) complete passes of the compacting and binding operations. All aggregate shall be completely compacted and bound at the end of each day's work or when traffic is to be permitted to operate on the

road. The dry density of each layer of processed aggregate base after compaction shall not be less than 95 percent of the dry density for that material when tested in accordance with AASHTO T180, Method D.

Should the subbase or subgrade material become churned up or mixed with the processed aggregate base at any time, the Contractor shall, without additional compensation remove the mixture. The Contractor shall add new subbase material, if required, and reshape and recompact the subbase in accordance with the requirements of Article 2.12.03. New aggregate material shall be added, compacted and bound, as hereinbefore specified, to match the surrounding surface.

Any surface irregularities which develop during, or after work on each course, shall be corrected by loosening material already in place and removing or adding aggregate as required. The entire area, including the surrounding surface, shall be re-compact and rebound until it is brought to a firm and uniform surface satisfactory to the Engineer.

3.04.04--Method of Measurement: Processed Aggregate Base will be measured horizontally in-place after final grading and compaction. Materials placed beyond the horizontal limits indicated on the plans will not be measured for payment.

The total thickness shall be as indicated on the plans, or as ordered by the Engineer and within a tolerance of minus three-fourths of an inch ($-\frac{3}{4}$ ") to plus one-half inch ($+\frac{1}{2}$ ") (-19 millimeters to +13 millimeters).

Measurements to determine the thickness will be taken by the Engineer at intervals of 500 feet (150 meters) or less, along lanes, and shall be considered representative of the lane. For the purpose of these measurements, a shoulder will be considered a lane.

If a thickness measurement is taken and found deficient, the Engineer will take such additional measurements as he considers necessary to determine the longitudinal limits of the deficiency. Areas not within allowable tolerances shall be corrected, as ordered by the Engineer, without additional compensation to the Contractor.

3.04.05--Basis of Payment: This work will be paid for at the contract unit price per cubic yard for "Processed Aggregate Base", complete in place, which price shall include all materials, tools, equipment and work incidental thereto.

| | |
|--------------------------|--------------|
| Pay Item | Pay Unit |
| Processed Aggregate Base | c.y. (cu. m) |

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 4.01
CONCRETE PAVEMENT**

Article 4.01.03-A. Composition:

Add the following new paragraph before the last paragraph:

“The temperature of the concrete at the time of placement shall not be less than 60° F (15.5° C) or greater than 90° F (32° C). For pumped concrete, the temperature shall be determined at the placement end of the pump line. The temperature of the concrete shall be determined in accordance with ASTM C1064.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 5.14
PRESTRESSED CONCRETE MEMBERS**

Article 5.14.03 – Construction Methods:

Change the last sentence of 5.14.03-16 – Methods and Equipment to read:

“The results of this investigation, including computations, shall be submitted to the Engineer.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 6.01
CONCRETE FOR STRUCTURES**

Article 6.01.02 – Materials:

Add the following:

Material for stay-in-place metal forms shall be made of zinc-coated (galvanized) steel sheet conforming to ASTM Specification A653, Structural Steel (SS) Grade 33 through 80 (ASTM Specification A653M, Structural Steel (SS) Grade 250 through 550). The minimum gage thickness shall be 20 gage. Coating weight shall conform to ASTM A924, Class G235 (ASTM A924M, Class Z700) and shall otherwise meet all requirements relevant to steel stay-in-place metal forms and the placing of concrete as specified herein and as noted on the contract drawings.

Material for the form supports shall be fabricated from the same material and conform to the same material requirements as the forms themselves or they shall be fabricated from structural steel conforming to the requirements of ASTM A36 (ASTM A36M) which shall be hot-dip galvanized in accordance with ASTM A123 (ASTM A123M).

Lightweight filler material shall be as recommended by the form's manufacturer.

Subarticle 6.01.03 – 3, Forms:

Add the following:

Stay-in-Place Metal Form System:

Stay-in-place metal forms shall have a minimum depth of form valley equal to two inches (50 millimeters). The forms shall have closed tapered ends. Lightweight filler material shall be used in the form valleys.

The metal forms shall be designed on the basis of dead load of the form, reinforcement and the plastic concrete, including the additional weight of concrete due to the deflection of the metal forms, plus 50 pounds per square foot (2.40 kilopascals) for construction loads. The allowable stress in the corrugated form and the accessories shall not be greater than 0.725 times the yield strength of the furnished material and the allowable stress shall not exceed 36,000 psi (250 megapascal). The span for design and deflection shall be the clear distance between edges of the beams or girders less two inches (50 millimeters) and shall be measured parallel to the form flutes. Maximum deflection of the forms under the weight of the plastic concrete, reinforcement, and forms shall not exceed 1/180 of the form span or 0.5 inches (13 millimeters), whichever is less. The permissible form camber shall be based on the actual dead load condition. Camber shall not be used to compensate for deflection in excess of the foregoing limits.

Form support angles shall be designed as a cantilever. The horizontal leg of the form's support angle shall not be greater than 3 inches (75 millimeters).

Before fabricating any material, the Contractor shall submit working drawings to the Engineer for review in accordance with Article 1.05.02-2, Working Drawings. These drawings shall include the proposed method of form construction, erection plans including weld procedure(s), material lists, material designation, gage of all materials, and the details of corrugation. Also, copies of the form design computations shall be submitted with the working drawings.

Form supports shall be used and no stay-in-place metal forms shall be placed over or be directly supported by the top flanges of beams or girders. The form supports may be supported by or be attached to the top flanges. Stay-in-place metal forms shall not be used in bays where longitudinal slab construction joints are located. Stay-in-place metal forms shall not be used under cantilevered slabs such as the overhang outside of fascia members.

Welding to the top flanges of steel beams and girders is not allowed in the areas where the top flanges are in tension, or as indicated on the plans. Alternate installation procedures shall be submitted addressing this condition.

Drilling of holes in prestressed concrete beams or the use of power-actuated tools on the prestressed concrete beams for fastening of the form supports to the prestressed concrete beams will not be permitted. No welding will be permitted on the reinforcing steel in the prestressed units.

All edges of openings cut for drains, pipes, and similar appurtenances shall be independently supported around the entire periphery of the opening.

All fabricated stay-in-place metal forms shall be unloaded, stored, and handled in such a manner as to preclude damage to the forms. Damaged material shall be replaced at no additional cost. Any exposed form or form support metal where the galvanized coating has been damaged, shall be thoroughly cleaned, wire brushed, then coated with two coats of a zinc dust-zinc oxide primer, FS No. TT-P-641d, Type II, as directed by the Engineer.

All fabricated stay-in-place metal forms shall be stored at the project site at least four inches (100 millimeters) above the ground on platforms, skids or other suitable supports and shall be protected against corrosion and damage.

Forms shall be installed from the topside in accordance with the manufacturer's placing plans, recommended details, and printed instructions. Forms shall be constructed to the lines, grades, shapes, and dimensions shown on the plans, unless otherwise directed by the Engineer. Form supports shall ensure that forms retain their correct dimensions and positions during use at all times. Form supports shall provide vertical adjustment to maintain design slab thickness at the crest of corrugation, to compensate for variations in camber of beams and girders, and to allow for deflections.

Field cutting of form sheet metal shall be made by a steel cutting saw. Supports, closures and cut-outs shall be cut with shears or saw. No flame cutting will be permitted.

All welding shall be accomplished by Connecticut certified welders in accordance with Subarticle 6.03.03 – 6, Welding.

The steel form supports shall be placed in direct contact with the flange of stringer or floor beam flanges and attached by bolts, clips, welding where permitted, or other approved means. Form sheets shall not be permitted to rest directly on the top of the stringer or floor beam flanges. Forms shall be securely fastened to form supports with self-drilling fasteners and shall have a minimum bearing length of one inch (25 millimeters) at each end.

In the areas where the form sheets lap, the form sheets shall be securely fastened to one another by fasteners at a maximum spacing of eighteen inches (450 millimeters). The ends of the form sheets shall be securely attached to the support angles with fasteners at a maximum spacing of eighteen inches (450 millimeters) or two corrugation widths, whichever is less. Welding of forms to supports is not allowed.

The depth of the concrete slab shall be as shown on the plans and the corrugated forms shall be placed so that the top of the corrugation will coincide with the bottom of the deck slab. No part of the forms or their supports shall protrude into the slab. All reinforcement in the bottom reinforcement mat shall have a minimum concrete cover of one inch (25 millimeters) unless noted otherwise on the plans.

The completed stay-in-place metal form system shall be sufficiently tight to prevent leakage of mortar or concrete.

Where forms or their installation are unsatisfactory in the opinion of the Engineer, either before or during placement of the concrete, the Contractor shall correct the defects before proceeding with the construction work. The cost of such corrective work shall be at the sole expense of the Contractor.

There will be no direct payment for the cost of the forms and form supports, or any material, tools, equipment, or labor incidental thereto, but the cost shall be considered included in the contract unit price per cubic yard (cu. m) for “Class ‘F’ Concrete”.

Article 6.01.03-8. Placing Concrete:

Add the following new paragraph after the first paragraph:

“The temperature of the concrete at the time of placement shall not be less than 60° F (15.5° C) or greater than 90° F (32° C). For pumped concrete, the temperature shall be determined at the placement end of the pump line. The temperature of the concrete shall be determined in accordance with ASTM C1064.”

Subarticle 6.01.03 – 9, Concrete for Bridge Decks:

Add the following:

Screed and runway supports shall not be located on any stay-in-place metal form sheets, form supports or reinforcing steel.

Concrete shall not be placed on the forms to a depth greater than twelve inches (300 millimeters) above the top of the forms. Concrete shall not be dropped more than three feet (1 meter) above the top of the forms, beams or girders.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 6.03
STRUCTURAL STEEL**

Delete the entire section and replace it with the following:

**SECTION 6.03
STRUCTURAL STEEL**

Description: Work under this item shall consist of furnishing, fabricating, transporting, storing, handling and erecting of structural steel of the type and size designated, as shown on the plans, as directed by the Engineer and in accordance with these specifications.

All work except as stated in the following paragraph shall conform to the requirements of the AASHTO LRFD Bridge Construction Specifications and the ANSI/AASHTO/AWS D1.5 – Bridge Welding Code.

All work subject to railroad loading shall conform to AREMA and the ANSI/AASHTO/AWS D1.5 – Bridge Welding Code.

Materials: The materials for this work shall conform to the requirements of Section M.06.

Materials for this work shall be stored off the ground before, during, and after fabrication. It shall be kept free from dirt, grease and other contaminants and shall be reasonably protected from corrosion. In addition, weathering steel shall be stored as to allow free drainage and promote the development of the oxide coating and a uniform appearance.

Construction Methods:

1. Pre-qualification:

(a) Fabricators producing material for Department projects under this item are required to have as a minimum, an active AISC Certification for Simple Steel Bridges. For fabrication of material for use on bridges other than un-spliced rolled beam bridges, AISC Major Steel Bridge Certification is required. If so noted on the plans, additional AISC endorsement for fabrication of fracture critical members is also required.

(b) Field Welders: Prior to working on material for Department projects under this specification, all field welders, field welding operators, and field tackers must possess a valid welder certification card issued by the Department's Division of Materials Testing. If such person has not been engaged in welding operations on a Department project or

project acceptable to the Department within a period of six months, or if he cannot produce an approved welding certificate dated within the previous twelve months from a welding agency acceptable to the Engineer, he shall be required to re-qualify through examination. The Engineer may require re-qualification of anyone whose quality of work he questions.

2. Submittals:

(a) Shop Drawings: Prior to any fabrication, the Contractor shall submit shop drawings in accordance with Article 1.05.02-3 to the Engineer for review and approval. Shop drawings shall include a cambering procedure and diagram. In the case of trusses, the Contractor is responsible for calculation of the camber (lengthening and shortening) of all truss members.

(b) Shop Schedule: The Contractor shall submit a detailed shop fabrication schedule to the Engineer for review within 30 days of the notice to proceed unless otherwise agreed to by the Engineer. At a minimum the schedule shall include the start date, milestone dates, and completion date. Any significant changes shall be brought to the attention of the Engineer immediately.

(c) Welding Procedures: Prior to start of fabrication, all weld procedures shall be submitted to the Engineer for review and approval.

(d) Working Drawings for Falsework and Erection of Structural Steel: Prior to erecting any steel fabricated under this specification, the Contractor shall submit drawings and supporting calculations, including erection stresses, in accordance with Article 1.05.02-2 to the Engineer. The design of temporary supports and falsework shall conform to the *AASHTO Specifications*, the *AASHTO Guide Design Specifications for Bridge Temporary Works* or any other standard acceptable to the Engineer. Falsework shall be of sufficient rigidity and strength to safely support all loads imposed and to produce in the finished structure the lines and grades indicated in the contract documents. The submittal shall include at a minimum:

- Title block with contract number, project identification number (PIN), town, and structure number and name.
- Plan of the work area showing support structures, roads, railroad tracks, Federal and State regulated areas as depicted on the plans, utilities or any other information relative to erection.
- A detailed narrative describing the erection sequence for main members and secondary members (cross frames, diaphragms, lateral bracing, portals, etc.), noting use of holding cranes or temporary supports, falsework, or bents.
- Delivery location of each girder.
- Location of each crane for each pick.
- Capacity chart for each crane and boom length used in the work.
- The capacity of the crane and of all lifting and connecting devices shall be adequate for the total pick load including spreaders and other materials. In the area of railroads and navigable waterways, the capacity shall be as required by Amtrak, Metro North, U.S. Coast Guard or other regulatory authorities. No picks shall be

allowed over vehicular or pedestrian traffic unless otherwise noted on the plans or permitted by the Engineer.

- Pick point location(s) on each member.
- Lifting weight of each member (including clamps, spreader beams, etc.)
- Lift and setting radius for each pick (or maximum lift radius).
- Description of lifting devices or other connecting equipment.
- Girder tie-down details or other method of stabilizing erected girders.
- Bolting requirements, including the minimum number of bolts and erection pins required to stabilize members during the erection sequence.
- Blocking details for stabilizing members supported on expansion bearings and on bearings that do not limit movement in the transverse direction.
- The method and location for temporary supports for field spliced or curved girders, including shoring, false work, holding cranes, guys, etc. The Engineer will review, but not approve details of temporary supports. The design, erection, and stability of these supports shall be the sole responsibility of the Contractor.
- Offsets necessary to adjust expansion bearings during erection to provide for temperature variance and dead load rotation.

The following notes shall be placed on the Erection Drawings:

- Cranes shall be operated in accordance with the Connecticut Department of Public Safety regulations.
- The Contractor shall be responsible for verifying the weight of each lift and for insuring the stability of each member during all phases of erection.
- Members shall be subject to only light drifting to align holes. Any drifting that results in distortion of the member or damage to the holes will be cause for rejection of the member.
- Field reaming of holes shall not be performed unless required by the Contract Drawing or approved by the Engineer.

The Contractor shall submit these documents to the Engineer at least 60 calendar days in advance of their proposed use. If the proposed method of erection requires additional members or modifications to the existing members of the structure, such additions and modifications shall be made by the Contractor at no expense to the State.

3. Shop Fabrication: Unless otherwise shown on the plans or indicated in the Special Provisions, Structural Steel shall be fabricated in accordance with the AASHTO LRFD Bridge Construction Specifications, amended as follows:

(a) Notification: The Contractor shall submit written notification to both the Engineer and the Director of Research and Materials Testing not less than 30 calendar days prior to start of fabrication. No material shall be manufactured or worked in the shop before the Engineer has been so notified. The notification shall include the name and location of the fabrication shop where the work will be done so that arrangements can be made for an audit of the facility and the assignment of a Department Quality Assurance inspector.

(b) Camber: All members shall be cambered prior to heat curving and painting. Rolled beams shall be heat cambered by methods approved by the Engineer. Plate girders shall be cambered by cutting the web to the prescribed shape with allowances for shrinkage due to cutting, welding, and heat curving. The fabricator is responsible to determine what allowances should be made. Rolled, plate-rolled, or fabricated sections shall be cambered to the total amount shown on the plans and within the camber deviation tolerances permitted for welded beams and girders, as indicated in the ANSI/AASHTO/AWS D1.5 Bridge Welding Code. The Contractor must submit to the Engineer for approval, a plan for corrective action if the actual camber is not within tolerance.

(c) Welding: Unless otherwise indicated on the plans or specifications, all work shall be performed in accordance with ANSI/AASHTO/AWS D1.5 – Bridge Welding Code.

(d) Preassembly of Field Connections: Field connections of main members of continuous beams, plate girders, bents, towers, rigid frames, trusses and arches shall be preassembled prior to erection as necessary to verify the geometry of the completed structure or unit and to verify or prepare field splices. The Contractor shall propose an appropriate method of preassembly for review and comment by the Engineer. The method and details of preassembly shall be consistent with the erection procedures shown on the working drawings and camber diagrams. As a minimum, the preassembly procedure shall consist of assembling three contiguous panels accurately adjusted for line and camber. Successive assemblies shall consist of at least one section or panel of the previous assembly plus two or more sections or panels added at the advancing end. In the case of structures longer than 150 feet (45 meters), each assembly shall not be less than 150 feet (45 meters) long regardless of the length of individual continuous panels or section. All falsework, tools, machinery and appliances, including drift pins and bolts necessary for the expeditious handling of the work shall be provided by the Contractor at no cost to the State.

(e) Inspection: The Contractor shall furnish facilities for the inspection of material and workmanship in the shop by the Engineer. The Engineer and his representative shall be allowed free access to the necessary parts of the premises.

The Engineer will provide Quality Assurance (QA) inspection at the fabrication shop to assure that all applicable Quality Control plans and inspections are adequately adhered to and maintained by the Contractor during all phases of the fabrication. A thorough inspection of a random selection of elements at the fabrication shop may serve as the basis of this assurance.

Prior to shipment to the project, each individual piece of structural steel shall be stamped or marked in a clear and permanent fashion by a representative of the fabricators' Quality Control (QC) Department to indicate complete final inspection by the fabricator and conformance to the project specifications for that piece. The stamp or mark must be dated. A Materials Certificate in accordance with Article 1.06.07 may be used in lieu of individual stamps or markings, for all material in a single shipment. The Materials Certificate must list each piece within the shipment and accompany the shipment to the project site.

Following the final inspection by the fabricator's QC personnel, the Engineer may select pieces of structural steel for re-inspection by the Department's QA inspector. Should non-conforming pieces be identified, all similar pieces must be re-inspected by the fabricator and repair procedure(s) submitted to the Engineer for approval. Repairs will be made at the Contractor's expense.

The pieces selected for re-inspection and found to be in conformance, or adequately repaired pieces, may be stamped or marked by the QA inspector. Such markings indicate the Engineer takes no exception to the pieces being sent to the project site. Such marking does not indicate acceptance or approval of the material by the Engineer.

Following delivery to the project site, the Engineer will perform a visual inspection of all material to verify shipping documents, fabricator markings, and that there was no damage to the material or coatings during transportation and handling.

The Engineer is not responsible for approving or accepting any fabricated materials prior to final erection and assembly at the project site.

(f) Nondestructive Testing: All nondestructive testing of structural steel and welding shall be performed as designated on the plans and in the project specifications. Such testing shall be performed by personnel approved by the Engineer.

Personnel performing Radiographic, Ultrasonic or Magnetic Particle testing shall be certified as a NDT Level II technician in accordance with the American Society for Non Destructive Testing (ASNT), Recommended Practice SNT-TC-1A.

Nondestructive testing shall be performed in accordance with the procedures and standards set forth in the AASHTO/AWS D1.5, Bridge Welding Code. The Department reserves the right to perform additional testing as determined by the Engineer.

All nondestructive testing shall be witnessed by an authorized representative of the Department. Certified reports of all tests shall be submitted to the Materials Testing Division for examination. Each certified report shall identify the structure, member, and location of weld or welds tested. Each report shall also list the length and location of any defective welds and include information on the corrective action taken and results of all retests of repaired welds.

Should the Engineer require nondestructive testing on welds not designated in the contract, the cost of such inspection shall be borne by the Contractor if the testing indicates that any weld is defective. If the testing indicates the weld to be satisfactory, the actual cost of such inspection will be paid by the Department.

