

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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JULY 22, 2020

FEDERAL AID PROJECT NO. 6080(007)
STATE PROJECT NO. 80-131
SUPERSTRUCTURE REPLACEMENT OF BRIDGE NO. 01160
BENSON ROAD OVER I-84
TOWN OF MIDDLEBURY

&

FEDERAL AID PROJECT NO. 6130(012)
STATE PROJECT NO. 130-184
SUPERSTRUCTURE REPLACEMENT OF BRIDGE NO. 01157
BUCKS HILL ROAD OVER I-84
TOWN OF SOUTHURBY

Towns of Middlebury & Southbury
Federal Aid Project Nos. 6080(007) & 6130(012)

The State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges, Facilities and Incidental Construction, Form 818, 2020, is hereby made part of this contract, as modified by the Special Provisions contained herein. Form 818 is available at the following DOT website link <http://www.ct.gov/dot/cwp/view.asp?a=3609&q=430362>. The current edition of the State of Connecticut Department of Transportation's "Construction Contract Bidding and Award Manual" ("Manual"), is hereby made part of this contract. If the provisions of this Manual conflict with provisions of other Department documents (not including statutes or regulations), the provisions of the Manual will govern. The Manual is available at the following DOT website link <http://www.ct.gov/dot/cwp/view.asp?a=2288&q=259258>. The Special Provisions relate in particular to the SUPERSTRUCTURE REPLACEMENT OF BRIDGE NO. 01160 BENSON ROAD OVER I-84 and the SUPERSTRUCTURE REPLACEMENT OF BRIDGE NO. 01157 BUCKS HILL ROAD OVER I-84 in the Towns of Middlebury & Southbury.

COMBINED PROJECTS

There will be but one Contract for Federal Aid Project No. 6080(007) (State Project No. 80-131) and Federal Aid Project No. 6130(012) (State Project No. 130-184). The two projects will be considered as a single contract in all respects.

CONTRACT TIME AND LIQUIDATED DAMAGES

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

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

1. For this contract, an assessment per day for liquidated damages, at a rate of Three Thousand Seven Hundred Dollars (\$3,700.00) per day shall be applied to each calendar day the work runs in excess of the Seven Hundred Twelve (712) allowed calendar days for the contract.
2. For this contract, an assessment per hour for liquidated damages shall be applied to each hour, or any portion thereof, in which the Contractor interferes with normal traffic operations during the restricted hours given in Article 1.08.04 of the Special Provisions. The liquidated damages shall be as shown in the following tables entitled "Liquidated Damages Per Hour" for each hour, or any portion thereof, in which the Contractor interferes with normal traffic operations during the restricted hours.

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

- A. Any portion of the travel lanes or shoulders is occupied by any personnel, equipment, materials, or supplies including signs.
 - B. The transition between the planes of pavement surfaces is at a rate of one inch in less than fifteen feet longitudinally.
3. For this contract, if the Contractor fails to complete, as accepted by the Engineer, the tasks described in the special provision entitled MILESTONE LIQUIDATED DAMAGES PROVISIONS by the Milestone Completion Date, the Contractor will be assessed a liquidated damage charge of \$10,800 (Ten Thousand Eight Hundred Dollars) on the first minute after the defined timeframe period has expired, and shall be assessed additional liquidated damage charges at the rate of \$10,800 (Ten Thousand Eight Hundred Dollars) per day thereafter until the tasks and corresponding milestone are complete and accepted by the Engineer.

LIQUIDATED DAMAGES PER HOUR

PROJECTS 0080-0131 & 0130-0184

I-84 WB in Middlebury and Southbury

2 Through Lane Section	
If Working Periods Extends Into	A.M. 1 Lane Closure
1st Hour of Restrictive Period	\$ 10,000
2nd Hour of Restrictive Period	\$ 40,000
3rd Hour or any Subsequent Hour of Restrictive Period	\$ 50,000

The above liquidated damages apply to those hours shown on the Limitation of Operations charts designated with a “0,” “1,” “2,” or “3”.

The above-liquidated damages shall be applied when the actual number of lanes closed exceeds the number of lanes allowed to be closed, as dictated in the Limitation of Operations Chart.

If all available shoulder widths or gore areas are not available to traffic for each hour designated with a “0” on the Limitation of Operations Charts, then liquidated damages of \$500 shall apply for each hour, or part thereof.