(g) Marking: Each member shall be identified with an erection mark corresponding with the member identification mark on the approved shop drawings. Identification marks shall be impressed into the member with a low stress stamp in a location in accordance with standard industry practice.

(h) Shipping, Handling, Storage and Receiving: The Contractor shall make all arrangements necessary to properly load, transport, unload, handle and store all material. The Contractor shall furnish to the Engineer copies of all shipping statements. The weight (mass) of the individual members shall be shown on the statements. Members having a weight (mass) of more than 3 tons (2700 kilograms) shall have the weight (mass) marked thereon. All material shall be unloaded promptly upon delivery. The Contractor shall be responsible for any demurrage charges. Damage to any material during transportation, improper storage, faulty erection, or undocumented fabrication errors may be cause for rejection of said material at the project site. Top lateral bracing should be installed in tub girders prior to shipping and erection of the field pieces. All costs associated with any corrective action will be borne by the Contractor.

4. Field Erection: A meeting shall be held on site prior to any erection of structural steel. The Contractor shall name the person responsible for the steel erection work and provide copies of all crane operator licenses. Proposed equipment, rigging, timetable and methods shall be proposed at this meeting.

(a) Falsework: Any temporary work shall be constructed in conformance with the working drawings. The Contractor shall verify that the quality of materials and work employed are consistent with their design.

All girders shall be stabilized with falsework, temporary braces, or holding cranes until a sufficient number of adjacent girders are erected with all diaphragms and cross frames connected to provide necessary lateral support as shown in the erecting diagrams.

Adjustment shall be provided in the falsework and other temporary supports so that the temporary elevation of the structural steel provided by the falsework is consistent with the deflections that will occur as the structure is completed. The elevation of falsework shall be such as to support the girders at the cambered no-load elevation. Unloading of temporary supports should be performed such that all temporary supports at each cross section are unloaded uniformly. Unless specifically permitted by the Engineer, welding of falsework support brackets to structural steel is not allowed.

Unless erected by the cantilever method, truss spans shall be erected on blocking. The blocking shall be left in place until the tension chord splices are fully bolted and all other truss connections pinned and bolted and the proper geometric shape is achieved.

(b) Anchorages: Anchor bolts and similar materials which are to be placed during the erection of the structural steel shall be carefully and accurately set to the requirements of Article 6.01.03.

(c) Bearings: Bearing plates shall have a full and uniform bearing upon the substructure masonry. Bearing plates shall be placed upon bearing areas which are finished according to the requirements of Article 6.01.03.

Prefabricated pads conforming to the requirements of Article M-12.01 shall be installed unless specifically noted otherwise on the contract plans.

Each piece shall be the same size as the bearing plate it is to support and the holes to accommodate the anchor bolts shall be clearly and accurately punched before setting the pad in place.

In placing expansion bearings, due consideration shall be given to the temperature at the time of erection and stage construction requirements. The nuts of anchor bolts at expansion bearings shall be adjusted to permit the free movement of the span.

(d) Field Assembly: Members and components shall be accurately assembled as shown on the plans and any match marks shall be followed. The material shall be carefully handled so that no components will be bent, broken or otherwise damaged.

Hammering which will injure or distort the members is not permitted. Bearing surfaces and surfaces to be in permanent contact shall be cleaned before the members are assembled.

Cylindrical erection pins shall be 1/32 inch (0.8 mm) larger than the nominal diameter of the holes.

Splices and field connections of main stress carrying members shall be made with a minimum of 50% of the holes filled and tightened with high strength bolts before the lifting system is released. The bolts shall be installed uniformly throughout the connection. Lateral stability must be maintained until the deck is placed.

The Contractor shall ensure that girders are stable throughout the erection process. The stage of completeness of the bolted connections shall be considered when evaluating the strength and stability of the steel during erection. For Closed Box and Tub Girders the Contractor shall ensure that the cross- section shape of each box is maintained during erection. Top lateral bracing should be installed in tub girders prior to shipping and erection of the field pieces.

(e) Welded Connections:

Unless otherwise shown on the plans or indicated by the special provisions, welding of structural steel shall be done in accordance with "ANSI/AASHTO/AWS D1.5 Bridge Welding Code."

The Contractor's welding and inspection procedures for each type of field weld and field tacking must be submitted to the Engineer on the form designated by the Department. All procedures must be approved by the Materials Testing Division prior to any work and must be adhered to at all times.

Quality control is the responsibility of the Contractor. The Contractor must provide an AWS Certified Welding Inspector (CWI) in accordance with AWS D1.5. The CWI must be qualified and certified in accordance with the provisions of AWS QC1, *Standard for Qualification and Certification of Welding Inspectors*.

The CWI shall make visual inspection of all welds. The Contractor will perform magnetic particle inspection, ultrasonic testing inspection, or radiographic testing inspection of field welds when required on the plans or special provisions. Each test may be witnessed by an authorized representative of the Engineer.

Welds or sections of welds containing imperfections determined to be unacceptable by either the CWI or the Engineer shall be removed and re-welded by the Contractor at their expense. Welds so removed and replaced shall be re-inspected by the CWI. All costs for re-inspection or testing of such welds shall be borne by the Contractor.

(f) High Strength Bolted Connections:

The assembly of structural connections using ASTM A 325/ A 325M or ASTM A 490/A 490M high-strength bolts shall be installed so as to develop the minimum required bolt tension specified in Table A. The Manufacturer's certified test report; including the rotational capacity test results **must** accompany the fastener assemblies. Fastener Assemblies delivered without the certified reports will be rejected.

Bolts, nuts and washers from each rotational-capacity lot shall be shipped in the same container. If there is only one production lot number for each size of nut and washer, the nuts and washers may be shipped in separate containers. Each container shall be permanently marked with the rotational-capacity lot number such that identification will be possible at any stage prior to installation. Assemblies of bolts, nuts and washers shall be installed from the same rotational-capacity lot. Pins, small parts and packages of bolts, washers, and nuts shall be shipped in boxes, crates, kegs, or barrels. A list and description of the contained materials shall be plainly marked on the outside of each shipping container.

Bolted Parts: All material within the grip of the bolt shall be steel; there shall be no compressible material, such as gaskets or insulation, within the grip. Bolted steel shall fit solidly together after the bolts are tensioned. The length of the bolts shall be such that the end of the bolt will be flush with or outside of the face of the nut when properly installed.

Surface Conditions: At the time of assembly, all connection surfaces, including surfaces adjacent to the bolt head and nut, shall be free of scale, except tight mill scale, and shall be free of dirt or other foreign material. Burrs that would prevent solid seating of the connected parts in the snug tight condition shall be removed.

Paint is permitted on the faying surface, including slip critical connections, only when shown on the plans. The faying surfaces of slip-critical connections shall meet the requirements of the following paragraphs, as applicable:

- Connections specified to have un-coated faying surfaces: any paint, including any inadvertent over spray, shall be excluded from areas closer than one bolt diameter, but not less than 1.0 in. (25 mm), from the edge of any hole and all areas within the bolt pattern.
- Connections specified to have painted faying surfaces: shall be blast cleaned and coated in accordance with Section 6.04, and shall not be assembled until the coating system has been properly cured.

- Connections specified to have galvanized faying surfaces: shall be hot-dip galvanized in accordance with ASTM A 123/A 123M, and shall subsequently be roughened by means of hand wire brushing. Power wire brushing is not permitted.

Installation: At the pre-erection meeting, the Contractor shall inform the Engineer of their planned method of tensioning high strength bolts. Acceptable methods are: Turn-of-Nut, Calibrated Wrench or Direct Tension Indicator.

Fastener Assemblies:

A "fastener assembly" is defined as a bolt, a nut, and a washer. Only complete fastener assemblies of appropriately assigned lot numbers shall be installed.

Fastener assemblies shall be stored in an area protected from dirt and moisture. Only as many fastener assemblies as are anticipated to be installed and tensioned during a work shift shall be taken from protected storage. Fastener assemblies not used shall be returned to protected storage at the end of the shift. Prior to installation, fastener assemblies shall not be cleaned of lubricant. Fastener assemblies which accumulate rust or dirt resulting from site conditions shall be cleaned, relubricated and tested for rotational-capacity prior to installation. All galvanized nuts shall be lubricated with a lubricant containing a visible dye. Plain bolts must be oily to the touch when delivered and installed. Lubricant shall be removed prior to painting.

All bolts shall have a hardened washer under the turned element (nut or bolt head). All hardened washers shall conform to the requirements of ASTM F 436/F 436M.

Where necessary, washers may be clipped on one side to a point not closer than $7/8$ of the bolt diameter from the center of the washer. Circular and beveled washers, when used adjacent to direct tension indicator washers shall not be clipped. Direct tension indicator washers shall not be clipped.

Bolt Tension Measuring Device: The Contractor shall provide a calibrated bolt tension measuring device (a Skidmore-Wilhelm calibrator (Skidmore) or other acceptable bolt tension indicating device) at all times when, and at all locations where high-strength fasteners are being installed and tensioned. The tension measuring device (Skidmore) shall be calibrated by an approved testing agency at least annually. The Skidmore shall be used to perform the rotational-capacity test of the fastener assemblies. The Skidmore will also be used to substantiate (1) the suitability of the fastener assembly to satisfy the requirements of Table A, including lubrication as required, (2) calibration of the installation wrenches, if applicable, and (3) the understanding and proper use by the contractor of the selected method of tensioning to be used.

Complete fastener assemblies shall be installed in properly aligned holes and then tensioned by the Turn-of-Nut, Calibrated Wrench or Direct Tension Indicator method to the minimum tension specified in Table A. Tensioning may be done by turning the bolt while the nut is prevented from rotating when it is impractical to turn the nut. Impact wrenches, if

used, shall be of adequate capacity and sufficiently supplied with air to perform the required tensioning of each bolt in approximately 10 seconds.

Bolts shall be installed in all holes of the connection and the connection brought to a snug condition. Snug is defined as having all the plies of the connection in firm contact. Snugging shall progress systematically from the most rigid part of the connection to the free edges. The bolts of the connection shall then be tightened in a similar manner as necessary until the connection is properly tensioned.

Nuts shall be located, whenever practical, on the side of the connection which will not be visible from the traveled way.

Unless otherwise approved by the Engineer fastener assemblies shall be brought to full tension immediately following snugging.

Fully tensioned fastener assemblies shall not be reused. Retightening previously tensioned bolts which may have been loosened by the tensioning of adjacent bolts shall not be considered as reuse.

Rotational-Capacity Tests: In addition to the certified test reports, on site Rotational-capacity tests may be required by the Engineer. This test shall be performed by the Contractor at the location where the fasteners are installed and tensioned. When performed in the field, the procedure shall conform to the requirements of ASTM A 325/ A 325M Appendix A-1.

Turn-of-Nut Installation Method:

At the start of the work, the Contractor shall demonstrate that the procedure used by the bolting crew to develop a snug condition and to control the turns from a snug condition develops the tension required in Table A. To verify their procedure, the Contractor shall test a representative sample of not less than three complete fastener assemblies of each diameter, length and grade to be used in the work. This shall be performed at the start of work using a Skidmore. Periodic retesting shall be performed when ordered by the Engineer.

After snugging the connection, the applicable amount of rotation specified in Table B shall be achieved. During the tensioning operation there shall be no rotation of the part not turned by the wrench. Tensioning shall progress systematically from the most rigid part of the connection to its free edges.

Calibrated Wrench Installation Method:

Calibrated wrench method may be used only when the installation wrenches are properly calibrated daily, or as determined by the Engineer. Standard torques determined from tables or from formulas which are assumed to relate torque to tension **shall not** be acceptable.

The Contractor shall demonstrate to the Engineer periodically that all equipment and wrenches are providing a torque which has been calibrated to produce the minimum tension specified in Table A. The installation procedures shall be verified periodically, as determined by the Engineer, for each bolt diameter, length and grade using the fastener assemblies that are being installed in the work. This verification testing shall be accomplished in a Skidmore by tensioning three complete fastener assemblies of each diameter, length and grade from those being installed with a hardened washer under the element turned.

When significant difference is noted in the surface condition of the bolts, threads, nuts or washers, as determined by the Engineer, wrenches shall be recalibrated. The Contractor shall verify during the installation of the assembled steel work that the wrench adjustment selected by the calibration does not produce a nut or bolt head rotation from snug greater than that permitted in Table B. If manual torque wrenches are used, nuts shall be turned in the tensioning direction when torque is measured.

When calibrated wrenches are used to install and tension bolts in a connection, bolts shall be installed with hardened washers under the element turned to tension the bolts. Once the connection has been snugged, the bolts shall be tensioned using the calibrated wrench. Tensioning shall progress systematically from the most rigid part of the connection to its free edges. A calibrated torque wrench shall be used to "touch up" previously tensioned bolts which may have been relaxed as a result of the subsequent tensioning of adjacent bolts until all bolts are tensioned to the prescribed amount.

Direct Tension Indicator Installation Method:

When Direct Tension Indicators (DTIs) meeting the requirements of Section M.06 are used with high-strength bolts to indicate bolt tension, they shall be subjected to the verification testing described below and installed in accordance with the method specified below. Unless otherwise approved by the Engineer, the DTIs shall be installed under the head of the bolt and the nut turned to tension the bolt. The Manufacturer's recommendations shall be followed for the proper orientation of the DTI and additional washers, if any, required for the correct use of the DTI. Installation of a DTI under the turned element may be permitted if a washer is used to separate the turned element from the DTI.

Verification: Verification testing shall be performed in a Skidmore. A special flat insert shall be used in place of the normal bolt head holding insert. Three verification tests shall be required for each combination of fastener assembly rotational-capacity lot, DTI lot, and DTI position relative to the turned element (bolt head or nut) to be used on the project. The fastener assembly shall be installed in the tension-measuring device with the DTI located in the same position as in the work. The element intended to be stationary (bolt or nut) shall be restrained from rotation.

The verification tests shall be conducted in two stages. The bolt nut and DTI assembly shall be installed in a manner so that at least three and preferably not more than five threads are located between the bearing face of the nut and the bolt head. The bolt shall be tensioned first to the load equal to that listed in Table C

under Verification Tension for the grade and diameter of the bolt. If an impact wrench is used, the tension developed using the impact wrench shall be no more than two-thirds of the required tension. Subsequently, a manual wrench shall be used to attain the required tension. The number of refusals of the 0.005-in. (0.125-mm) tapered feeler gage in the spaces between the protrusions shall be recorded. The number of refusals for uncoated DTIs under the stationary or turned element, or coated DTIs under the stationary element, shall not exceed the number listed under Maximum Verification Refusals in Table C for the grade and diameter of bolt used. The maximum number of verification refusals for coated DTIs (galvanized, painted, or epoxy-coated), when used under the turned element, shall be no more than the number of spaces on the DTI less one. The DTI lot shall be rejected if the number of refusals exceeds the values in the table or, for coated DTIs if the gage is refused in all spaces.

After the number of refusals is recorded at the verification load, the bolt shall be further tensioned until the 0.005-in (0.125-mm) feeler gage is refused at all the spaces and a visible gap exists in at least one space. The load at this condition shall be recorded and the bolt removed from the tension-measuring device. The nut shall be able to be run down by hand for the complete thread length of the bolt excluding thread run-out. If the nut cannot be run down for this thread length, the DTI lot shall be rejected unless the load recorded is less than 95 percent of the average load measured in the rotational capacity test of the fastener lot as specified previously in "Rotational-Capacity Tests."

If the bolt is too short to be tested in the calibration device, the DTI lot shall be verified on a long bolt in a calibrator to determine the number of refusals at the verification tension listed in Table C. The number of refusals shall not exceed the values listed under maximum verification refusals in Table C. Another DTI from the same lot shall then be verified with the short bolt in a convenient hole in the work. The bolt shall be tensioned until the 0.005-in. (0.125-mm) feeler gage is refused in all spaces and a visible gap exists in at least one space. The bolt shall then be removed from the tension-measuring device and the nut shall be able to be run down by hand for the complete thread length of the bolt excluding thread run-out. The DTI lot shall be rejected if the nut cannot be run down this thread length.

Installation: Installation of fastener assemblies using DTIs shall be performed in two stages. The stationary element shall be held against rotation during each stage of the installation. The connection shall be first snugged with bolts installed in all holes of the connection and tensioned sufficiently to bring all the plies of the connection into firm contact. The number of spaces in which a 0.005-in. (0.125-mm) feeler gage is refused in the DTI after snugging shall not exceed those listed under maximum verification refusals in Table C. If the number exceeds the values in the table, the fastener assembly shall be removed and another DTI installed and snugged.

For uncoated DTIs used under a stationary or turned element and for coated DTIs used under a stationary element, the bolts shall be further tensioned until the number of refusals of the 0.005-in. (0.125-mm) feeler gage shall be equal or greater than the number listed under Minimum Installation Refusals in Table C. If the bolt is

tensioned so that no visible gap in any space remains, the bolt and DTI shall be removed and replaced by a new properly tensioned bolt and DTI.

When coated DTIs (galvanized, painted or epoxy coated) are used under a turned element, the 0.005-in (0.125-mm) feeler gage shall be refused in all spaces.

Inspection:

The Contractor shall provide all the material, equipment, tools and labor necessary for the inspection of the bolted connections. Access to the bolted parts and fastener assemblies, both before and after the fasteners are installed and tensioned, shall be provided.

The Contractor is responsible for Quality Control (QC). The Contractor shall review this specification with its project personnel prior to performing the work. The Contractor shall verify the proper markings, surface conditions and storage of fastener assemblies. The Contractor shall inspect the faying surfaces of connections for compliance with the plans and specifications. The Contractor shall provide to the Engineer a copy of their written QC report for each shift of the calibration or verification testing specified. This report shall confirm that the selected procedure is properly used and that the fastener assemblies installed meet the tensions specified in Table A. The Contractor shall monitor the installation of fasteners in the work to assure that the selected procedure, as demonstrated in the initial testing to provide the specified tension, is routinely and properly applied.

The Contractor, in the presence of the Engineer, shall inspect the tensioned bolts using an inspection torque wrench, as defined below. If direct tension indicator devices are used, the appropriate feeler gauge will be used. Inspection tests shall be performed within 24 hours of bolt tensioning to prevent possible loss of lubrication or corrosion influence on tensioning torque.

The inspection torque wrench shall be calibrated as follows. Three bolts of the same grade, size, and condition as those under inspection shall be placed individually in a device calibrated to measure bolt tension. This calibration operation shall be done at least once each inspection day. There shall be a washer under the part turned in torquing each bolt. In the calibrated device, each bolt shall be tightened by any convenient means to the specified tension. The inspection wrench shall then be applied to the tensioned bolt to determine the torque required to turn the nut or head five degrees in the tightening direction. The average of the torque required for all three bolts shall be defined as the job-inspection torque.

Twenty-five percent, but a minimum of two, of the tensioned bolts shall be selected by the Engineer for inspection in each connection. (The Engineer may reduce the number of bolts tested at a connection to 10% based on the Contractor's past performance and splice location.) The job-inspection torque shall then be applied to each selected assembly with the inspection torque wrench turned in the tightening direction. If all inspected bolt heads or nuts do not turn, the bolts in the connection shall be considered to be properly tensioned. If the torque turns one or more bolt heads or nuts, the job-inspection torque shall then be applied to **all** bolts in the connection or to the satisfaction of the Engineer. Any bolt whose head or nut turns shall be re-tensioned and re-inspected. The Contractor

may, however, re-tension all the bolts in the connection with the inspection torque wrench and resubmit it for inspection, so long as the bolts are not over-tensioned or damaged by this action.

(g) Field Corrections and Misfits: Reaming of bolt holes during erection shall be permitted only with approval of the Engineer. No excessive forces shall be applied to any member to provide for proper alignment of the bolt holes.

The correction of minor misfits involving minor amounts of reaming, cutting, grinding and chipping shall be considered a legitimate part of the erection. However, any error in the shop fabrication or deformation resulting from handling and transportation may be cause for rejection. The Contractor shall be responsible for all misfits, errors and damage and shall make the necessary corrections and replacements.

TABLE A (Metric)
Minimum Bolt Tension in Kilonewtons*

| Bolt Size | ASTM A 325M | ASTM A 490M |
|------------------|--------------------|--------------------|
| M16 | 91 | 114 |
| M20 | 142 | 179 |
| M22 | 176 | 221 |
| M24 | 205 | 257 |
| M27 | 267 | 334 |
| M30 | 326 | 408 |
| M36 | 475 | 595 |

*Equal to 70% of specified minimum tensile strength of bolts (as specified in ASTM Specifications for tests of full-size A 325M and A 490M bolts with metric coarse threads series ANSI B1.13M, loaded in axial tension) rounded to the nearest kilonewton.

Table A (English)
Minimum Bolt Tension in kips*

| Bolt Size (Inches) | ASTM A 325 | ASTM A 490 |
|---------------------------|-------------------|-------------------|
| 5/8 | 19 | 24 |
| 3/4 | 28 | 35 |
| 7/8 | 39 | 49 |
| 1 | 51 | 64 |
| 1 1/8 | 56 | 80 |
| 1 1/4 | 71 | 102 |
| 1 3/8 | 85 | 121 |
| 1 1/2 | 103 | 148 |

*Equal to 70% of specified minimum tensile strength of bolts (as specified in ASTM Specifications for tests of full-size A 325 and A 490 bolts with UNC threads, loaded in axial tension) rounded to the nearest kip.

**TABLE B (English and Metric)
Nut Rotation from the Snug Condition
Geometry^{a,b,c} of Outer Faces of Bolted Parts**

| Bolt Length (measured from underside of head to end of bolt) | Both Faces Normal to Bolt Axis | One Face Normal to Bolt Axis and Other Face Sloped Not More Than 1:20, Bevel Washer Not Used | Both Faces Sloped Not More Than 1:20 From Normal to Bolt Axis, Bevel Washer Not Used |
|---|---|---|---|
| Up to and including 4 diameters | 1/3 turn | 1/2 turn | 2/3 turn |
| Over 4 diameters but not exceeding 8 diameters | 1/2 turn | 2/3 turn | 5/6 turn |
| Over 8 diameters but not exceeding 12 diameters | 2/3 turn | 5/6 turn | 1 turn |

(a) Nut rotation, as used in Table B, shall be taken as relative to the bolt, regardless of the element (nut or bolt) being turned. For bolts installed by 1/2 turn and less, the tolerance should be plus or minus 30 degrees; for bolts installed by 2/3 turn and more, the tolerance should be plus or minus 45 degrees.

To determine the nut rotation for installation and inspection of the fasteners, the nut and the end of the bolt or the head of the bolt and the adjacent steel shall be match marked.

(b) The values, given in Table B, shall be applicable only to connections in which all material within grip of the bolt is steel.

(c) No research work has been performed by the Research Council Riveted and Bolted Structural Joints to establish the turn-of-nut procedure when bolt lengths exceed 12 diameters. For situations in which the bolt length, measured from the underside of the head to the end of the bolt, exceeds 12 diameters, the required rotation shall be determined by actual tests in a suitable tension device simulating the actual conditions.

TABLE C (Metric)

| Bolt Dia. (in.) | Verification Tension | | Maximum Verification Refusals | | DTI Spaces | | Minimum Installation Refusals | |
|-----------------|----------------------|------|-------------------------------|-----------|------------|-----------|-------------------------------|-----------|
| | A325 | A490 | Type 8.8 | Type 10.9 | Type 8.8 | Type 10.9 | Type 8.8 | Type 10.9 |
| M16 | 96 | 120 | 1 | 1 | 4 | 4 | 2 | 2 |
| M20 | 149 | 188 | 2 | 2 | 5 | 6 | 3 | 3 |
| M22 | 185 | 232 | 2 | 2 | 5 | 6 | 3 | 3 |
| M24 | 215 | 270 | 2 | 2 | 5 | 6 | 3 | 3 |
| M27 | 280 | 351 | 2 | 3 | 6 | 7 | 3 | 4 |
| M30 | 342 | 428 | 3 | 3 | 7 | 8 | 4 | 4 |
| M36 | 499 | 625 | 3 | 4 | 8 | 9 | 4 | 5 |

TABLE C (English)

| Bolt Dia. (in.) | Verification Tension | | Maximum Verification Refusals | | DTI Spaces | | Minimum Installation Refusals | |
|-----------------|----------------------|------|-------------------------------|-----|------------|-----|-------------------------------|-----|
| | A325 | A490 | 325 | 490 | 325 | 490 | 325 | 490 |
| 5/8 | 20 | 25 | 1 | 2 | 4 | 5 | 2 | 3 |
| ¾ | 29 | 37 | 2 | 2 | 5 | 6 | 3 | 3 |
| 7/8 | 41 | 51 | 2 | 2 | 5 | 6 | 3 | 3 |
| 1 | 54 | 67 | 2 | 3 | 6 | 7 | 3 | 4 |
| 1 1/8 | 59 | 84 | 2 | 3 | 6 | 7 | 3 | 4 |
| 1¼ | 75 | 107 | 3 | 3 | 7 | 8 | 4 | 4 |
| 1 3/8 | 89 | 127 | 3 | 3 | 7 | 8 | 4 | 4 |
| 1½ | 108 | 155 | 3 | 4 | 8 | 9 | 4 | 5 |

Method of Measurement: Payment under this item will be at the contract lump sum price per each complete bridge structure or shall be based on the net weight (mass) of metal in the fabricated structure, whichever method appears on the proposal form.

When payment is based on a lump sum basis, the work, including anchor bolts, steel bearings and plates will not be measured for payment. Bearing plates welded to the girder are included in the price of the structural steel and bearing plates bonded to the bearings are included in the price of the bearing.

When payment is based on the net weight (mass) of metal in the fabricated structure, it shall be computed as described below.

The weight (mass) of the metal works to be paid for under the item of structural steel shall be computed on the basis of the net finished dimensions of the parts as shown on the shop drawings, deducting for copes, cuts, clips and all open holes, except bolt holes, and on the following basis:

1. The weights (masses) of rolled shapes shall be computed on the basis of their nominal weights (masses) per foot (meter), as shown in the shop drawings or listed in handbooks.

The weight (mass) of plates shall be computed on the basis of the nominal weight (mass) for their width and thickness as shown on the shop drawings.

2. The weight (mass) of temporary erection bolts, shop and field paint, galvanization, boxes, crates and other containers used for shipping, and materials used for supporting members during transportation and erection, shall not be included.

3. The weight (mass) of all high strength bolts, nuts, and washers shall be included on the basis of the following weights (masses):

| Weight per 100 | | | |
|--------------------------------------|--|------------------------------------|---|
| Nominal diameter of H.S. bolt (inch) | Bolthead, nut, 1 washer and stickthrough (lbs) | Nominal diameter of H.S. bolt (mm) | Bolthead, nut, 1 washer and stickthrough (kg) |
| 1/2 | 22 | 16 | 17 |
| 5/8 | 33 | 20 | 26 |
| 3/4 | 55 | 22 | 39 |
| 7/8 | 84 | 24 | 50 |
| 1 | 120 | 27 | 60 |
| 1 1/8 | 169 | 30 | 73 |
| 1 1/4 | 216 | 36 | 122 |

4. The weight (mass) of weld metal shall be computed on the basis of the theoretical volume from plan dimensions of the welds.

| Size of fillet in Inches (mm) | | Weight of weld in pounds per foot (kg per meter) | |
|----------------------------------|-------|---|---------|
| 3/16 | (5) | 0.08 | (0.119) |
| 1/4 | (6) | 0.14 | (0.208) |
| 5/16 | (8) | 0.22 | (0.327) |
| 3/8 | (9.5) | 0.30 | (0.446) |
| 1/2 | (13) | 0.55 | (0.818) |
| 5/8 | (16) | 0.80 | (1.190) |
| 3/4 | (19) | 1.10 | (1.636) |
| 7/8 | (22) | 1.50 | (2.231) |
| 1 | (25) | 2.00 | (2.974) |

5. The weight (mass) of steel shims, filler plates and anchor bolts shall be measured for payment.

When the pay item "Materials for Structural Steel (Site No.)" is included in the Contract, payment for furnishing of the raw steel material for the plates and shape material only, excluding any markup, based on the net weight (mass) required, and the payment will be made under the estimated item "Materials for Structural Steel (Site No.)". The overruns or wastage shall not exceed ten per cent for straight girders and fifteen per cent for curved girders. All other work specified in this section for the bridge will be deemed paid for under the lump sum price. In the absence of the pay item "Materials for Structural Steel (Site No.)", the cost of the raw material is included in the Lump Sum payment for this item, "Structural Steel (Site No.)".

Basis of Payment: The structural steel, incorporated in the completed and accepted structure, will be paid for at the contract lump sum price for "Structural Steel (Site No.)," or at the contract unit price per hundred weight (kilogram) for "Structural Steel," whichever is indicated in the contract documents.

Payment for either method shall be for structural steel, complete in place, which price shall include quality control, furnishing, fabricating, transporting, storing, erecting, welding, surface preparation and all materials including fastener assemblies, steel bearing assemblies and anchor bolts, equipment, tools and labor incidental thereto.

When the pay item "Materials for Structural Steel (Site No.)" is included in the Contract, payment for furnishing of the raw steel material for the plates and shape material only,

excluding any markup, based on the net weight (mass) required, and the payment will be made under the estimated item "Materials for Structural Steel (Site No.)". All remaining work including, but not limited to, preparation of shop drawings, fabricating, transporting, storage and handling, erecting, surface preparation and all materials, equipment, tools and labor incidental thereto, will be paid for under "Structural Steel (Site No.)".

In the absence of the pay item "Materials for Structural Steel (Site No.)", the cost of the raw material is included in the Lump Sum payment for this item, "Structural Steel (Site No.)". All remaining work including, but not limited to, preparation of shop drawings, fabricating, transporting, storage and handling, erecting, surface preparation and all materials, equipment, tools and labor incidental thereto, will be paid for under "Structural Steel (Site No.)".

No direct payment will be made for setting anchor bolts, preparing bearing areas, furnishing and placing materials under bearings. No direct payment will be made for non destructive testing as shown on the plans.

| <u>Pay Item</u> | <u>Pay Unit</u> |
|------------------------------|-----------------|
| Structural Steel (Site No.) | l.s. (l.s.) |
| Structural Steel | cwt. (kg) |

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 6.12
CONCRETE CYLINDER CURING BOX**

Delete the entire section and replace with it the following:

6.12.01 –Description: This item shall consist of furnishing a box for curing concrete test cylinders. The box shall be commercially available and manufactured specifically for curing concrete test cylinders. The box will remain the property of the Contractor at the conclusion of the project. The box shall be delivered to a location on the project as directed by the Engineer.

6.12.02 – Materials: A catalog cut listing detailed specifications of the box and operating instructions from the manufacturer must be submitted to the Engineer. The box and its components shall be constructed of non-corroding materials and shall be capable of storing a minimum of 18 test cylinders, 6" X 12" (152 mm X 305 mm) stored vertically with the lid closed. The lid must be watertight when closed and hinged in the back with security latches on the front that can be padlocked. The box must be capable of holding water to a maximum level of one inch above test cylinders placed in the box vertically. A drain hole must be provided in a wall of the box to allow manual drainage of the water that exceeds this level. A drain hole must also be provided at the bottom of the box so that it can be manually emptied. The temperature of the water must be controlled by heating and cooling device capable of maintaining the temperature of the water within a range of 60 to 80° F, +/- 2 °F (15.5 to 26.7 °C, +/- 1 °C) within an outside ambient air temperature range of -10 to 120 ° F (-23.3 to 49 °C). The heating and cooling device must be positioned to allow free circulation of air and water around the cylinders and be rated at 120 volts and 15 amps. A rack must be provided within the box to support the cylinders above the pool of temperature controlled water. The device must be thermostatically controlled with a digital readout that is capable of displaying the high/low water temperature within the box since the last reading was taken.

6.12.03 - Construction Methods: The Contractor shall maintain the curing box in working order and shall provide all necessary electrical service and water so that the curing box can be used properly during the entire course of the project. Any curing box that is not operating properly, as determined by the Engineer, shall be replaced within 24 hours by the Contractor at no expense to the State. The Engineer reserves the right to prohibit placement of fresh concrete on the project until a curing box acceptable to the Engineer is operational on the project site.

6.12.04 - Method of Measurement: The furnishing of the concrete test cylinder curing box will be measured for payment by the number of boxes delivered by the Contractor and accepted by the Engineer.

6.12.05 – Basis of Payment: This item will be paid for at the contract unit price each for “Concrete Cylinder Curing Box” ordered and accepted on the project, which price shall include all submittals, material, tools, equipment, and labor incidental thereto. The price shall also include all maintenance and operating costs related to the curing box for the duration of the project.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 6.51
CULVERTS**

6.51.02 – Materials:

In the 2nd paragraph replace “Gravel fill” with “Granular fill”.

6.51.03 – Construction Methods:

In the 8th paragraph replace “gravel fill” with “granular fill”.

Delete the 13th paragraph, “Bituminous fiber and ... as the pipe.”

6.51.04 – Methods of Measurement:

In the 7th paragraph replace “Gravel Fill” with “Granular Fill”.

6.51.05 – Basis of Payment:

In the 8th paragraph replace “Gravel Fill” with “Granular Fill”.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 7.02
PILES**

Article 7.02.05- Basis of Payment:

In the first sentence of the first paragraph of Section "2. Timber Piles" change "Furnishing Timber Piles Foot (Meter Length) and Furnishing Treated Timber Piles Foot (Meter Length)" to "Furnishing (Type) Timber Piles (Foot (Meter) Length)".

In the first sentence of the last paragraph of Section "2. Timber Piles" change "Driving Timber Piles" and "Driving Treated Timber Piles " to "Driving (Type) Timber Piles".

Under Pay Items:

Delete:

| <u>Pay Item</u> | <u>Pay Unit</u> |
|-----------------------------------|-----------------|
| Furnishing (Type) Piles (Lengths) | lb. (kg) |

Add:

| <u>Pay Item</u> | <u>Pay Unit</u> |
|--|-----------------|
| Furnishing (Type) Timber Piles (Length) | ea. (ea) |
| Furnishing Steel Piles | lb. (kg) |
| Furnishing (Type) Prestressed Concrete Piles | l.f. (m) |
| Cast-in-Place Concrete Piles | l.f. (m) |

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 8.22
TEMPORARY PRECAST CONCRETE BARRIER CURB**

Article 8.22.04 – Method of Measurement:

Add the following sentence to the end of the second paragraph:

“Relocation of Temporary Precast Concrete Barrier Curb for access to the work area or for the convenience of the Contractor shall be considered incidental to Maintenance and Protection of Traffic and will not be measured for payment.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.10
METAL BEAM RAIL**

Article 9.10.04 – Method of Measurement

Subarticle 1 – Metal Beam Rail (Type)

Delete the only sentence and replace with the following:

The length of metal beam rail measured for payment will be the number of linear feet (meters) of accepted rail of the type or designation installed, including radius rail other than Curved Guide Rail Treatment, measured along the top of rail between centers of end posts in each continuous section.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.18
THREE CABLE GUIDE RAILING
(I-BEAM POSTS) AND ANCHORAGES**

9.18.03 – Construction Methods:

In the 10th paragraph, replace “MIL” with “MILSPEC.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.22
BITUMINOUS CONCRETE SIDEWALK
BITUMINOUS CONCRETE DRIVEWAY**

9.22.03 – Construction Methods:

Replace the first paragraph with the following:

“1. Excavation: Excavation, including saw cutting, removal of any existing sidewalk, or driveway, shall be made to the required depth below the finished grade, as shown on the plans or as directed by the Engineer. All soft and yielding material shall be removed and replaced with suitable material.”

9.22.05 – Basis of Payment:

Replace the only paragraph with the following:

“This work will be paid for at the contract unit price per square yard (square meter) for "Bituminous Concrete Sidewalk" or "Bituminous Concrete Driveway," as the case may be, complete in place, which price shall include all saw cutting, excavation as specified above, backfill, disposal of surplus material, gravel or reclaimed miscellaneous aggregate base, and all equipment, tools, labor and materials incidental thereto.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.44
TOPSOIL**

Add the following paragraph to the beginning of article 9.44.03 – Construction Methods:

“The Contractor shall notify the Engineer of the location of the topsoil at least 15 calendar days prior to delivery. The topsoil and its source shall be inspected and approved by the Engineer before the material is delivered to the project. Any material delivered to the project, which does not meet specifications or which has become mixed with undue amounts of subsoil during any operation at the source or during placing and spreading, will be rejected and shall be replaced by the Contractor with acceptable material.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.49
FURNISHING, PLANTING and MULCHING
TREES, SHRUBS, VINES and GROUND COVER PLANTS**

9.49.03 – Construction Methods:

Replace subsection 5. Pits with the following:

“5. Pits: The pit diameters shall be twice the diameter of the root-spread or container diameters, and shall be 2- inches (50 millimeters) less than the height of the rootball measured from the bottom of the ball to the root collar. (i. e. A 12-inch (300 millimeters) measurement between the root collar and the bottom of the rootball will require a 10-inch (250 millimeters) deep pit). Any excavation in excess of that required shall be replaced with planting soil and compacted to the satisfaction of the Engineer.”

Add the following sentence to subsection 6. Obstructions Below Ground:

“If removal of obstructions results in a deeper hole than needed for planting, backfill material shall be added and compacted to the satisfaction of the Engineer.”

Replace subsection 7. Preparation of Backfill with the following:

“**7. Backfill:** Backfill shall conform to M.13.01-1 Planting Soil.”

Replace subsection 8. Setting Plants with the following:

“**8. Setting Plants:** All plants shall be plumb and at a level that is 2-inches (50 millimeters) higher than the surrounding ground. Backfill material for all plants shall be thoroughly and properly settled by firming or tamping. Thorough watering shall accompany backfilling. Saucers capable of holding water shall be formed at individual plants (exclusive of plant beds) by placing ridges of planting soil around each, or as directed by the Engineer.

a. Balled and Burlapped plants: Plants shall be handled in such manner so that the soil will not be loosened from the roots inside of the ball. Carefully place the plant into the prepared pits and backfill with planting soil to one - half the depth of the pit, thoroughly tamp to the satisfaction of the Engineer around the ball. Fill the remaining area of the pit with water. Once water has completely drained, loosen the burlap and peel down the top one third. If wire baskets are used, cut and bend down the top third of the basket. Roots that have been wrapped around the ball within the burlap shall be straightened and the remainder of the pit filled with planting soil tamped to ensure that no air pockets remain.

b. Container Grown Plants: Carefully remove the plant from the container over the prepared pits. Gently loosen the soil and straighten all roots as naturally as possible. Place into the bottom of the pit. Backfill with planting soil to one - half the depth of the pit. Thoroughly tamp to the satisfaction of the Engineer. Fill remaining area of the pit with water. Once water has completely drained fill the remainder of the pit with planting soil tamped to ensure that no air pockets remain.

c. Bare-roots Plants: Carefully spread roots as naturally as possible and place into the bottom of the pit. All broken or frayed roots shall be cleanly cut off. Backfill with planting soil to one - half the depth of the pit. Thoroughly tamp to the satisfaction of the Engineer. Fill remaining area of the pit with water. Once water has completely drained fill the remainder of the pit with planting soil tamped to ensure that no air pockets remain.”

Replace subsection 10. Watering with the following:

“10. Watering: All plants shall be watered upon setting and as many times thereafter as conditions warrant.

The following is a guide for minimum requirements:

Trees:

2 ½” Caliper and less – Fifteen (15) gallons each.

3” to 5” Caliper – Twenty (20) gallon each.

5 ½” Caliper and above – Twenty-five (25) gallon each.

Shrubs:

24” and less – Six (6) gallon each.

More than 24”- Ten (10) gallon each.

Vines, Perennials, and Ornamental Grasses – Three (3) gallons each.

Groundcovers and Bulbs – Two (2) gallons per square foot.

Water shall be applied at a controlled rate and in such a manner to ensure that the water reaches the root zone (saucer) of the plant or plant bed and does not run off to adjacent areas. Watering shall be applied in a manner that does not dislodge plants, erode soil or mulch, or cause damage to saucer.

The Contractor may use slow-release, drip irrigation bags for watering in accordance with manufacturer’s instructions. The use of these portable/temporary irrigation bags will require the approval of the Engineer.