LIQUIDATED DAMAGES PER HOUR

PROJECTS 0080-0131 & 0130-0184

I-84 EB in Middlebury and Southbury

2 Through Lane Section	
If Working Periods Extends Into	A.M. 1 Lane Closure
1st Hour of Restrictive Period	\$ 500
2nd Hour of Restrictive Period	\$ 500
3rd Hour or any Subsequent Hour of Restrictive Period	\$ 4,000

The above liquidated damages apply to those hours shown on the Limitation of Operations charts designated with a “0,” “1,” “2,” or “3”.

The above-liquidated damages shall be applied when the actual number of lanes closed exceeds the number of lanes allowed to be closed, as dictated in the Limitation of Operations Chart.

If all available shoulder widths or gore areas are not available to traffic for each hour designated with a “0” on the Limitation of Operations Charts, then liquidated damages of \$500 shall apply for each hour, or part thereof.

MILESTONE LIQUIDATED DAMAGES PROVISIONS

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

Bridge No. 01157 Bucks Hill Road over I-84:

A maximum of 245 consecutive days will be allowed for the closure of Bucks Hill Road and Bridge 01157 beginning on Monday, March 29, 2021 at 12:00 a.m. and ending on or before Sunday, November 21, 2021 at 11:59 pm. A corresponding approximate 4.1 mile detour will service the traffic as detailed within the Contract. The reopening of the noted bridge and route is defined below.

The tasks are:

- The **closure time frame begins** with the uncovering of the detour signage required on the Detour Plan
- Removal of concrete deck, parapet and girders
- Pier removal
- Reconstruction of Pier
- Girder erection
- Construction of concrete deck, parapet and approach pavement
- Pave Bucks Hill Road
- Installation of fence
- Installation of guiderail system
- Removal of all signs pertaining to the closure of Bucks Hill Road, as shown on the Detour Plan
- **MILESTONE:** The **closure timeframe ends** with the completion of all above tasks and ancillary work thereto and with the reopening of Bucks Hill Road to normal traffic operations, exclusive of temporary alternating one-way traffic operations, as specified within the contract that may be necessary to complete the project. “Normal traffic operations” are defined as one lane of traffic open in each direction with full shoulders.

Bridge No. 01160 Benson Road over I-84:

A maximum of 245 consecutive days will be allowed for the closure of Benson Road and Bridge 01160 beginning on Monday, February 28, 2022 at 12:00 a.m. and ending on or before Sunday, October 30, 2022 at 11:59 pm. A corresponding approximate 2.7 mile detour will service the traffic as detailed within the Contract. The reopening of the noted bridge and route is defined below.

The tasks are:

- The **closure time frame begins** with the uncovering of the detour signage required on the Detour Plan
- Removal of concrete deck, parapet, sidewalk and girders
- Pier cap removal
- Reconstruction of Piers
- Girder erection
- Installation of proposed water main, sewer main, gas main and conduits below bridge deck
- Construction of concrete deck, parapet and approach slab
- Membrane bridge deck
- Pave Benson Road
- Installation of fence
- Installation of guiderail system
- removal of all signs pertaining to the closure of Benson Road, as shown on the Detour Plan
- **MILESTONE: The closure timeframe ends** with the completion of all above tasks and ancillary work thereto and with the reopening of Benson Road to normal traffic operations, exclusive of temporary alternating one-way traffic operations, as specified within the contract that may be necessary to complete the project. “Normal traffic operations” are defined as one lane of traffic open in each direction with full shoulders.

Prior to beginning work on the project, the Contractor shall furnish to the Engineer for approval a Critical Path Method (CPM) schedule that details all of the day-to-day operations necessary to complete the above tasks during the two hundred and forty-five day detour timeframe for each bridge. The schedule shall include:

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

Accompanying the CPM schedule shall be the following, as applicable.

- description of any special resources, including back up equivalent resources
- Contingency plans for mechanical failure
- M&PT plans

The Contractor must notify the Engineer and Town of Southbury of the proposed closure date of Bucks Hill Road at least four weeks prior to the closure. The Contractor must notify the Engineer and the Town of Middlebury of the proposed closure date of Benson Road at least four weeks prior to the closure.

Milestone Liquidated Damages Terms and Conditions

If the Contractor fails to complete, as accepted by the Engineer, the above-listed tasks by the Milestone Completion Date, the Contractor will be assessed a liquidated damage charge of \$10,800 (Ten Thousand Eight Hundred Dollars) on the first minute after the defined timeframe period has expired, and shall be assessed additional liquidated damage charges at the rate of \$10,800 (Ten Thousand Eight Hundred Dollars) per day thereafter until the tasks and corresponding milestone are complete and accepted by the Engineer. The maximum assessment of Milestone Liquidated Damages shall not be capped and shall be considered separate from any Liquidated Damages assessed to the Contractor for failure to complete the project on time per Section 1.08.09 of the Standard Specifications.