Overhead hydro-seeder spray nozzles shall not be used as watering devices.”

Replace subsection 17. Establishment Period with the following:

“17. One-Year Establishment Period: All plant material shall be subject to a One-Year Establishment Period. During this time, the Contractor shall use currently accepted horticultural practices to keep all plant material installed in a healthy, vigorous growing condition at the date of final acceptance. The date of final

acceptance shall be one full calendar year following the satisfactory completion of the planting activities as confirmed by the Engineer.

An inspection will be held one year from the date of installation with the Contractor, Engineer, and Landscape Designer to determine the acceptability of the plant establishment. An inventory of losses and rejected materials will be made and corrective and necessary clean up measures will be determined at the plant inspection.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.75
MOBILIZATION**

9.75.04 – Method of Measurement:

Delete the entire section and replace with the following:

This work will be measured for payment in the manner described hereinafter; however, the determination of the total contract price earned shall not include the amount of mobilization earned during the period covered by the current monthly estimate- but shall include amounts previously earned and certified for payment:

1. When the first payment estimate is made, 25 percent of the lump sum bid price for this item or 2.5 percent of the total original contract price, whichever is less, shall be certified for payment.
2. When the Baseline Schedule, as specified under Section 1.05.08, is accepted, 50 percent of the lump sum bid price or 5 percent of the total original contract price, whichever is less, minus any previous payments, will be certified for payment.
3. When 10 percent of the total original contract price is earned and the Baseline Schedule, as specified under Section 1.05.08, is accepted, 75 percent of the lump sum price of this item or 7.5 percent of the total original contract price, whichever is less, minus any previous payments, will be certified for payment.
4. When 30 percent of the total original contract price is earned and the Baseline Schedule, as specified under Section 1.05.08, is accepted, 100 percent of the lump sum price of this item or 10 percent of the total original contract price, whichever is less, minus any previous payments, will be certified for payment.

Upon completion of all work on the project, payment of any amount bid for mobilization in excess of 10 percent of the original contract amount will be paid.

Nothing herein shall be construed to limit or preclude partial payments otherwise provided for by the contract.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 10.01
TRENCHING AND BACKFILLING**

Article 10.01.01- Description:

In the only sentence of the first paragraph after "...satisfactory..." add the following: "clean-up and".

In the only sentence of the second paragraph after "...reconstruction of..." add the following: "bituminous, concrete and granite curbing,".

Article 10.01.05- Basis of Payment:

In the only sentence of the second paragraph after "...mulching..." add the following: "clean-up and". After "...installing..." add the word "curbing,".

At the end of the third paragraph, add the following: "In the absence of a "Rock in Trench Excavation" item, the work will be compensated as extra work."

In the only sentence of the sixth paragraph, after ... "...unit price for 'Concrete Sidewalk'..." add the following: "or as extra work, if no unit price has been established."

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 10.10
CONCRETE HANDHOLE**

Article 10.10.05 – Basis of Payment

Remove the words “ground wire”.

At the end of the paragraph add the following sentence:

The ground wire (bonding wire) is included in the Contract unit price under Section 10.08 – Electrical Conduit.

Add the word “Cover” to the end of the pay item “Cast Iron Handhole”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 11.13
CONTROL CABLE**

11.13.03 – Construction Methods:

In the 1st paragraph of subsection 2 replace "MIL" with "MILSPEC."

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 12.10
EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS**

12.10.03 (2) – Procedures:

Insert the following after the sixth paragraph:

The epoxy shall be uniformly applied to the surface to be marked to ensure a wet film thickness of the applied epoxy, without glass beads, of 20 mils +/- 1 mil (500 um +/- 25 um).

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.06
METALS**

Article M.06.01 – Reinforcing Steel:

Subarticle 1. Bar Reinforcement:

Delete the third paragraph and replace it with:

“Epoxy coated bar reinforcement shall conform to the requirements of ASTM A 615/A 615M, Grade 60 (420) and shall be epoxy coated to the requirements of ASTM A 775/A 775M. All field repairs of the epoxy coating shall conform to the requirements of ASTM D 3963/D 3963M.”

Article M.06.02—Structural Steel and Other Structural Materials:

Delete the entire article and replace it with the following:

Article M.06.02—Structural Steel: The materials for this work shall conform to the following requirements:

1. Structural Steel:

Structural steel for bridges shall conform to the designation shown on the plans. Unless otherwise indicated in the plans or specifications, structural steel for non-bridge related members or components shall conform to ASTM A709/A709M, Grade 36 (250).

All surfaces of steel plates and shapes used in the fabrication of bridge girders shall be blast cleaned and visually inspected by the Contractor prior to any fabrication or preparation for fabrication. Blast cleaning shall conform to the requirements of SSPC-SP-6-Commercial Blast.

All steel plates and shapes used in the fabrication of bridge girders shall be substantially free from pitting and gouges, regardless of the cause. Substantially free is defined as:

- The measured surface area of all pits and gouges regardless of depth represent less than 1% of the surface area of the plate or shape.
- No pit or gouge greater than 1/32 (0.08mm) inch deep.
- No pit or gouge closer than six inches (15.25 cm) from another.

Any repair of plates or shapes will be performed in accordance with ASTM A6/A 6M.

2. Anchor Bolts:

Unless otherwise designated on the plans, anchor bolts, including suitable nuts and washers, shall conform to the following requirements:

Anchor bolt assemblies shall conform to the requirements of ASTM F1554, Grade 36 (250). All components of the bolt assembly shall be galvanized in conformance with ASTM A 153/A 153M.

Certified Test Reports and Material Samples: The Contractor shall submit notarized copies of Certified Test Reports in conformance with Article 1.06.07. Prior to incorporation into the work, the Contractor shall submit samples of the anchor bolt assemblies to the Engineer for testing in accordance with the latest edition of the "Schedule of Minimum Requirements for Acceptance Testing". One sample shall be submitted for each diameter, material designation, grade or coating of anchor bolt assembly.

3. High Strength Bolts: High strength bolts, including suitable nuts and hardened washers, shall conform to the following requirements:

- a) High strength bolts shall conform to ASTM A325 or ASTM A490 as shown on the plans. High-strength bolts used with coated steel shall be mechanically galvanized, unless otherwise specified. High-strength bolts used with uncoated weathering grades of steel shall be Type 3.

Nuts for ASTM A325 bolts shall conform to ASTM A563, grades DH, DH3, C, C3 and D. Where galvanized high-strength bolts are used, the nuts shall be galvanized, heat treated grade DH or DH3. Where Type 3 high-strength bolts are used, the nuts shall be grade C3 or DH3.

Nuts for ASTM A490 bolts shall conform to the requirements of ASTM A563, grades DH and DH3. Where Type 3 high-strength bolts are used, the nuts shall be grade DH3.

All galvanized nuts shall be lubricated with a lubricant containing a visible dye of any color that contrasts with the color of the galvanizing. Black bolts must be oily to the touch when delivered and installed.

Circular flat and square or rectangular beveled, hardened steel washers shall conform to ASTM F436. Unless otherwise specified, galvanized washers shall be furnished when galvanized high-strength bolts are specified, and washers with atmospheric corrosion resistance and weathering characteristics shall be furnished when Type 3 high-strength bolts are specified.

Compressible-washer-type direct tension indicator washers, used in conjunction with high strength bolts, shall conform to ASTM F959. Where galvanized high-strength bolts are used, the washers shall be galvanized in accordance with ASTM B695, Class 50. Where Type 3 high-strength bolts are used, the washers shall be galvanized in accordance with ASTM B695, Class 50 and coated with epoxy.

- b) Identifying Marks:** ASTM A325 for bolts and the specifications referenced therein for nuts require that bolts and nuts manufactured to the specification be identified by specific markings on the top of the bolt head and on one face of the nut. Head markings must identify the grade by the symbol "A325", the manufacturer and the type, if Type 2 or 3. Nut markings must identify the grade, the manufacturer and if Type 3, the type. Markings on direct tension indicators must identify the manufacturer and Type "325". Other washer markings must identify the manufacturer and if Type 3, the type.

ASTM A490 for bolts and the specifications reference therein for nuts require that bolts and nuts manufactured to the specifications be identified by specific markings on the top of the bolt head and on one face of the nut. Head markings must identify the grade by the symbol "A490", the manufacturer and the type, if Type 2 or 3. Nut markings must identify the grade, the manufacturer and if Type 3, the type. Markings on direct tension indicators must identify the manufacturer and Type "490". Other washer markings must identify the manufacturer and if Type 3, the type.

- c) Dimensions:** Bolt and nuts dimensions shall conform to the requirements for Heavy Hexagon Structural Bolts and for Heavy Semi-Finished Hexagon Nuts given in ANSI Standard B18.2.1 and B18.2.2, respectively.
- d) Galvanized Bolts:** Galvanized bolts shall conform to ASTM A325, Type 1. The bolts shall be hot-dip galvanized in accordance with ASTM A153, Class C or mechanically galvanized in accordance with ASTM B695, Class 50. Bolts, nuts, and washers of any assembly shall be galvanized by the same process. The nuts shall be overtapped to the minimum amount required for the fastener assembly, and shall be lubricated with a lubricant containing a visible dye so a visual check can be made for the lubricant at the time of field installation. Galvanized bolts shall be tension tested after galvanizing. ASTM A 490 bolts shall not be galvanized.
- e) Test Requirements:** The maximum hardness of A325 bolts 1" or less in diameter shall be 33 HRC.

Plain, ungalvanized nuts shall have a minimum hardness of 89 HRB.

Proof load tests, in accordance with the requirements of ASTM F606 Method 1, shall be required for the bolts. Wedge tests of full-size bolts are required in accordance with Section 8.3 of ASTM A325. Galvanized bolts shall be wedge tested after galvanizing. Proof load tests of ASTM A563 are required for nuts. Proof load tests for nuts used with galvanized bolts shall be performed after galvanizing, overtapping and lubricating.

Rotational-capacity tests are required and shall be performed on all plain or galvanized (after galvanizing) bolt, nut and washer assemblies by the manufacturer or distributor prior to shipping and by the Contractor at the job site.

The thickness of galvanizing on bolts, nuts and washers shall be measured. On bolts, it shall be measured on the wrench flats or on top of the bolt head, and on nuts it shall be measured on the wrench flats.

f) Certified Test Reports and Materials Certificates: The Contractor shall submit notarized copies of Certified Test Reports and Materials Certificates in conformance with Article 1.06.07 for fastener assemblies. In addition the Certified Test Reports and Materials Certificates shall include the following:

- a. Mill test reports shall indicate the place where the material was melted and manufactured.
- b. Test reports for proof load tests, wedge tests, and rotational-capacity tests shall indicate where the tests were performed, date of tests, location of where the components were manufactured and lot numbers.
- c. The test report for galvanized components shall indicate the thickness of the galvanizing.

g) Material Samples: Prior to incorporation into the work, the Contractor shall submit samples of the bolt assemblies to the Engineer for testing in accordance with the latest edition of the "Schedule of Minimum Requirements for Acceptance Testing". Samples shall be submitted for each diameter, length, material designation, grade, coating and manufacturer of bolt assembly.

4. Welded Stud Shear Connectors:

a) Materials: Stud shear connectors shall conform to the requirements of ASTM A 108, cold-drawn bar, Grades 1015, 1018 or 1020, either semi- or fully-killed. If flux-retaining caps are used, the steel for the caps shall be of a low carbon grade suitable for welding and shall comply with ASTM A 109.

Stud shear connectors shall be of a design suitable for electrically end-welding to steel with automatically timed stud welding equipment. The studs shall be of the sizes and dimensions noted on the plans. Flux for welding shall be furnished with each stud, either attached to the end of the stud or combined with the arc shield for automatic application in the welding operation. Each stud shall be furnished with a disposable ferrule of sufficient strength to remain intact during the welding operation and not crumble or break; it shall not be detrimental to the weld or create excessive slag.

Tensile properties, as determined by tests of bar stock after drawing or of finished studs, shall conform to the following requirements in which the yield strength is as determined by the 0.2% offset method:

| | |
|--------------------------|----------------------------------|
| Tensile strength (min.) | 60,000 psi (415 megapascals) |
| Yield strength (min.) | 50,000 psi (345 megapascals) |
| Elongation (min.) | 20% in 2 inches (50 millimeters) |
| Reduction of area (min.) | 50% |

- b) Test Methods:** Tensile properties shall be determined in accordance with the applicable sections of ASTM A 370. Tensile tests of finished studs shall be made on studs welded to test plates using a test fixture similar to that shown in Figure 7.2 of the current AASHTO/AWS D1.5 – Bridge Welding Code. If fracture occurs outside of the middle half of the gage length, the test shall be repeated.
- c) Finish:** Finished studs shall be of uniform quality and condition, free from injurious laps, fins, seams, cracks, twists, bends or other injurious defects. Finish shall be as produced by cold-drawing, cold-rolling or machining.
- d) Certified Test Reports and Materials Certificates:** The Contractor shall submit a certified copy of the in-plant quality control test report in conformance with Article 1.06.07. The Contractor shall submit a Materials Certificate in conformance with Article 1.06.07 for the welded studs.
- e) Sample Materials for Testing:** Prior to incorporation into the work, the Contractor shall submit samples of the stud shear connectors to the Engineer for testing in accordance with the latest edition of the “Schedule of Minimum Requirements for Acceptance Testing”. One sample shall be submitted for each diameter and length of welded stud.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.13
ROADSIDE DEVELOPMENT**

Delete article M.13.01 – Topsoil and replace it with the following:

“Article M.13.01 – Topsoil: The term topsoil used herein shall mean a soil meeting the soil textural classes established by the USDA Classification System based upon the proportion of sand, silt, and clay size particles after passing a No. 10 (2 millimeter) sieve and subjected to a particle size analysis. The topsoil shall contain 5% to 20% organic matter as determined by loss on ignition of oven-dried samples dried at 221° F (105° C). The pH range of the topsoil shall be 5.5 to 7.0.

The following textural classes shall be acceptable:

Loamy sand, including coarse, loamy fine, and loamy very fine sand, with not more than 80% sand

Sandy loam, including coarse, fine and very fine sandy loam

Loam

Clay loam, with not more than 30% clay

Silt loam, with not more than 60% silt

Sandy clay loam, with not more than 30% clay

All textural classes of topsoil with greater than 80% sand content will be rejected.

The topsoil furnished by the Contractor shall be a natural, workable soil that is screened and free of subsoil, refuse, stumps, roots, brush, weeds, rocks and stones over 1 1/4 inches (30 millimeters) in diameter, and any other foreign matter that would be detrimental to the proper development of plant growth.

The Contractor shall notify the Engineer of the location of the topsoil at least 15 calendar days prior to delivery. The topsoil and its source shall be inspected and approved by the Engineer before the material is delivered to the project. Any material delivered to the project, which does not meet specifications or which has become mixed with undue amounts of subsoil during any operation at the source or during placing and spreading, will be rejected and shall be replaced by the Contractor with acceptable material.

When topsoil is not furnished by the Contractor, it shall be material that is stripped in accordance with Section 2.02 or is furnished by the State, and will be tested as determined by the Engineer.

1. Planting Soil: Soil Material to be used for plant backfill shall be one of the following textural classes:

Loamy sand, with not more than 80% sand

Sandy loam

Loam

Clay loam, with not more than 30% clay

Silt loam, with not more than 60% silt

Sandy clay loam, with not more than 30% clay

Planting soil shall be premixed, consisting of approximately 50 % topsoil, 25 % compost or peat, and 25% native soil. Planting soil shall be loose, friable, and free from refuse, stumps, roots, brush, weeds, rocks and stones 2 inches (50 millimeters) in diameter. In addition, the material shall be free from any material that will prevent proper development and plant growth.

- (a) For ericaceous plants and broad-leaved evergreens requiring an acid soil, planting soil shall have a true pH of 4.5 to 5.5. If it has not, it shall be amended by the Contractor at his own expense to the proper pH range by mixing with sulphur.
- (b) Planting soil for general planting of nonacid-loving plants shall have a true pH value of 5.6 to 6.5. If it has not, it shall be amended by the Contractor at his own expense to the proper pH range by mixing with dolomitic limestone.

The amount of either sulphur or limestone required to adjust the planting soil to the proper pH range (above) shall be determined by the Engineer based on agronomic tests. The limestone shall conform to the requirements of Article M.13.02. The sulphur shall be commercial or flour sulphur, unadulterated, and shall be delivered in containers with the name of the manufacturer, material, analysis, and net weight (mass) appearing on each container.

The Engineer reserves the right to draw such samples and to perform such tests as he deems necessary to ensure that these specifications are met.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.16
TRAFFIC CONTROL SIGNALS**

Article M.16.04 – Poles:

Subarticle 1. Steel Poles:

(i) Wire Entrance Fitting:

In the second sentence, delete “required to accept the cables”.

Article M.16.06 – Traffic Signals:

In the 1st paragraph of subsection 9 replace “MIL” with “MILSPEC”.

Under the paragraph entitled Third Coat, replace the first two sentence with the following:

“Dark Green Enamel: Shall be Dark Green exterior baked enamel and shall comply with FS A-A 2962. The color shall be No. 14056, FS No. 595.”

and in the third sentence replace “MIL” with “MILSPEC.”

Article M.16.08 – Pedestrian Push Button

Subarticle – Painting

Delete the entire “Third Coat” paragraph and replace with the following:

Third Coat: Dark Green Enamel, shall be DARK GREEN exterior-baking enamel and shall comply with Federal Specifications A-A 2962. The color shall be No. 14056, Federal Standard No. 595.

M.16.15 – Messenger and Span Wire:

Delete the entire article and replace with the following:

The materials for this work shall conform to the following requirements:

1. Messenger wire shall be made of double-galvanized 7-strand utilities-grade steel wire cable, not less than 3/16 inch (4.8 millimeters) in diameter, with at least a 2,400-pound (10.7-killinewton) breaking strength.

2. Span wire:

(a) "Span wire" shall be made of double-galvanized 7-strand utilities-grade steel wire cable, not less than 3/8 inch (9.5 millimeters) in diameter, with at least an 11,200-pound (50-kilonewton) breaking strength.

(b) "Span wire (high strength)" shall be made of double-galvanized 7-strand extra-high-strength-grade steel wire cable, not less than 7/16 inch (11.1 millimeters) in diameter, with at least a 20,800-pound (94-kilonewton) breaking strength.

3. All hardware accessories shown on the plans to be used in span wire or messenger mounting shall be made of high-strength, double-galvanized, first-quality materials.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.17
ELASTOMERIC MATERIALS**

M.17.01 – Elastomeric Bearing Pads:

In the 2nd paragraph of subsection 4(b), replace “MS MIL” with “MILSPEC.”

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.18
SIGNING**

M.18.10 – Demountable Copy:

In the chart under subsection 3H, replace “MS MIL” with “MILSPEC.”

Construction Contracts - Required Contract Provisions (FHWA Funded Contracts)

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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
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 - 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
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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)

EXHIBIT G

(state wages will be inserted here)

Federal Wage Rates 3-1-13

General Decision Number: CT130001 03/01/2013 CT1

Superseded General Decision Number: CT20120001

State: Connecticut

Construction Type: Highway

Counties: Fairfield, Litchfield, Middlesex, New Haven, Tolland and Windham Counties in Connecticut.

HIGHWAY CONSTRUCTION PROJECTS

| Modification Number | Publication Date |
|---------------------|------------------|
| 0 | 01/04/2013 |
| 1 | 03/01/2013 |

* BRCT0001-004 12/31/2012

| | Rates | Fringes |
|--|----------|---------|
| BRICKLAYER BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, PLASTERERS AND STONE MASONS. | \$ 32.50 | 25.81 |

CARP0024-006 05/07/2012

LITCHFIELD COUNTY
Harwinton, Plymouth, Thomaston, Watertown
MIDDLESEX COUNTY
NEW HAVEN COUNTY
Beacon Falls, Bethany, Branford, Cheshire, East Haven,
Guilford, Hamden. Madison, Meriden, Middlebury, Naugatuck, New
Haven, North Branford, North Haven, Orange (east of Orange
Center Road and north of Route 1, and north of Route 1 and east
of the Oyster River), Prospect, Southbury, Wallingford,
Waterbury, West Haven, Wolcott, Woodbridge
TOLLAND COUNTY
Andover, Columbia, Coventry, Hebron, Mansfield, Union,
Willington
WINDHAM COUNTY

| | Rates | Fringes |
|------------------------------|----------|---------|
| Carpenters: | | |
| Carpenters, Piledrivers..... | \$ 29.65 | 21.00 |
| Diver Tenders..... | \$ 29.65 | 21.00 |
| Divers..... | \$ 38.11 | 21.00 |

CARP0043-004 05/07/2012

| | Rates | Fringes |
|---|----------|---------|
| Carpenters: (TOLLAND COUNTY Bolton, Ellington, Somers, Tolland, Vernon) | | |
| CARPENTERS, PILEDRIVERS..... | \$ 29.65 | 21.00 |
| DIVER TENDERS..... | \$ 29.65 | 21.00 |
| DIVERS..... | \$ 38.11 | 21.00 |

CARP0210-002 05/07/2012

| | Rates | Fringes |
|------------------------------|----------|---------|
| Carpenters: | | |
| CARPENTERS, PILEDRIVERS..... | \$ 29.65 | 21.00 |
| DIVER TENDERS..... | \$ 29.65 | 21.00 |
| DIVERS..... | \$ 38.11 | 21.00 |

FAIRFIELD COUNTY

Bethel, Bridgeport, Brookfield, Danbury, Darien, Easton, Fairfield, Greenwich, Monroe, New Canaan, New Fairfield, Newtown, Norwalk, Redding, Ridgefield, Shelton, Sherman, Stamford, Stratford, Trumbull, Weston, Westport, Wilton;

LITCHFIELD COUNTY

Barkhamstead, Bethlehem, Bridgewater, Canaan, Colebrook, Cornwall, Goshen, Kent, Litchfield, Morris, New Hartford, New Milford, Norfolk, North Canaan, Roxbury, Salisbury, Sharon, Torrington, Warren, Washington, Winchester, Woodbury;

NEW HAVEN COUNTY

Ansonia, Derby, Milford, Orange (west of Orange Center Road and south of Route 1 and west of the Oyster River), Oxford, Seymour;

ELEC0003-002 05/08/2008

| | Rates | Fringes |
|--|----------|---------|
| Electricians | | |
| FAIRFIELD COUNTY | | |
| Darien, Greenwich, New Canaan, Stamford..... | \$ 44.75 | 30.42 |

ELEC0035-001 06/01/2012

| | Rates | Fringes |
|---|----------|---------|
| Electricians: | | |
| MIDDLESEX COUNTY (Cromwell, Middlefield, Middleton and Portland); TOLLAND COUNTY; WINDHAM COUNTY..... | | |
| | \$ 37.10 | 22.12 |

ELEC0090-002 06/01/2012

| | Rates | Fringes |
|--------------------|----------|---------|
| Electricians:..... | \$ 36.25 | 22.49 |
| LITCHFIELD COUNTY | | |

Plymouth Township;

MIIDDLESEX COUNTY

Chester, Clinton, Deep River, Durham, East Haddam, East Hampton, Essex, Haddam, Killingworth, Old Saybrook, Westbrook;

NEW HAVEN COUNTY

All Townships excluding Beacon Falls, Middlebury, Milford, Naugatuck, Oxford, Prospect, Seymour, Southbury, Waterbury and Wolcott.

ELEC0488-002 06/01/2011

| | Rates | Fringes |
|-------------------|----------|---------|
| Electricians..... | \$ 35.10 | 22.26 |

FAIRFIELD COUNTY

Bethel, Bridgeport, Brookfield, Danbury, Easton, Fairfield, Monroe, New Fairfield, Newtown, Norwalk, Redding, Ridgefield, Shelton, Sherman, Stratford, Trumbull, Weston, Westport and Wilton.

LITCHFIELD COUNTY

Except Plymouth;

NEW HAVEN COUNTY

Beacon Falls, Middlebury, Milford, Naugatuck, Oxford, Prospect, Seymour, Southbury, Waterbury and Wolcott

ENGI0478-001 04/01/2012

| | Rates | Fringes |
|----------------------------|----------|---------|
| Power equipment operators: | | |
| GROUP 1..... | \$ 35.50 | 20.50+a |
| GROUP 2..... | \$ 35.18 | 20.50+a |
| GROUP 3..... | \$ 34.44 | 20.50+a |
| GROUP 4..... | \$ 34.05 | 20.50+a |
| GROUP 5..... | \$ 33.46 | 20.50+a |
| GROUP 6..... | \$ 33.15 | 20.50+a |
| GROUP 7..... | \$ 32.81 | 20.50+a |
| GROUP 8..... | \$ 32.41 | 20.50+a |
| GROUP 9..... | \$ 31.98 | 20.50+a |
| GROUP 10..... | \$ 29.94 | 20.50+a |
| GROUP 11..... | \$ 29.94 | 20.50+a |
| GROUP 12..... | \$ 29.88 | 20.50+a |
| GROUP 13..... | \$ 31.41 | 20.50+a |
| GROUP 14..... | \$ 29.30 | 20.50+a |
| GROUP 15..... | \$ 28.99 | 20.50+a |
| GROUP 16..... | \$ 28.16 | 20.50+a |
| GROUP 17..... | \$ 27.75 | 20.50+a |
| GROUP 18..... | \$ 27.10 | 20.50+a |

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

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).

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 (skooter).

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) .

CT1_dvb

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 07/02/2012

| | Rates | Fringes |
|---|----------|---------|
| Ironworkers: (Reinforcing, Structural and Precast Concrete Erection)..... | \$ 33.50 | 27.98+a |

a. PAID HOLIDAY: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

LABO0056-003 04/01/2012

| | Rates | Fringes |
|--------------|----------|---------|
| Laborers: | | |
| GROUP 1..... | \$ 25.80 | 16.45 |
| GROUP 2..... | \$ 26.05 | 16.45 |
| GROUP 3..... | \$ 26.30 | 16.45 |
| GROUP 4..... | \$ 26.80 | 16.45 |
| GROUP 5..... | \$ 27.55 | 16.45 |
| GROUP 6..... | \$ 27.80 | 16.45 |
| GROUP 7..... | \$ 16.00 | 16.45 |

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

PAIN0011-001 06/01/2012

| | Rates | Fringes |
|---------------------------|----------|---------|
| Painters: | | |
| Blast and Spray..... | \$ 33.22 | 16.90 |
| Brush and Roll..... | \$ 30.22 | 16.90 |
| Tanks, Towers, Swing..... | \$ 32.22 | 16.90 |

PAIN0011-003 06/01/2012

CT1_dvb

| | Rates | Fringes |
|--|----------|---------|
| Painters: (BRIDGE CONSTRUCTION) | | |
| Brush, Roller, Blasting (Sand, water, etc.) Spray... | \$ 42.75 | 16.90 |
| ----- | | |
| TEAM0064-001 04/01/2012 | | |

| | Rates | Fringes |
|--|----------|---------|
| Truck drivers: | | |
| 2 Axle Ready Mix..... | \$ 27.98 | 17.22+a |
| 2 Axle..... | \$ 27.88 | 17.22+a |
| 3 Axle Ready Mix..... | \$ 28.03 | 17.22+a |
| 3 Axle..... | \$ 27.98 | 17.22+a |
| 4 Axle Ready Mix..... | \$ 28.13 | 17.22+a |
| 4 Axle..... | \$ 28.08 | 17.22+a |
| Heavy Duty Trailer 40 tons and over..... | \$ 28.33 | 17.22+a |
| Heavy Duty Trailer up to 40 tons..... | \$ 28.08 | 17.22+a |
| Specialized (Earth moving equipment other than conventional type on-the-road trucks and semi-trailers, including Euclids)..... | \$ 28.13 | 17.22+a |

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.

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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 union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters , PLUM, indicate the international union and the four-digit number, 0198, that follows 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. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

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.

CT1_dvb

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.

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END OF GENERAL DECISION

General Decision Number: CT120002 07/06/2012 CT2

Superseded General Decision Number: CT20100003

State: Connecticut

Construction Type: Highway

County: New London County in Connecticut.

HIGHWAY CONSTRUCTION PROJECTS

| Modification Number | Publication Date |
|---------------------|------------------|
| 0 | 01/06/2012 |
| 1 | 01/20/2012 |
| 2 | 04/06/2012 |
| 3 | 06/01/2012 |
| 4 | 06/15/2012 |
| 5 | 07/06/2012 |

BRCT0001-003 03/31/2012

| | Rates | Fringes |
|--|----------|---------|
| BRICKLAYER | | |
| BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, PLASTERERS, STONE MASONS.... | \$ 32.50 | 24.55 |

CARP0024-002 05/07/2012

| | Rates | Fringes |
|------------------------------|----------|---------|
| Carpenters: | | |
| Carpenters, Piledrivers..... | \$ 29.65 | 21.00 |
| Diver Tenders..... | \$ 29.65 | 21.00 |
| Divers..... | \$ 38.11 | 21.00 |

* ELEC0035-003 06/01/2012

| | Rates | Fringes |
|---|----------|---------|
| Electricians: | | |
| Bozrah, Colchester, Franklin, Griswold, Lebanon, Ledyard, Lisbon, Montville, North Stonington, Norwich, Preston, Salem, Sprague, Stonington and Voluntown.... | \$ 37.10 | 22.12 |

ELEC0090-003 06/01/2010

East Lyme, Groton, New London, Old Lyme, Waterford, plus the part of Ledyard wherein the property of the Submarine Base is located

| | Rates | Fringes |
|------------------|----------|---------|
| ELECTRICIAN..... | \$ 35.20 | 20.51 |

ENGI0478-002 04/01/2012

| | Rates | Fringes |
|----------------------------|----------|---------|
| Power equipment operators: | | |
| GROUP 1..... | \$ 35.50 | 20.50+a |
| GROUP 2..... | \$ 35.18 | 20.50+a |
| GROUP 3..... | \$ 34.44 | 20.50+a |
| GROUP 4..... | \$ 34.05 | 20.50+a |
| GROUP 5..... | \$ 33.46 | 20.50+a |
| GROUP 6..... | \$ 33.15 | 20.50+a |
| GROUP 7..... | \$ 32.81 | 20.50+a |
| GROUP 8..... | \$ 32.41 | 20.50+a |
| GROUP 9..... | \$ 31.98 | 20.50+a |
| GROUP 10..... | \$ 29.94 | 20.50+a |
| GROUP 11..... | \$ 29.94 | 20.50+a |
| GROUP 12..... | \$ 29.88 | 20.50+a |
| GROUP 13..... | \$ 31.41 | 20.50+a |

| | | |
|---------------|----------|---------|
| GROUP 14..... | \$ 29.30 | 20.50+a |
| GROUP 15..... | \$ 28.99 | 20.50+a |
| GROUP 16..... | \$ 28.16 | 20.50+a |
| GROUP 17..... | \$ 27.75 | 20.50+a |
| GROUP 18..... | \$ 27.10 | 20.50+a |

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.

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).

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.

* IRON0015-003 07/02/2012

| | Rates | Fringes |
|--|----------|---------|
| Ironworkers: (Reinforcing & Structural)..... | \$ 33.50 | 27.98+a |

a. PAID HOLIDAY: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

LABO0056-003 04/01/2012

| | Rates | Fringes |
|--------------|----------|---------|
| Laborers: | | |
| GROUP 1..... | \$ 25.80 | 16.45 |
| GROUP 2..... | \$ 26.05 | 16.45 |
| GROUP 3..... | \$ 26.30 | 16.45 |
| GROUP 4..... | \$ 26.80 | 16.45 |
| GROUP 5..... | \$ 27.55 | 16.45 |
| GROUP 6..... | \$ 27.80 | 16.45 |
| GROUP 7..... | \$ 16.00 | 16.45 |

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

PAIN0011-002 06/01/2012

| | Rates | Fringes |
|---------------------------|----------|---------|
| Painters: | | |
| Blast and Spray..... | \$ 33.22 | 16.90 |
| Brush and Roll..... | \$ 30.22 | 16.90 |
| Tanks, Towers, Swing..... | \$ 32.22 | 16.90 |

PAIN0011-003 06/01/2012

| | Rates | Fringes |
|--|----------|---------|
| Painters: (BRIDGE CONSTRUCTION) | | |
| Brush, Roller, Blasting (Sand, Water, etc.) Spray... | \$ 42.75 | 16.90 |

TEAM0064-003 04/01/2012

| | Rates | Fringes |
|-----------------------|----------|---------|
| Truck drivers: | | |
| 2 Axle Ready Mix..... | \$ 27.98 | 17.22+a |
| 2 Axle..... | \$ 27.88 | 17.22+a |
| 3 Axle Ready Mix..... | \$ 28.03 | 17.22+a |
| 3 Axle..... | \$ 27.98 | 17.22+a |
| 4 Axle Ready Mix..... | \$ 28.13 | 17.22+a |
| 4 Axle..... | \$ 28.08 | 17.22+a |

| | | |
|--|----------|---------|
| Heavy Duty Trailer 40 tons and over..... | \$ 28.33 | 17.22+a |
| Heavy Duty Trailer up to 40 tons..... | \$ 28.08 | 17.22+a |
| Specialized (Earth moving equipment other than conventional type on-the-road trucks and semi-trailers, including Euclids)..... | \$ 28.13 | 17.22+a |

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 union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters, PLUM, indicate the international union and the four-digit number, 0198, that follows 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. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rate.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

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.

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END OF GENERAL DECISION

General Decision Number: CT130003 03/01/2013 CT3

Superseded General Decision Number: CT20120003

State: Connecticut

Construction Type: Highway

County: Hartford County in Connecticut.

HIGHWAY CONSTRUCTION PROJECTS

| | |
|---------------------|------------------|
| Modification Number | Publication Date |
| 0 | 01/04/2013 |
| 1 | 03/01/2013 |

* BRCT0001-003 12/31/2012

| | Rates | Fringes |
|-------------------------------|----------|---------|
| BRICKLAYER | | |
| BRICKLAYERS, CEMENT | | |
| MASONS, CEMENT FINISHERS, | | |
| PLASTERERS, STONE MASONS..... | \$ 32.50 | 25.81 |

CARP0024-005 05/07/2012

| | Rates | Fringes |
|---|----------|---------|
| Carpenters: (Berlin, Bristol, Burlington, Canton, Marlborough, New Britain, Newington, Plainville, Southington) | | |
| CARPENTERS; PILEDRIVERS..... | \$ 29.65 | 21.00 |
| DIVER TENDERS..... | \$ 29.65 | 21.00 |
| DIVERS..... | \$ 38.11 | 21.00 |

CARP0043-003 05/07/2012

| | 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..... | \$ 29.65 | 21.00 |
| DIVER TENDERS..... | \$ 29.65 | 21.00 |
| DIVERS..... | \$ 38.11 | 21.00 |

ELEC0035-002 06/01/2012

| | Rates | Fringes |
|--|-------|---------|
| Electricians: | | |
| Entire County, excluding Berlin, Bristol, Hartland, | | |

CT3

New Britain, Newington,
Plainville and Southington..\$ 37.10 22.12

ELEC0090-001 06/01/2010

| | Rates | Fringes |
|---|----------|---------|
| Electricians: | | |
| Berlin, Bristol, New Britain, Newington, Plainville, Southington..... | \$ 35.20 | 20.51 |

ELEC0488-004 06/01/2011

| | Rates | Fringes |
|--------------------|----------|---------|
| Electricians:..... | \$ 35.10 | 22.26 |

ENGI0478-002 04/01/2012

| | Rates | Fringes |
|----------------------------|----------|---------|
| Power equipment operators: | | |
| GROUP 1..... | \$ 35.50 | 20.50+a |
| GROUP 2..... | \$ 35.18 | 20.50+a |
| GROUP 3..... | \$ 34.44 | 20.50+a |
| GROUP 4..... | \$ 34.05 | 20.50+a |
| GROUP 5..... | \$ 33.46 | 20.50+a |
| GROUP 6..... | \$ 33.15 | 20.50+a |
| GROUP 7..... | \$ 32.81 | 20.50+a |
| GROUP 8..... | \$ 32.41 | 20.50+a |
| GROUP 9..... | \$ 31.98 | 20.50+a |
| GROUP 10..... | \$ 29.94 | 20.50+a |
| GROUP 11..... | \$ 29.94 | 20.50+a |
| GROUP 12..... | \$ 29.88 | 20.50+a |
| GROUP 13..... | \$ 31.41 | 20.50+a |
| GROUP 14..... | \$ 29.30 | 20.50+a |
| GROUP 15..... | \$ 28.99 | 20.50+a |
| GROUP 16..... | \$ 28.16 | 20.50+a |
| GROUP 17..... | \$ 27.75 | 20.50+a |
| GROUP 18..... | \$ 27.10 | 20.50+a |

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.

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.

CT3

GROUP 2: Cranes (100 ton rated capacity and over); Excavator over 2 cubic yards; Piledriver (\$3.00 premium when operator controls hammer).

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.

CT3

| | Rates | Fringes |
|---|----------|---------|
| Ironworkers: (Reinforcing, Structural and Precast Concrete Erection)..... | \$ 33.50 | 27.98+a |

a. PAID HOLIDAY: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

LABO0056-003 04/01/2012

| | Rates | Fringes |
|--------------|----------|---------|
| Laborers: | | |
| GROUP 1..... | \$ 25.80 | 16.45 |
| GROUP 2..... | \$ 26.05 | 16.45 |
| GROUP 3..... | \$ 26.30 | 16.45 |
| GROUP 4..... | \$ 26.80 | 16.45 |
| GROUP 5..... | \$ 27.55 | 16.45 |
| GROUP 6..... | \$ 27.80 | 16.45 |
| GROUP 7..... | \$ 16.00 | 16.45 |

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

PAIN0011-003 06/01/2012

| | Rates | Fringes |
|--|----------|---------|
| Painters: (BRIDGE CONSTRUCTION) Brush, Roller, Blasting (Sand, water, etc.) Spray.... | \$ 42.75 | 16.90 |

PAIN0011-004 06/01/2012

| | Rates | Fringes |
|---------------------------|----------|---------|
| Painters: | | |
| Blast and Spray..... | \$ 33.22 | 16.90 |
| Brush and Roll..... | \$ 30.22 | 16.90 |
| Tanks, Towers, Swing..... | \$ 32.22 | 16.90 |

TEAM0064-005 04/01/2012

CT3

| | Rates | Fringes |
|---|----------|---------|
| Truck drivers: | | |
| 2 Axle Ready Mix..... | \$ 27.98 | 17.22+a |
| 2 Axle..... | \$ 27.88 | 17.22+a |
| 3 Axle Ready Mix..... | \$ 28.03 | 17.22+a |
| 3 Axle..... | \$ 27.98 | 17.22+a |
| 4 Axle Ready Mix..... | \$ 28.13 | 17.22+a |
| 4 Axle..... | \$ 28.08 | 17.22+a |
| Heavy Duty Trailer 40 tons and over..... | \$ 28.33 | 17.22+a |
| Heavy Duty Trailer up to 40 tons..... | \$ 28.08 | 17.22+a |
| Specialized (Earth moving equipment other than conventional type on-the- road trucks and semi- trailers, including Euclids)..... | \$ 28.13 | 17.22+a |

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 union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters, PLUM, indicate the international union and the four-digit number, 0198, that follows indicates the local union number or district council number where applicable, i.e.,

CT3

Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

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

CT3

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:

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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

Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

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- * a survey underlying a wage determination
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Washington, DC 20210

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=====
END OF GENERAL DECISION

General Decision Number: CT130006 01/04/2013 CT6

Superseded General Decision Number: CT20120006

State: Connecticut

Construction Type: Heavy Dredging

Counties: Connecticut Statewide.

CONNECTICUT

ALL DREDGING, EXCEPT SELF-PROPELLED HOPPER DREDGES, ON THE ATLANTIC OCEAN AND TRIBUTARY WATERS EMPTYING INTO THE ATLANTIC OCEAN.