The Contractor is responsible for determining the full scope of labor and equipment resources and anticipated accelerated operations needed to complete the milestone tasks by the Milestone Completion Date, and shall bid the on-time completion of the work accordingly.

Any and all costs or detrimental effects incurred by the Contractor in accelerating his work in an attempt to meet the Milestone Completion Date, regardless of the effects of any delay, disruption, inefficiency or other detrimental effect including, but not limited to, the deletion of Contract work, the issuing of construction orders, the execution of supplemental agreements, the discovery of differing site conditions, the adding of extra work to the Contract, the emergence of right-of-way conflicts, problems with the obtaining or the terms of permits, action or inaction by persons or entities working on the project or by third parties, delays in the process of reviewing or approving shop drawings, expansion of the physical limits of the Project, the effects of weather conditions on Project activities, the occurrence of weekends or holidays, the suspension of any Project operation, or other events, forces or factors that affect highway construction work, shall be solely the Contractor's responsibility, and may not be used as the basis for any claim by the Contractor for additional compensation.

The Contractor is directed to follow the procedures of Section 1.08.08 of the Form 817 Standard Specifications for any request presented to the Engineer for an adjustment of the Milestone Completion Date for any unforeseeable causes noted in Section 1.08.08 that have resulted in the need for an adjusted date. There will be no adjustment to the Milestone Completion Date for events, forces or factors, as noted above, that the Contractor was to have foreseen and included in the cost and schedule of his work.

NOTICE TO CONTRACTOR - PRE-BID QUESTIONS AND ANSWERS

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

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

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

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

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

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

NOTICE TO CONTRACTOR - COMPASS SUBMITTALS

Upon execution of the Contract, the Contractor acknowledges and agrees that contractual submittals for this Project shall be submitted and handled through the Department's project management system, COMPASS.

Contractor submittals including, but not limited to, Shop Drawings, Working Drawings, Product Data, RFIs, and RFCs shall be generated and delivered by the Contractor in accordance with the Department's [COMPASS Contractor's User Manual](#). The administering District office will inform the Contractor of other deliverables required to be similarly submitted.

Access credentials for COMPASS will be provided free of charge to the Contractor.

The Department shall not be held responsible for delays, lack of processing or responses to submittals that do not follow the specified guidelines in the COMPASS Contractor's User Manual.

NOTICE TO CONTRACTOR - FEDERAL WAGE DETERMINATIONS (Davis Bacon Act)

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

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

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

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

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

NOTICE TO CONTRACTOR - PORTLAND CEMENT CONCRETE (PCC) MIX CLASSIFICATIONS

SECTIONS 6.01 and M.03 MIX CLASSIFICATION EQUIVALENCY

Sections 6.01 *Concrete for Structures* and M.03 *Portland Cement Concrete* have been revised to reflect changes to item names and nomenclature for standard Portland Cement Concrete (PCC) mix classifications. Special Provisions, plan sheets and select pay items in this Contract may not reflect this change. Refer to the Concrete Mix Classification Equivalency Table below to associate the Concrete Mix Classifications with Former Mix Classifications that may be present elsewhere in the Contract.

Concrete Mix Classification Equivalency Table

New Mix Classification (Class PCCXXYZ ¹)	Former Mix Classification
Class PCC03340	Class "A"
Class PCC03360	Class "C"
Class PCC04460 ²	Class "F"
Class PCC04462 ²	High Performance Concrete
Class PCC04481, PCC05581	Class "S"

Table Notes:

1. See Table M.03.02-1, Standard Portland Cement Concrete Mixes, for the new Mix Classification naming convention.
2. Class PCC04462 (formerly Class "HP1" Concrete; also called low permeability concrete) is to be used for the following cast-in-place bridge components: decks, bridge sidewalks, and bridge parapets.

Where called for in the Contract, **Low Permeability Concrete** shall be used, as specified in Sections 6.01 and M.03. Please pay special attention to the requirements for Class PCC04462, including:

- Submittal of a mix design developed by the Contractor and a concrete supplier **at least 90 days prior to placing the concrete**
- Testing and trial placement of the concrete mix is to be developed and discussed with the Department

The Department will not consider any requests for change to eliminate the use of Low Permeability Concrete on this Project.