Modification Number 0 Publication Date 01/04/2013

* ENGI0025-001 10/01/2009

STATEWIDE

| | Rates | Fringes |
|------------------|----------|----------|
| Dredging: | | |
| CLASS A..... | \$ 32.89 | 8.05+a+b |
| CLASS B1..... | \$ 28.49 | 8.05+a+b |
| CLASS B2..... | \$ 26.84 | 8.05+a+b |
| CLASS C1(a)..... | \$ 25.55 | 8.05+a+b |
| CLASS C1..... | \$ 26.14 | 8.05+a+b |
| CLASS C2..... | \$ 25.29 | 8.05+a+b |
| CLASS D(a)..... | \$ 20.43 | 8.05+a+b |
| CLASS D..... | \$ 21.09 | 8.05+a+b |

CLASSIFICATIONS:

- CLASS A: Lead Dredgeman, Operator, Leverman, Licensed Tug Operator over 1000 HP
- CLASS B1: Derrick Operator, Spider/Spill Barge Operator, Engineer, Electrician. Chief Welder, Cheif Mate, Fill Placer, Operator II, Maintenance Engineer, Licensed Boat Operator
- CLASS B2: Licensed Boat Operator, Certified Welder.
- CLASS C1: Mate, Drag Barge Operator, Steward, Assistant Fill Placer.
- CLASS C1(a): Welder.
- CLASS C2: Boat Operator
- CLASS D: Shoreman, Deckhand, Rodman, Scowman, Cook, Messman, Porter/Janitor.
- CLASS D(a) Oiler.

PREMIUMS: Additional 20% for hazardous material work

FOOTNOTES APPLICABLE TO ABOVE CRAFTS:

- a. PAID HOLIDAYS: New Year's Day, Martin Luther King, Jr.'s Birthday, Memorial Day, Good Friday, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day
- b. VACATION: Eight percent (8%) of the straight time rate, multiplied by the total hours worked.

INCENTIVE PAY: (Add to Hourly Rate)

- Operator (NCCCO License/Certification) \$0.50 Licensed Tug Operator over 1000 HP (Assigned as Master) (USCG licensed Master of Towing Vessels (MOTV) \$1.00;
- Licensed Boat Operator (Assigned as lead boat captain) USCG licensed boat operator \$0.50;
- Engineer (QMED and Tankerman endorsement or licensed engineer (USCG) \$0.50
- Oiler (QMED and Tankerman endorsement (USCG) \$0.50; All classifications (Tankerman endorsement only) USCG \$0.25;
- Deckhand or Mate (AB with Lifeboatman endorsement (USCG)

\$0.50; All classifications (lifeboatman endorsement only
(USCG) \$0.25; Welder (ABS certification) \$0.50

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 union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with
characters other than "SU" denotes that the union
classification and rate have found to be prevailing for that
classification. Example: PLUM0198-005 07/01/2011. The first
four letters, PLUM, indicate the international union and the
four-digit number, 0198, that follows 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.
The date, 07/01/2011, following these characters is the
effective date of the most current negotiated rate/collective
bargaining agreement which would be July 1, 2011 in the above
example.

Union prevailing wage rates will be updated to reflect any
changes in the collective bargaining agreements governing the
rates.

0000/9999: weighted union wage rates will be published annually
each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived
from survey data by computing average rates and are not union
rates; however, the data used in computing these rates may
include both union and non-union data. Example: SULA2004-007
5/13/2010. SU indicates the rates are not union majority rates,
LA indicates the State of Louisiana; 2004 is the year of the
survey; and 007 is an internal number used in producing the
wage determination. A 1993 or later date, 5/13/2010, indicates
the classifications and rates under that identifier were issued
as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change
until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can
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- * 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.

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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:

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U.S. Department of Labor
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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:

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200 Constitution Avenue, N.W.
Washington, DC 20210

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=====

END OF GENERAL DECISION

General Decision Number: CT130013 03/01/2013 ^{CT13} CT13

Superseded General Decision Number: CT20120013

State: Connecticut

Construction Type: Heavy

County: Fairfield County in Connecticut.

HEAVY CONSTRUCTION PROJECTS

| Modification Number | Publication Date |
|---------------------|------------------|
| 0 | 01/04/2013 |
| 1 | 03/01/2013 |

* BRCT0001-011 12/31/2012

| | Rates | Fringes |
|-----------------|----------|---------|
| BRICKLAYER..... | \$ 32.50 | 25.81 |

* BRCT0001-012 12/31/2012

| | Rates | Fringes |
|-----------------------------------|----------|---------|
| CEMENT MASON/CONCRETE FINISHER... | \$ 32.50 | 25.81 |

CARP0210-005 05/07/2012

| | Rates | Fringes |
|----------------|----------|---------|
| CARPENTER..... | \$ 29.65 | 21.00 |

ELEC0003-004 05/03/2012

Darien, Greenwich, New Canaan, Stamford and the portion of Norwalk lying west of Five Mile River

| | Rates | Fringes |
|------------------|----------|---------|
| ELECTRICIAN..... | \$ 48.75 | 37.73 |

ELEC0488-006 06/01/2011

Bethel, Bridgeport, Brookfield, Danbury, Easton, Fairfield, Monroe, New Fairfield, Newtown, Norwalk, Redding, Ridgefield, Shelton, Sherman, Stratford, Trumbull, Weston, Westport and Wilton Townships

| | Rates | Fringes |
|------------------|----------|---------|
| ELECTRICIAN..... | \$ 35.10 | 22.26 |

ENGI0478-007 04/01/2012

| | Rates | Fringes |
|---------------------------|----------|---------|
| POWER EQUIPMENT OPERATOR: | | |
| Asphalt Paver..... | \$ 33.46 | 20.50+a |
| Asphalt Roller..... | \$ 32.81 | 20.50+a |

| | | |
|---|----------|---------|
| | CT13 | |
| Asphalt Spreader..... | \$ 33.46 | 20.50+a |
| Backhoe/Excavator 2 cubic yards and over..... | \$ 35.18 | 20.50+a |
| Backhoe/Excavator under 2 cubic yards..... | \$ 34.44 | 20.50+a |
| Bulldozer (Rough Grade Dozer)..... | \$ 33.15 | 20.50+a |
| Bulldozer Fine Grade(includes slopes, shaping, laser or gps)..... | \$ 34.44 | 20.50+a |
| Crane handling or erecting structural steel or stone...\$ | 35.50 | 20.50+a |
| Cranes (100 ton capacity & over)..... | \$ 35.18 | 20.50+a |
| Cranes (under 100 ton rated capacity)..... | \$ 34.44 | 20.50+a |
| Drills with self contained power units; Directional driller..... | \$ 33.46 | 20.50+a |
| Earth Roller..... | \$ 29.94 | 20.50+a |
| Forklift..... | \$ 31.98 | 20.50+a |
| Front End Loader (3 cubic yards up to 7 cubic yards)..\$ | 33.15 | 20.50+a |
| Front End Loader (7 cubic yards or over)..... | \$ 35.50 | 20.50+a |
| Front End Loader (under 3 cubic yards)..... | \$ 31.98 | 20.50+a |
| Grader/Blade..... | \$ 34.44 | 20.50+a |
| Maintenance Engineer/Oiler..\$ | 27.10 | 20.50+a |
| Mechanic..... | \$ 32.41 | 20.50+a |
| Rubber Tire Backhoe/Excavator..... | \$ 34.44 | 20.50+a |

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.

IRON0015-005 07/02/2012

| | | |
|------------------------------|----------|---------|
| | Rates | Fringes |
| IRONWORKER, REINFORCING..... | \$ 33.50 | 27.98+a |

a. PAID HOLIDAY: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

LABO0056-005 04/01/2012

| | | |
|--------------|----------|---------|
| | Rates | Fringes |
| LABORERS | | |
| GROUP 1..... | \$ 25.80 | 16.45 |
| GROUP 2..... | \$ 26.05 | 16.45 |
| GROUP 3..... | \$ 26.30 | 16.45 |

| | | | |
|--------------|----------|------|-------|
| | | CT13 | |
| GROUP 4..... | \$ 26.80 | | 16.45 |
| GROUP 5..... | \$ 27.55 | | 16.45 |
| GROUP 6..... | \$ 27.80 | | 16.45 |
| GROUP 7..... | \$ 16.00 | | 16.45 |

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 06/01/2010

| | Rates | Fringes |
|-----------------------|----------|---------|
| PAINTER | | |
| Brush and Roller..... | \$ 28.47 | 15.40 |
| Spray Only..... | \$ 31.47 | 15.40 |
| Steel Only..... | \$ 30.47 | 15.40 |

 SUCT2002-008 12/16/2008

| | Rates | Fringes |
|-----------------------------|----------|---------|
| IRONWORKER, STRUCTURAL..... | \$ 28.62 | 10.84 |

 TEAM0064-006 04/01/2012

| | Rates | Fringes |
|---------------------------------|----------|---------|
| TRUCK DRIVER: 4 Axle Truck..... | \$ 28.08 | 17.22+a |

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)).

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Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

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1.) Has there been an initial decision in the matter? This can be:

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=====

END OF GENERAL DECISION

General Decision Number: CT130014 03/01/2013 ^{CT14} CT14

Superseded General Decision Number: CT20120014

State: Connecticut

Construction Type: Heavy

County: Hartford County in Connecticut.

HEAVY CONSTRUCTION PROJECTS

| Modification Number | Publication Date |
|---------------------|------------------|
| 0 | 01/04/2013 |
| 1 | 03/01/2013 |

* BRCT0001-012 12/31/2012

| | Rates | Fringes |
|-----------------------------------|----------|---------|
| CEMENT MASON/CONCRETE FINISHER... | \$ 32.50 | 25.81 |

CARP0024-014 05/07/2012

Berlin, Bristol, Burlington, Canton, Marlborough, New Britain, Newington, Plainville and Southington

| | Rates | Fringes |
|-----------------------------------|----------|---------|
| CARPENTER, Includes Form Work.... | \$ 29.65 | 21.00 |

CARP0043-005 05/07/2012

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, Includes Form Work.... | \$ 29.65 | 21.00 |

ELEC0035-006 06/01/2012

Entire County excluding Berlin, Bristol, Hartland, New Britain, Newington, Plainville and Southington Townships

| | Rates | Fringes |
|------------------|----------|---------|
| ELECTRICIAN..... | \$ 37.10 | 22.12 |

ELEC0090-005 06/01/2012

Berlin, Bristol, New Britain, Newington, Plainville, Southington Townships

| | Rates | Fringes |
|------------------|----------|---------|
| ELECTRICIAN..... | \$ 35.70 | 22.49 |

ELEC0488-005 06/01/2011

Hartland Township

| | Rates | Fringes |
|------------------|----------|---------|
| ELECTRICIAN..... | \$ 35.10 | 22.26 |

ENGI0478-010 04/01/2012

| | Rates | Fringes |
|---|----------|---------|
| POWER EQUIPMENT OPERATOR: | | |
| Asphalt Paver..... | \$ 33.46 | 20.50+a |
| Asphalt Roller..... | \$ 32.81 | 20.50+a |
| Asphalt Spreader..... | \$ 33.46 | 20.50+a |
| Bulldozer (Rough Grade Dozer)..... | \$ 33.15 | 20.50+a |
| Bulldozer Fine Grade(includes slopes, shaping, laser or gps)..... | \$ 34.44 | 20.50+a |
| Crane handling or erecting structural steel or stone...\$ | 35.50 | 20.50+a |
| Cranes (100 ton capacity & over)..... | \$ 35.18 | 20.50+a |
| Cranes (under 100 ton rated capacity)..... | \$ 34.44 | 20.50+a |
| Drills with self contained power units; Directional driller..... | \$ 33.46 | 20.50+a |
| Earth Roller..... | \$ 29.94 | 20.50+a |
| Excavator/Backhoe 2 cubic yards and over..... | \$ 35.18 | 20.50+a |
| Excavator/Backhoe under 2 cubic yards..... | \$ 34.44 | 20.50+a |
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| Mechanic..... | \$ 32.41 | 20.50+a |

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 .
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- 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.

IRON0015-007 07/02/2012

CT14

IRONWORKER, STRUCTURAL.....\$ 33.50 27.98+a

a. PAID HOLIDAY: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

LABO0056-006 04/01/2012

| | Rates | Fringes |
|--------------|----------|---------|
| LABORERS | | |
| GROUP 1..... | \$ 25.80 | 16.45 |
| GROUP 2..... | \$ 26.05 | 16.45 |
| GROUP 3..... | \$ 26.30 | 16.45 |
| GROUP 4..... | \$ 26.80 | 16.45 |
| GROUP 5..... | \$ 27.55 | 16.45 |
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GROUP 4: Asbestos/lead removal

GROUP 5: Blasters

GROUP 6: Toxic waste remover

GROUP 7: Traffic control signalman

PAIN0011-013 06/01/2010

| | Rates | Fringes |
|-----------------------|----------|---------|
| PAINTER | | |
| Brush and Roller..... | \$ 28.47 | 15.40 |
| Spray Only..... | \$ 31.47 | 15.40 |
| Steel Only..... | \$ 30.47 | 15.40 |

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 |

TEAM0064-006 04/01/2012

CT14

| | Rates | Fringes |
|---------------------------------|----------|---------|
| TRUCK DRIVER: 4 Axle Truck..... | \$ 28.08 | 17.22+a |

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 union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters , PLUM, indicate the international union and the four-digit number, 0198, that follows 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. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

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.

CT14

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: CT130015 01/04/2013 CT15

Superseded General Decision Number: CT20120015

State: Connecticut

Construction Type: Heavy

Counties: Middlesex and Tolland Counties in Connecticut.

HEAVY CONSTRUCTION PROJECTS

Modification Number 0 Publication Date 01/04/2013

CARP0024-016 05/07/2012

MIDDLESEX COUNTY
TOLLAND COUNTY
Andover, Columbia, Coventry, Hebron, Mansfield, Union,
Willington

Table with 2 columns: Rates, Fringes. Row: CARPENTER, Includes Form Work...\$ 29.65 21.00

CARP0043-006 05/07/2012

TOLLAND COUNTY
Bolton, Ellington, Somers, Tolland, Vernon

Table with 2 columns: Rates, Fringes. Row: CARPENTER, Includes Form Work...\$ 29.65 21.00

* ELEC0035-004 06/01/2012

Cromwell, Middlefield, Middleton and Portland

Table with 2 columns: Rates, Fringes. Row: ELECTRICIAN.....\$ 37.10 22.12

ELEC0090-006 06/01/2012

Chester, Clinton, Deep River, Durham, East Haddam, East
Hampton, Essex, Haddam, Killingsworth, Old Saybrook, Westbrook

Table with 2 columns: Rates, Fringes. Row: ELECTRICIAN.....\$ 36.25 22.49

ENGI0478-007 04/01/2012

Table with 2 columns: Rates, Fringes. Section: POWER EQUIPMENT OPERATOR:
Asphalt Paver...\$ 33.46 20.50+a
Asphalt Roller...\$ 32.81 20.50+a
Asphalt Spreader...\$ 33.46 20.50+a
Backhoe/Excavator 2 cubic yards and over...\$ 35.18 20.50+a
Backhoe/Excavator under 2 cubic yards...\$ 34.44 20.50+a
Bulldozer (Rough Grade Dozer)...\$ 33.15 20.50+a
Bulldozer Fine Grade(includes slopes, shaping, laser or gps)...\$ 34.44 20.50+a
Crane handling or erecting structural steel or stone...\$ 35.50 20.50+a
Cranes (100 ton capacity & over)...\$ 35.18 20.50+a
Cranes (under 100 ton rated capacity)...\$ 34.44 20.50+a
Drills with self contained power units; Directional

| | | |
|--|----------|---------|
| driller..... | \$ 33.46 | 20.50+a |
| Earth Roller..... | \$ 29.94 | 20.50+a |
| Forklift..... | \$ 31.98 | 20.50+a |
| Front End Loader (3 cubic yards up to 7 cubic yards).. | \$ 33.15 | 20.50+a |
| Front End Loader (7 cubic yards or over)..... | \$ 35.50 | 20.50+a |
| Front End Loader (under 3 cubic yards)..... | \$ 31.98 | 20.50+a |
| Grader/Blade..... | \$ 34.44 | 20.50+a |
| Maintenance Engineer/Oiler.. | \$ 27.10 | 20.50+a |
| Mechanic..... | \$ 32.41 | 20.50+a |
| Rubber Tire Backhoe/Excavator..... | \$ 34.44 | 20.50+a |

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.

 * IRON0015-008 07/02/2012

| | Rates | Fringes |
|---|----------|---------|
| IRONWORKER, REINFORCING AND STRUCTURAL..... | \$ 33.50 | 27.98+a |

a. PAID HOLIDAY: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

 LABO0056-007 04/01/2012

| | Rates | Fringes |
|--------------|----------|---------|
| LABORERS | | |
| GROUP 1..... | \$ 25.80 | 16.45 |
| GROUP 2..... | \$ 26.05 | 16.45 |
| GROUP 3..... | \$ 26.30 | 16.45 |
| GROUP 4..... | \$ 26.80 | 16.45 |
| GROUP 5..... | \$ 27.55 | 16.45 |
| GROUP 6..... | \$ 27.80 | 16.45 |
| GROUP 7..... | \$ 16.00 | 16.45 |

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 06/01/2010

| | Rates | Fringes |
|-----------------------|----------|---------|
| PAINTER | | |
| Brush and Roller..... | \$ 28.47 | 15.40 |
| Spray Only..... | \$ 31.47 | 15.40 |
| Steel Only..... | \$ 30.47 | 15.40 |

| | Rates | Fringes |
|-----------------------------------|----------|---------|
| CEMENT MASON/CONCRETE FINISHER... | \$ 25.52 | 8.49 |
| TRUCK DRIVER: 3 Axle & Semi | | |
| - Truck..... | \$ 19.93 | 7.39 |

TEAM0064-006 04/01/2012

| | Rates | Fringes |
|---------------------------------|----------|---------|
| TRUCK DRIVER: 4 Axle Truck..... | \$ 28.08 | 17.22+a |

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 union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters , PLUM, indicate the international union and the four-digit number, 0198, that follows 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. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the

survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

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: CT130016 03/01/2013 ^{CT16} CT16

Superseded General Decision Number: CT20120016

State: Connecticut

Construction Type: Heavy

County: New Haven County in Connecticut.

HEAVY CONSTRUCTION PROJECTS

| | |
|---------------------|------------------|
| Modification Number | Publication Date |
| 0 | 01/04/2013 |
| 1 | 03/01/2013 |

* BRCT0001-011 12/31/2012

| | Rates | Fringes |
|-----------------|----------|---------|
| BRICKLAYER..... | \$ 32.50 | 25.81 |

* BRCT0001-012 12/31/2012

| | Rates | Fringes |
|-----------------------------------|----------|---------|
| CEMENT MASON/CONCRETE FINISHER... | \$ 32.50 | 25.81 |

CARP0024-015 05/07/2012

Beacon Falls, Bethany, Branford, Cheshire, East Haven, Guilford, Hamden, Madison, Meriden, Middlebury, Naugatuck, New Haven, North Branford, North Haven, Orange (east of Orange Center Road and north of Route 1, and north of Route 1 and east of the Oyster River), Prospect, Southbury, Wallingford, Waterbury, West Haven, Wolcott, Woodbridge

| | Rates | Fringes |
|----------------|----------|---------|
| CARPENTER..... | \$ 29.65 | 21.00 |

CARP0210-006 05/07/2012

Ansonia, Derby, Milford, Orange (West of Orange Center Road and South of Route 1 and West of the Oyster River), Oxford, Seymour

| | Rates | Fringes |
|----------------|----------|---------|
| CARPENTER..... | \$ 29.65 | 21.00 |

ELEC0090-004 06/01/2012

Entire County excluding Beacon Falls, Middlebury, Milford, Naugatuck, Oxford, Prospect, Seymour, Southbury, Waterbury and Wolcott Townships

| | Rates | Fringes |
|------------------|----------|---------|
| ELECTRICIAN..... | \$ 36.25 | 22.49 |

ELEC0488-007 06/01/2011

Beacon Falls, Middlebury, Milford, Naugatuck, Oxford, Prospect, Seymour, Southbury, Waterbury and Wolcott Townships

| | Rates | Fringes |
|------------------|----------|---------|
| ELECTRICIAN..... | \$ 35.10 | 22.26 |

ENGI0478-011 04/01/2012

| | Rates | Fringes |
|--|----------|---------|
| POWER EQUIPMENT OPERATOR: | | |
| Asphalt Paver..... | \$ 33.46 | 20.50+a |
| Asphalt Roller..... | \$ 32.81 | 20.50+a |
| Asphalt Spreader..... | \$ 33.46 | 20.50+a |
| Backhoe/Excavator 2 cubic yards and over..... | \$ 35.18 | 20.50+a |
| Backhoe/Excavator under 2 cubic yards..... | \$ 34.44 | 20.50+a |
| Crane handling or erecting structural steel or stone...\$ | 35.50 | 20.50+a |
| Cranes (100 ton capacity & over)..... | \$ 35.18 | 20.50+a |
| Cranes (under 100 ton rated capacity)..... | \$ 34.44 | 20.50+a |
| Drills with self contained power units; Directional driller..... | \$ 33.46 | 20.50+a |
| Earth Roller..... | \$ 29.94 | 20.50+a |
| Forklift..... | \$ 31.98 | 20.50+a |
| Front End Loader (3 cubic yards up to 7 cubic yards)..\$ | 33.15 | 20.50+a |
| Front End Loader (7 cubic yards or over)..... | \$ 35.50 | 20.50+a |
| Front End Loader (under 3 cubic yards)..... | \$ 31.98 | 20.50+a |
| Grader/Blade..... | \$ 34.44 | 20.50+a |
| Maintenance Engineer/Oiler..\$ | 27.10 | 20.50+a |
| Mechanic..... | \$ 32.41 | 20.50+a |
| Rubber Tire Backhoe/Excavator..... | \$ 34.44 | 20.50+a |

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.

IRON0015-005 07/02/2012

| | Rates | Fringes |
|------------------------------|----------|---------|
| IRONWORKER, REINFORCING..... | \$ 33.50 | 27.98+a |

CT16

a. PAID HOLIDAY: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

LABO0056-005 04/01/2012

| | Rates | Fringes |
|--------------|----------|---------|
| LABORERS | | |
| GROUP 1..... | \$ 25.80 | 16.45 |
| GROUP 2..... | \$ 26.05 | 16.45 |
| GROUP 3..... | \$ 26.30 | 16.45 |
| GROUP 4..... | \$ 26.80 | 16.45 |
| GROUP 5..... | \$ 27.55 | 16.45 |
| GROUP 6..... | \$ 27.80 | 16.45 |
| GROUP 7..... | \$ 16.00 | 16.45 |

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 06/01/2010

| | Rates | Fringes |
|-----------------------|----------|---------|
| PAINTER | | |
| Brush and Roller..... | \$ 28.47 | 15.40 |
| Spray Only..... | \$ 31.47 | 15.40 |
| Steel Only..... | \$ 30.47 | 15.40 |

SUCT2002-011 12/16/2008

| | Rates | Fringes |
|-----------------------------|----------|---------|
| IRONWORKER, STRUCTURAL..... | \$ 24.85 | 13.83 |
| OPERATOR: Bulldozer..... | \$ 25.33 | 9.64 |

TEAM0064-006 04/01/2012

| | Rates | Fringes |
|---------------------------------|----------|---------|
| TRUCK DRIVER: 4 Axle Truck..... | \$ 28.08 | 17.22+a |

Hazardous waste removal work receives additional \$1.25 per hour.

CT16

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 union or non-union.

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Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates,

CT16

LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

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

CT16

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

General Decision Number: CT130017 01/04/2013 CT17

Superseded General Decision Number: CT20120017

State: Connecticut

Construction Type: Heavy

County: New London County in Connecticut.

HEAVY CONSTRUCTION PROJECTS

Modification Number 0 Publication Date 01/04/2013

CARP0024-007 05/07/2012

| | Rates | Fringes |
|-----------------------------------|----------|---------|
| CARPENTER, Includes Form Work.... | \$ 29.65 | 21.00 |

* ELEC0035-011 06/01/2012

Bozrah, Colchester, Franklin, Griswold, Lebanon, Ledyard, Lisbon, Montville, North Stonington, Norwich, Preston, Salem, Sprague, Stonington and Voluntown

| | Rates | Fringes |
|------------------|----------|---------|
| ELECTRICIAN..... | \$ 37.10 | 22.12 |

ELEC0090-003 06/01/2010

East Lyme, Groton, New London, Old Lyme, Waterford, plus the part of Ledyard wherein the property of the Submarine Base is located

| | Rates | Fringes |
|------------------|----------|---------|
| ELECTRICIAN..... | \$ 35.20 | 20.51 |

ENGI0478-008 04/01/2012

| | Rates | Fringes |
|---|----------|---------|
| POWER EQUIPMENT OPERATOR: | | |
| Asphalt Paver..... | \$ 33.46 | 20.50+a |
| Asphalt Roller..... | \$ 32.81 | 20.50+a |
| Asphalt Spreader..... | \$ 33.46 | 20.50+a |
| Backhoe/Excavator 2 cubic yards and over..... | \$ 35.18 | 20.50+a |
| Backhoe/Excavator under 2 cubic yards..... | \$ 34.44 | 20.50+a |
| Bulldozer (Rough Grade Dozer)..... | \$ 33.15 | 20.50+a |
| Bulldozer Fine Grade(includes slopes, shaping, laser or gps)..... | \$ 34.44 | 20.50+a |
| Crane handling or erecting structural steel or stone...\$ | 35.50 | 20.50+a |
| Cranes (100 ton capacity & over)..... | \$ 35.18 | 20.50+a |
| Cranes (under 100 ton rated capacity)..... | \$ 34.44 | 20.50+a |
| Drills with self contained power units; Directional driller..... | \$ 33.46 | 20.50+a |
| Earth Roller..... | \$ 29.94 | 20.50+a |
| Forklift..... | \$ 31.98 | 20.50+a |
| Front End Loader (3 cubic yards up to 7 cubic yards)..\$ | 33.15 | 20.50+a |
| Front End Loader (7 cubic yards or over)..... | \$ 35.50 | 20.50+a |
| Front End Loader (under 3 cubic yards)..... | \$ 31.98 | 20.50+a |
| Grader/Blade..... | \$ 34.44 | 20.50+a |
| Maintenance Engineer/Oiler..\$ | 27.10 | 20.50+a |
| Mechanic..... | \$ 32.41 | 20.50+a |

Rubber Tire
 Backhoe/Excavator.....\$ 34.44 20.50+a

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.

 * IRON0015-008 07/02/2012

| | Rates | Fringes |
|---|----------|---------|
| IRONWORKER, REINFORCING AND STRUCTURAL..... | \$ 33.50 | 27.98+a |

a. PAID HOLIDAY: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

 LABO0056-007 04/01/2012

| | Rates | Fringes |
|--------------|----------|---------|
| LABORERS | | |
| GROUP 1..... | \$ 25.80 | 16.45 |
| GROUP 2..... | \$ 26.05 | 16.45 |
| GROUP 3..... | \$ 26.30 | 16.45 |
| GROUP 4..... | \$ 26.80 | 16.45 |
| GROUP 5..... | \$ 27.55 | 16.45 |
| GROUP 6..... | \$ 27.80 | 16.45 |
| GROUP 7..... | \$ 16.00 | 16.45 |

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 06/01/2010

| | Rates | Fringes |
|-----------------------|----------|---------|
| PAINTER | | |
| Brush and Roller..... | \$ 28.47 | 15.40 |
| Spray Only..... | \$ 31.47 | 15.40 |
| Steel Only..... | \$ 30.47 | 15.40 |

 SUCT2002-012 12/16/2008

| | Rates | Fringes |
|---|----------|---------|
| CEMENT MASON/CONCRETE FINISHER... | \$ 25.52 | 8.49 |
| TRUCK DRIVER: 3 Axle & Semi - Truck..... | \$ 19.93 | 7.01 |

 TEAM0064-006 04/01/2012

| | Rates | Fringes |
|--|-------|---------|
|--|-------|---------|

TRUCK DRIVER: 4 Axle Truck.....\$ 28.08 17.22+a

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 union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters, PLUM, indicate the international union and the four-digit number, 0198, that follows 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. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

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.

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END OF GENERAL DECISION

General Decision Number: CT130026 03/01/2013 ^{CT26} CT26

Superseded General Decision Number: CT20120026

State: Connecticut

Construction Type: Heavy

Counties: Litchfield and Windham Counties in Connecticut.

HEAVY CONSTRUCTION PROJECTS

| | |
|---------------------|------------------|
| Modification Number | Publication Date |
| 0 | 01/04/2013 |
| 1 | 03/01/2013 |

* BRCT0001-015 12/31/2012

| | Rates | Fringes |
|---------------------------|----------|---------|
| BRICKLAYER | | |
| BRICKLAYERS, CEMENT | | |
| MASONS, CEMENT FINISHERS, | | |
| STONE MASONS..... | \$ 32.50 | 25.81 |

CARP0024-011 05/07/2012

| | Rates | Fringes |
|------------------------------|----------|---------|
| CARPENTER | | |
| Carpenters, Piledrivers..... | \$ 29.65 | 21.00 |
| Diver Tenders..... | \$ 29.65 | 21.00 |
| Divers..... | \$ 38.11 | 21.00 |
| Millwrights..... | \$ 30.15 | 21.39 |

ELEC0035-008 06/01/2012

WINDHAM COUNTY

| | Rates | Fringes |
|------------------|----------|---------|
| ELECTRICIAN..... | \$ 37.10 | 22.12 |

ELEC0042-001 09/03/2012

| | Rates | Fringes |
|-------------------------------|----------|------------|
| Line Construction: (Railroad | | |
| Construction and Maintenance) | | |
| Equipment Operator..... | \$ 38.62 | 6.5%+14.30 |
| Groundmen..... | \$ 24.99 | 6.5%+9.75 |
| Heavy Equipment Operators... | \$ 40.89 | 6.5%+14.60 |
| Lineman, Cable Splicer, | | |
| Technician..... | \$ 45.43 | 6.5%+16.20 |
| Truck Driver..... | \$ 34.07 | 6.5%+13.45 |

ELEC0090-008 06/01/2012

LITCHFIELD COUNTY
Plymouth Township

Rates Fringes

CT26

ELECTRICIAN.....\$ 36.25 22.49

 ELEC0488-011 06/01/2011

LITCHFIELD COUNTY (Excluding Plymouth Township)

| | Rates | Fringes |
|------------------|----------|---------|
| ELECTRICIAN..... | \$ 35.10 | 22.26 |

 ENGI0478-001 04/01/2012

| | Rates | Fringes |
|----------------------------|----------|---------|
| Power equipment operators: | | |
| GROUP 1..... | \$ 35.50 | 20.50+a |
| GROUP 2..... | \$ 35.18 | 20.50+a |
| GROUP 3..... | \$ 34.44 | 20.50+a |
| GROUP 4..... | \$ 34.05 | 20.50+a |
| GROUP 5..... | \$ 33.46 | 20.50+a |
| GROUP 6..... | \$ 33.15 | 20.50+a |
| GROUP 7..... | \$ 32.81 | 20.50+a |
| GROUP 8..... | \$ 32.41 | 20.50+a |
| GROUP 9..... | \$ 31.98 | 20.50+a |
| GROUP 10..... | \$ 29.94 | 20.50+a |
| GROUP 11..... | \$ 29.94 | 20.50+a |
| GROUP 12..... | \$ 29.88 | 20.50+a |
| GROUP 13..... | \$ 31.41 | 20.50+a |
| GROUP 14..... | \$ 29.30 | 20.50+a |
| GROUP 15..... | \$ 28.99 | 20.50+a |
| GROUP 16..... | \$ 28.16 | 20.50+a |
| GROUP 17..... | \$ 27.75 | 20.50+a |
| GROUP 18..... | \$ 27.10 | 20.50+a |

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

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).

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

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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 (skooter).

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.

IRON0015-001 07/02/2012

| | Rates | Fringes |
|---|----------|---------|
| Ironworkers: (Ornamental, Reinforcing, Structural and Precast Concrete Erection)..... | \$ 33.50 | 27.98+a |

CT26

a. PAID HOLIDAY: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

LABO0056-004 04/01/2012

| | Rates | Fringes |
|---|----------|---------|
| Laborers: (TUNNEL CONSTRUCTION) | | |
| CLEANING, CONCRETE AND CAULKING TUNNEL: | | |
| Concrete Workers, Form Movers and Strippers..... | \$ 30.37 | 16.45+a |
| Form Erectors..... | \$ 30.68 | 16.45+a |
| ROCK SHAFT, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR: | | |
| Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers..... | \$ 30.37 | 16.45+a |
| Laborers Topside, Cage Tenders, Bellman..... | \$ 30.26 | 16.45+a |
| Miners..... | \$ 31.28 | 16.45+a |
| SHIELD DRIVE AND LINER PLATE TUNNELS IN FREE AIR: | | |
| Brakemen and Trackmen..... | \$ 30.37 | 16.45+a |
| Miners, Motormen, Mucking Machine Operators, Nozzlemen, Grout Men, Shaft and Tunnel, Steel and Rodmen, Shield and Erector, Arm Operator, Cable Tenders..... | \$ 31.28 | 16.45+a |
| TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: | | |
| Blaster..... | \$ 37.41 | 16.45+a |
| Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders..... | \$ 37.22 | 16.45+a |
| Change House Attendants, Powder Watchmen, Top on Iron Bolts..... | \$ 35.35 | 16.45+a |
| Mucking Machine Operator... | \$ 37.97 | 16.45+a |

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.

LABO0056-013 04/01/2012

| | Rates | Fringes |
|------------------------------|----------|---------|
| LABORER (HEAVY CONSTRUCTION) | | |
| GROUP 1..... | \$ 25.80 | 16.45 |
| GROUP 2..... | \$ 26.05 | 16.45 |
| GROUP 3..... | \$ 26.30 | 16.45 |
| GROUP 4..... | \$ 26.80 | 16.45 |

| | | |
|--------------|----------|-------|
| | CT26 | |
| GROUP 5..... | \$ 27.55 | 16.45 |
| GROUP 6..... | \$ 27.80 | 16.45 |
| GROUP 7..... | \$ 16.00 | 16.45 |

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

PAIN0011-003 06/01/2012

| | Rates | Fringes |
|---|----------|---------|
| Painters: (BRIDGE CONSTRUCTION) Brush, Roller, Blasting (Sand, water, etc.) Spray... | \$ 42.75 | 16.90 |

PAIN0011-018 06/01/2012

| | Rates | Fringes |
|---------------------------------|----------|---------|
| PAINTER Blast and Spray..... | \$ 33.22 | 16.90 |
| Brush and Roll..... | \$ 30.22 | 16.90 |
| Tanks, Towers, Swing..... | \$ 32.22 | 16.90 |

PLUM0777-002 06/01/2012

| | Rates | Fringes |
|-------------------------|----------|---------|
| PLUMBER/PIPEFITTER..... | \$ 38.67 | 25.56 |

TEAM0064-001 04/01/2012

| | Rates | Fringes |
|--|----------|---------|
| Truck drivers: | | |
| 2 Axle Ready Mix..... | \$ 27.98 | 17.22+a |
| 2 Axle..... | \$ 27.88 | 17.22+a |
| 3 Axle Ready Mix..... | \$ 28.03 | 17.22+a |
| 3 Axle..... | \$ 27.98 | 17.22+a |
| 4 Axle Ready Mix..... | \$ 28.13 | 17.22+a |
| 4 Axle..... | \$ 28.08 | 17.22+a |
| Heavy Duty Trailer 40 tons and over..... | \$ 28.33 | 17.22+a |
| Heavy Duty Trailer up to | | |

| | | | |
|---|----------|------|---------|
| 40 tons..... | \$ 28.08 | CT26 | 17.22+a |
| Specialized (Earth moving equipment other than conventional type on-the- road trucks and semi- trailers, including Euclids)..... | \$ 28.13 | | 17.22+a |

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 union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters, PLUM, indicate the international union and the four-digit number, 0198, that follows 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. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

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

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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:

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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

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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:

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U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

Project: Installation And Revision Of Traffic Control Signals In Districts III And IV

**Minimum Rates and Classifications
for Heavy/Highway Construction**

**Connecticut Department of Labor
Wage and Workplace Standards Division**

ID#: H 17535

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 Statewide

FAP Number: 000R(772)

State Number: 173-402, 173-404, 173-412

Project: Installation And Revision Of Traffic Control Signals In Districts III And IV

CLASSIFICATION

Hourly Rate

Benefits

01) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters. **See Laborers Group 5 and 7**

1) Boilermaker 33.79 34% + 8.96

1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons 32.50 24.55

2) Carpenters, Piledrivermen 29.65 21.00

As of: Wednesday, March 06, 2013

Project: Installation And Revision Of Traffic Control Signals In Districts III And IV

| | | |
|---|-------|-------|
| 2a) Diver Tenders | 29.65 | 21.00 |
| 3) Divers | 38.11 | 21.00 |
| 4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray | 42.75 | 16.90 |
| 4a) Painters: Brush and Roller | 30.22 | 16.90 |
| 4b) Painters: Spray Only | 33.22 | 16.90 |
| 4c) Painters: Steel Only | 30.47 | 15.40 |
| 4d) Painters: Blast and Spray | 33.22 | 16.90 |

Project: Installation And Revision Of Traffic Control Signals In Districts III And IV

| | | |
|--|-------|-----------|
| 4e) Painters: Tanks, Tower and Swing | 32.22 | 16.90 |
| 5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9) | 37.10 | 22.12 |
| 6) Ironworkers: (Ornamental, Reinforcing, Structural, and Precast Concrete Erection) | 33.50 | 27.98 + a |
| 7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9) | 38.67 | 25.56 |
| ----LABORERS---- - Last updated 4/11/12 | | |
| 8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist | 25.80 | 16.45 |
| 9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen, air tool operator | 26.05 | 16.45 |

Project: Installation And Revision Of Traffic Control Signals In Districts III And IV

| | | |
|--|-------|-------|
| 10) Group 3: Pipelayers | 26.30 | 16.45 |
| 11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block pavers and curb setters | 26.30 | 16.45 |
| 12) Group 5: Toxic waste removal (non-mechanical systems) | 27.80 | 16.45 |
| 13) Group 6: Blasters | 27.55 | 16.45 |
| Group 7: Asbestos Removal, non-mechanical systems (does not include leaded joint pipe) | 26.80 | 16.45 |
| Group 8: Traffic control signalmen | 16.00 | 16.45 |

----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.---- Last updated 4/11/12----

As of: Wednesday, March 06, 2013

Project: Installation And Revision Of Traffic Control Signals In Districts III And IV

| | | |
|---|-------|-----------|
| 13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders | 31.28 | 16.45 + a |
|---|-------|-----------|

| | | |
|-------------------------|-------|-----------|
| 13b) Brakemen, Trackmen | 30.37 | 16.45 + a |
|-------------------------|-------|-----------|

----CLEANING, CONCRETE AND CAULKING TUNNEL----Last updated 4/11/12----

| | | |
|--|-------|-----------|
| 14) Concrete Workers, Form Movers, and Strippers | 30.37 | 16.45 + a |
|--|-------|-----------|

| | | |
|-------------------|-------|-----------|
| 15) Form Erectors | 30.68 | 16.45 + a |
|-------------------|-------|-----------|

----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----Last updated 4/11/12----

| | | |
|---|-------|-----------|
| 16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers | 30.37 | 16.45 + a |
|---|-------|-----------|

Project: Installation And Revision Of Traffic Control Signals In Districts III And IV

| | | |
|---|-------|-----------|
| 17) Laborers Topside, Cage Tenders, Bellman | 30.26 | 16.45 + a |
|---|-------|-----------|

| | | |
|------------|-------|-----------|
| 18) Miners | 31.28 | 16.45 + a |
|------------|-------|-----------|

----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED
AIR: ----Last updated 4/11/12----

| | | |
|--------------|-------|-----------|
| 18a) Blaster | 37.41 | 16.45 + a |
|--------------|-------|-----------|

| | | |
|---|-------|-----------|
| 19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders | 37.22 | 16.45 + a |
|---|-------|-----------|

| | | |
|---|-------|-----------|
| 20) Change House Attendants, Powder Watchmen, Top on Iron Bolts | 35.35 | 16.45 + a |
|---|-------|-----------|

| | | |
|------------------------------|-------|-----------|
| 21) Mucking Machine Operator | 37.97 | 16.45 + a |
|------------------------------|-------|-----------|

Project: Installation And Revision Of Traffic Control Signals In Districts III And IV

----TRUCK DRIVERS----(*see note below)

| | | |
|--|-------|-----------|
| Two axle trucks | 27.88 | 17.22 + a |
| Three axle trucks; two axle ready mix | 27.98 | 17.22 + a |
| Three axle ready mix | 28.03 | 17.22 + a |
| Four axle trucks, heavy duty trailer (up to 40 tons) | 28.08 | 17.22 + a |
| Four axle ready-mix | 28.13 | 17.22 + a |
| Heavy duty trailer (40 tons and over) | 28.33 | 17.22 + a |

Project: Installation And Revision Of Traffic Control Signals In Districts III And IV

| | | |
|---|-------|-----------|
| Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids) | 28.13 | 17.22 + 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) | 35.50 | 20.50 + a |
|---|-------|-----------|

| | | |
|---|-------|-----------|
| Group 2: Cranes (100 ton rate capacity and over); Backhoe/Excavator over 2 cubic yards; Piledriver (\$3.00 premium when operator controls hammer). (Trade License Required) | 35.18 | 20.50 + a |
|---|-------|-----------|

| | | |
|---|-------|-----------|
| Group 3: Excavator/Backhoe under 2 cubic yards; Cranes (under 100 ton rated capacity), Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar); Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required) | 34.44 | 20.50 + a |
|---|-------|-----------|

| | | |
|---|-------|-----------|
| Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper) | 34.05 | 20.50 + 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) | 33.46 | 20.50 + a |
|--|-------|-----------|

Project: Installation And Revision Of Traffic Control Signals In Districts III And IV

| | | |
|--|-------|-----------|
| Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller. | 33.46 | 20.50 + a |
| Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer). | 33.15 | 20.50 + a |
| Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and Under Mandrel). | 32.81 | 20.50 + a |
| Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine. | 32.41 | 20.50 + a |
| Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder). | 31.98 | 20.50 + a |
| Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc. | 29.94 | 20.50 + a |
| Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment. | 29.94 | 20.50 + a |

Project: Installation And Revision Of Traffic Control Signals In Districts III And IV

| | | |
|---|-------|-----------|
| Group 12: Wellpoint Operator. | 29.88 | 20.50 + a |
| Group 13: Compressor Battery Operator. | 29.30 | 20.50 + a |
| Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain). | 28.16 | 20.50 + a |
| Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator. | 27.75 | 20.50 + a |
| Group 16: Maintenance Engineer/Oiler | 27.10 | 20.50 + a |
| Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator. | 31.41 | 20.50 + a |
| Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license). | 28.99 | 20.50 + a |

Project: Installation And Revision Of Traffic Control Signals In Districts III And IV

**NOTE: SEE BELOW

----LINE CONSTRUCTION----(Railroad Construction and Maintenance)----Last updated 9/3/2010----

| | | |
|--|-------|------------|
| 20) Lineman, Cable Splicer, Dynamite Man | 44.36 | 3% + 13.70 |
|--|-------|------------|

| | | |
|------------------------------|-------|------------|
| 21) Heavy Equipment Operator | 39.92 | 3% + 13.70 |
|------------------------------|-------|------------|

| | | |
|--|-------|------------|
| 22) Equipment Operator, Tractor Trailer Driver, Material Men | 37.71 | 3% + 13.70 |
|--|-------|------------|

| | | |
|----------------------|-------|------------|
| 23) Driver Groundmen | 33.27 | 3% + 13.70 |
|----------------------|-------|------------|

----LINE CONSTRUCTION----Last updated 4/17/09----

Project: Installation And Revision Of Traffic Control Signals In Districts III And IV

| | | |
|--|-------|--------------|
| 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: Installation And Revision Of Traffic Control Signals In Districts III And IV

Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional \$1.25 per hour for truck drivers.*

***Note: Hazardous waste premium \$3.00 per hour over classified rate*

- Crane with 150 ft. boom (including jib) - \$1.50 extra
- Crane with 200 ft. boom (including jib) - \$2.50 extra
- Crane with 250 ft. boom (including jib) - \$5.00 extra
- Crane with 300 ft. boom (including jib) - \$7.00 extra
- Crane with 400 ft. boom (including jib) - \$10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyman instructing and supervising the work of each apprentice in a specific trade.

~~Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work ~~

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

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

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Project: Installation And Revision Of Traffic Control Signals In Districts III And IV

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

As of:

Wednesday, March 06, 2013

Connecticut Department of Labor
Wage and Workplace Standards Division
FOOTNOTES

Please Note: If the “Benefits” listed on the schedule for the following occupations includes a letter(s) (+ a or + a+b for instance), refer to the information below.

Benefits to be paid at the appropriate prevailing wage rate for the listed occupation.

If the “Benefits” section for the occupation lists only a dollar amount, disregard the information below.

Bricklayers, Cement Masons, Cement Finishers, Concrete Finishers, Stone Masons
(Building Construction) and
(Residential- Hartford, Middlesex, New Haven, New London and Tolland Counties)

- a. Paid Holiday: Employees shall receive 4 hours for Christmas Eve holiday provided the employee works the regularly scheduled day before and after the holiday. Employers may schedule work on Christmas Eve and employees shall receive pay for actual hours worked in addition to holiday pay.

Elevator Constructors: Mechanics

- a. Paid Holidays: New Year’s Day, Memorial Day, Independence Day, Labor Day, Veterans’ Day, Thanksgiving Day, Christmas Day, plus the Friday after Thanksgiving.
- b. Vacation: Employer contributes 8% of basic hourly rate for 5 years or more of service or 6% of basic hourly rate for 6 months to 5 years of service as vacation pay credit.

Glaziers

- a. Paid Holidays: Labor Day and Christmas Day.

Power Equipment Operators
(Heavy and Highway Construction & Building Construction)

- a. Paid Holidays: New Year’s Day, Good Friday, Memorial day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday. Holidays falling on Saturday may be observed on Saturday, or if the employer so elects, on the preceding Friday.

Ironworkers

- a. Paid Holiday: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

Laborers (Tunnel Construction)

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. No employee shall be eligible for holiday pay when he fails, without cause, to work the regular work day preceding the holiday or the regular work day following the holiday.

Roofers

- a. Paid Holidays: July 4th, Labor Day, and Christmas Day provided the employee is employed 15 days prior to the holiday.

Sprinkler Fitters

- a. Paid Holidays: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

Truck Drivers

(Heavy and Highway Construction & Building Construction)

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas day, and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

Information Bulletin

Occupational Classifications

The Connecticut Department of Labor has the responsibility to properly determine "job classification" on prevailing wage projects covered under C.G.S. Section 31-53.

Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification.

Below are additional clarifications of specific job duties performed for certain classifications:

- **ASBESTOS WORKERS**

Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.

- **ASBESTOS INSULATOR**

Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.

- **BOILERMAKERS**

Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.

- **BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS**

Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.

- **CARPENTERS, MILLWRIGHTS. PILEDIVERMEN. LATHERS. RESILIENT FLOOR LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS**

Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.

- **CLEANING LABORER**

The clean up of any construction debris and the general cleaning, including sweeping, wash down, mopping, wiping of the construction facility, washing, polishing, dusting, etc., prior to the issuance of a certificate of occupancy falls under the *Labor classification*.

- **DELIVERY PERSONNEL**

If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages are not required. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.

An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer/tradesman and not a delivery personnel.

- **ELECTRICIANS**

Install, erect, maintenance, alteration or repair of any wire, cable, conduit, etc., which generates, transforms, transmits or uses electrical energy for light, heat, power or other purposes, including the Installation or maintenance of telecommunication, LAN wiring or computer equipment, and low voltage wiring.

***License required per Connecticut General Statutes: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9.**

- **ELEVATOR CONSTRUCTORS**

Install, erect, maintenance and repair of all types of elevators, escalators, dumb waiters and moving walks. ***License required by Connecticut General Statutes: R-1,2,5,6.**

- **FORK LIFT OPERATOR**

Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.

Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.

- **GLAZIERS**

Glazing wood and metal sash, doors, partitions, and 2 story aluminum storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which requires either a blended rate or equal composite workforce.

- **IRONWORKERS**

Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which requires either a blended rate or equal composite workforce. Insulated metal and insulated composite panels are still installed by the Ironworker.

- **INSULATOR**

Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings. Past practice using the applicable licensed trades, Plumber, Sheet Metal, Sprinkler Fitter, and Electrician, is not inconsistent with the Insulator classification and would be permitted.

- **LABORERS**

Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.

- **PAINTERS**

Maintenance, preparation, cleaning, blasting (water and sand, etc.), painting or application of any protective coatings of every description on all bridges and appurtenances of highways, roadways, and railroads. Painting, decorating, hardwood finishing, paper hanging, sign writing, scenic art work and drywall hhg for any and all types of building and residential work.

- **LEAD PAINT REMOVAL**

Painter's Rate

1. Removal of lead paint from bridges.
2. Removal of lead paint as preparation of any surface to be repainted.
3. Where removal is on a Demolition project prior to reconstruction.

Laborer's Rate

1. Removal of lead paint from any surface NOT to be repainted.
2. Where removal is on a *TOTAL* Demolition project only.

- **PLUMBERS AND PIPEFITTERS**

Installation, repair, replacement, alteration or maintenance of all plumbing, heating, cooling and piping. ****License required per Connecticut General Statutes: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2 S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4.***

- **POWER EQUIPMENT OPERATORS**

Operates several types of power construction equipment such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers or motor graders, etc. Repairs and maintains equipment. ***License required, crane operators only, per Connecticut General Statutes.**

- **ROOFERS**

Covers roofs with composition shingles or sheets, wood shingles, slate or asphalt and gravel to waterproof roofs, including preparation of surface. (tear-off and/or removal of any type of roofing and/or clean-up of any and all areas where a roof is to be relaid)

- **SHEETMETAL WORKERS**

Fabricate, assembles, installs and repairs sheetmetal products and equipment in such areas as ventilation, air-conditioning, warm air heating, restaurant equipment, architectural sheet metal work, sheetmetal roofing, and aluminum gutters.

Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, fascia, louvers, partitions, wall panel siding, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc.

The sheet metal classification also applies to the vast variety of coated metal material panels and composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Insulated metal and insulated composite panels are still installed by the Iron Worker. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal and composite lockers and shelving, kitchen equipment, and walk-in coolers.

- **SPRINKLER FITTERS**

Installation, alteration, maintenance and repair of fire protection sprinkler systems.

***License required per Connecticut General Statutes: F-1,2,3,4.**

- **TILE MARBLE AND TERRAZZO FINISHERS**

Assists and tends the tile setter, marble mason and terrazzo worker in the performance of their duties.

- **TRUCK DRIVERS**

Definitions:

1) “Site of the work” (29 Code of Federal Regulations (CFR) 5.2(l)(b) is the physical place or places where the building or work called for in the contract will remain and any other site where a significant portion of the building or work is constructed, provided that such site is established specifically for the performance of the contract or project;

(a) Except as provided in paragraph (l) (3) of this section, job headquarters, tool yards, batch plants, borrow pits, etc. are part of the “site of the work”; provided they are dedicated exclusively, or nearly so, to the performance of the contract or project, and provided they are adjacent to “the site of work” as defined in paragraph (e)(1) of this section;

(b) Not included in the “site of the work” are permanent home offices, branch plant establishments, fabrication plants, tool yards etc, of a contractor or subcontractor whose location and continuance in operation are determined wholly without regard to a particular State or political subdivision contract or uncertain and indefinite periods of time involved of a few seconds or minutes duration and where the failure to count such time is due to consideration justified by industrial realities (29 CFR 785.47)

2) “Engaged to wait” is waiting time that belongs to and is controlled by the employer which is an integral part of the job and is therefore compensable as hours worked. (29 CFR 785.15)

3) “Waiting to be engaged” is waiting time that an employee can use effectively for their own purpose and is not compensable as hours worked. (29 CFR 785.16)

4) “De Minimus” is a rule that recognizes that unsubstantial or insignificant periods of time which cannot as a practical administrative matter be precisely recorded for payroll purposes, may be disregarded. This rule applies only where there are uncertain and indefinite periods of time involved of a short duration and where the failure to count such time is due to consideration justified by worksite realities. For example, with respect to truck drivers on prevailing wage sites, this is typically less than 15 minutes at a time.

Coverage of Truck Drivers on State or Political subdivision Prevailing Wage Projects

Truck drivers are covered for payroll purposes under the following conditions:

- Truck Drivers for time spent working on the site of the work.
- Truck Drivers for time spent loading and/or unloading materials and supplies on the site of the work, if such time is not de minimus

- Truck drivers transporting materials or supplies between a facility that is deemed part of the site of the work and the actual construction site.
- Truck drivers transporting portions of the building or work between a site established specifically for the performance of the contract or project where a significant portion of such building or work is constructed and the physical places where the building or work outlined in the contract will remain.

For example: Truck drivers delivering asphalt are covered under prevailing wage while” engaged to wait” on the site and when directly involved in the paving operation, provided the total time is not “de minimus”

Truck Drivers are not covered in the following instances:

- Material delivery truck drivers while off “the site of the work”
- Truck Drivers traveling between a prevailing wage job and a commercial supply facility while they are off the “site of the work”
- Truck drivers whose time spent on the “site of the work” is de minimus, such as under 15 minutes at a time, merely to drop off materials or supplies, including asphalt.

These guidelines are similar to U.S. Labor Department policies. The application of these guidelines may be subject to review based on factual considerations on a case by case basis.

For example:

- Material men and deliverymen are not covered under prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.
- Hauling material off site is not covered provided they are not dumping it at a location outlined above.
- Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

Any questions regarding the proper classification should be directed to:

*Public Contract Compliance Unit
Wage and Workplace Standards Division
Connecticut Department of Labor
200 Folly Brook Blvd, Wethersfield, CT 06109
(860) 263-6543*

Statute 31-55a

Last Updated: June 02, 2008

You are here: [DOL Web Site](#) ▶ [Wage and Workplace Issues](#) ▶ Statute 31-55a

- Special Notice -

To All State and Political Subdivisions, Their Agents, and Contractors

Connecticut General Statute 31-55a - Annual adjustments to wage rates by contractors doing state work.

Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee, effective each July first.

- The prevailing wage rates applicable to any contract or subcontract awarded on or after October 1, 2002 are subject to annual adjustments each July 1st for the duration of any project which was originally advertised for bids on or after October 1, 2002.
- Each contractor affected by the above requirement shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.
- It is the *contractor's* responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's Web Site. The annual adjustments will be posted on the Department of Labor Web page: www.ctdol.state.ct.us. For those without internet access, please contact the division listed below.
- The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project. All subsequent annual adjustments will be posted on our Web Site for contractor access.

Any questions should be directed to the Contract Compliance Unit, Wage and Workplace

Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd.,
Wethersfield, CT 06109 at (860)263-6790.

[Workplace Laws](#)

Published by the Connecticut Department of Labor, Project Management Office

November 29, 2006

Notice
To All Mason Contractors and Interested Parties
Regarding Construction Pursuant to Section 31-53 of the
Connecticut General Statutes (Prevailing Wage)

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute.

Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute.

The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

Forklift Operator:

- **Laborers (Group 4) Mason Tenders** - operates forklift solely to assist a mason to a maximum height of nine feet only.
- **Power Equipment Operator (Group 9)** - operates forklift to assist any trade and to assist a mason to a height over nine feet.

The U.S. Labor Department conducted a survey of rates in Connecticut but it has not been published and the rate in effect remains as outlined in the above Occupational Bulletin.

Since this is a classification matter and not one of jurisdiction, effective January 1, 2007 the Connecticut Labor Department will enforce the rate on each schedule in accordance with our statutory authority.

Your cooperation in filing appropriate and accurate certified payrolls is appreciated.

Informational Bulletin

THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE

(applicable to public building contracts entered into *on or after July 1, 2007*, where the total cost of all work to be performed is at least \$100,000)

- (1) This requirement was created by Public Act No. 06-175, which is codified in Section 31-53b of the Connecticut General Statutes (pertaining to the prevailing wage statutes);
- (2) The course is required for public building construction contracts (projects funded in whole or in part by the state or any political subdivision of the state) entered into on or after July 1, 2007;
- (3) It is required of private employees (not state or municipal employees) and apprentices who perform manual labor for a general contractor or subcontractor on a public building project where the total cost of all work to be performed is at least \$100,000;
- (4) The ten-hour construction course pertains to the ten-hour Outreach Course conducted in accordance with federal OSHA Training Institute standards, and, for telecommunications workers, a ten-hour training course conducted in accordance with federal OSHA standard, 29 CFR 1910.268;
- (5) The internet website for the federal OSHA Training Institute is http://www.osha.gov/fso/ote/training/edcenters/fact_sheet.html;
- (6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;
- (7) Within 30 days of receiving a contract award, a general contractor must furnish proof to the Labor Commissioner that all employees and apprentices performing manual labor on the project will have completed such a course;
- (8) Proof of completion may be demonstrated through either: (a) the presentation of a *bona fide* student course completion card issued by the federal OSHA Training Institute; *or* (2) the presentation of documentation provided to an employee by a trainer certified by the Institute pending the actual issuance of the completion card;
- (9) Any card with an issuance date more than 5 years prior to the commencement date of the construction project shall not constitute proof of compliance;

- (10) Each employer shall affix a copy of the construction safety course completion card to the certified payroll submitted to the contracting agency in accordance with Conn. Gen. Stat. § 31-53(f) on which such employee's name first appears;
- (11) Any employee found to be in non-compliance shall be subject to removal from the worksite if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;
- (12) Any such employee who is determined to be in noncompliance may continue to work on a public building construction project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;
- (13) The Labor Commissioner may make complaint to the prosecuting authorities regarding any employer or agent of the employer, or officer or agent of the corporation who files a false certified payroll with respect to the status of an employee who is performing manual labor on a public building construction project;
- (14) The statute provides the minimum standards required for the completion of a safety course by manual laborers on public construction contracts; any contractor can exceed these minimum requirements; and
- (15) Regulations clarifying the statute are currently in the regulatory process, and shall be posted on the CTDOL website as soon as they are adopted in final form.
- (16) Any questions regarding this statute may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of <http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm>; or by telephone at (860)263-6790.

THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE, AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTIMATELY ARISE CONCERNING THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.

Sec. 31-53b. Construction safety and health course. Proof of completion required for employees on public building projects. Enforcement. Regulations. (a) Each contract entered into on or after July 1, 2007, for the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public building project by the state or any of its agents, or by an political subdivision of the state or any of its agents, where the total cost of all work to be performed by all contractors and subcontractors in connection with the contract is at least one hundred thousand dollars, shall contain a provision requiring that, not later than thirty days after the date such contract is awarded, each contractor furnish proof to the Labor Commissioner that all employees performing manual labor on or in such public building, pursuant to such contract, have completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, in the case of telecommunications employees, have completed at least ten hours of training in accordance with 29 CFR 1910.268.

(b) Any employee required to complete a construction safety and health course required under subsection (a) of this section who has not completed the course shall be subject to removal from the worksite if the employee does not provide documentation of having completed such course by the fifteenth day after the date the employee is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section.

(c) Not later than January 1, 2007, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project.

(d) For the purposes of this section, "public building" means a structure, paid for in whole or in part with state funds, within a roof and within exterior walls or fire walls, designed for the housing, shelter, enclosure and support or employment of people, animals or property of any kind, including, but not limited to, sewage treatment plants and water treatment plants, "Public building" does not include site work, roads or bridges, rail lines, parking lots or underground water, sewer or drainage systems including pump houses or other utility systems.

CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION

CONTRACTORS WAGE CERTIFICATION FORM

I, _____ of _____
Officer, Owner, Authorized Rep. Company Name

do hereby certify that the _____
Company Name

Street

City

and all of its subcontractors will pay all workers on the

Project Name and Number

Street and City

the wages as listed in the schedule of prevailing rates required for such project (a copy of which is attached hereto).

Signed

Subscribed and sworn to before me this _____ day of _____, 2004.

Notary Public

 Return to:

Connecticut Department of Labor
Wage & Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109