NOTICE TO CONTRACTOR - ARCHITECTURAL AND INDUSTRIAL MAINTENANCE COATINGS

This Contract includes the application of materials subject to the Volatile Organic Compounds (VOC) content limits stated in the Regulations of Connecticut State Agencies (RCSA) Sections 22a-174-41 and -41a. All architectural and industrial maintenance (AIM) coatings and applications of such coatings must comply with these regulations.

The Contractor shall submit a Material Safety Data Sheet/Safety Data Sheet or Product Technical Data Sheet developed by the manufacturer of each material that may be subject to the Regulations. The submittal must verify both the type of AIM and its VOC Content. VOC content shall be determined based on the formulation data supplied by the materials manufacturer.

The Contractor may only use AIM coatings that contain VOCs below the respective coating category Phase II limits specified in Table 1 if either:

- a) the coating was manufactured on or after May 1, 2018, **or**
- b) the coating is being applied after April 30, 2021.

The Contractor may use AIM coatings that contain VOCs exceeding the respective coating category Phase II limits specified in Table 1 only if all of the following four conditions are met:

- a) the coating is being applied on or before April 30, 2021,
- b) the coating contains VOCs below the applicable Phase I limits specified in Table 1,
- c) the coating was manufactured prior to May 1, 2018, **and**
- d) the coating container(s) are dated (or date coded) as such.

For any coating that is not categorized within Table 1, the Contractor shall classify the coating as follows and apply corresponding limits in Table 1.

- Registers gloss <15 on an 85-degree meter or <5 on a 60-degree meter) – Flat Coating,
- Registers gloss of ≥ 15 on an 85-degree meter and ≥ 5 on a 60-degree meter) - Nonflat Coating,
- Registers gloss of ≥ 70 on a 60-degree meter - Nonflat-High Gloss Coating.

The Contractor must close all containers of coating and solvent when not in use.

Coating container labels must display the date the coating was manufactured, the manufacturer's recommendation regarding thinning with solvent, and the coating's VOC content in grams per liter (g/L) of coating. Certain coating categories as noted in Table 1 have additional labeling requirements.

The Contractor may add additional solvent to a coating only if such addition does not cause the coating to exceed the applicable VOC limit specified Table 1. The Contractor must adhere to type(s) of solvent and maximum amount of solvent recommended by coating manufacturer. VOC content of a thinned coating shall be the VOC content as listed by the manufacturer after thinning in accordance with its recommendation.

TABLE 1		
Coating Category	Phase I	Phase II
	manufactured prior to May 1, 2018 VOC content limit (g/L)	manufactured on or after May 1, 2018 VOC content limit (g/L)
Aluminum roof coating	--- ¹	450
Antenna coating	530	--- ¹
Antifouling coating	400	--- ¹
Basement specialty coating	--- ¹	400
Bituminous roof coating	300	270
Bituminous roof primer	350	350
Bond breaker	350	350
Calcimine recoater	475	475
Clear wood coating - Clear brushing lacquer²	680	275
Clear wood coating - Lacquer^{2,3}	550	275
Clear wood coating - Sanding sealer^{2,4}	350	275
Clear wood coating - Varnish²	350	275
Concrete curing compound	350	350
Concrete or masonry sealer/ Waterproofing concrete or masonry sealer	400	100
Concrete surface retarder	780	780
Conjugated oil varnish	--- ¹	450
Conversion varnish	725	725
Driveway sealer	--- ¹	50
Dry fog coating	400	150
Faux finishing coating²	350	350
Fire resistive coating	350	350
Fire retardant coating - Clear	650	--- ¹
Fire retardant coating - Opaque	350	--- ¹
Flat coating	100	50
Floor coating	250	100
Flow coating	420	--- ¹
Form-release compound	250	250
Graphic arts coating (sign paint)	500	500
High temperature coating	420	420
Impacted immersion coating	780	780
Industrial maintenance coating²	340	250
Industrial maintenance coating	340	250
Low solids coating	120	120
Magnesite cement coating	450	450
Mastic texture coating	300	100
Metallic pigmented coating	500	500
Multi-color coating	250	250

TABLE 1		
Coating Category	Phase I	Phase II
	manufactured prior to May 1, 2018 VOC content limit (g/L)	manufactured on or after May 1, 2018 VOC content limit (g/L)
Nonflat coating	150	100
Nonflat high gloss coating²	250	150
Nuclear coating	450	450
Pre-treatment wash primer	420	420
Primer, sealer and undercoater	200	100
Quick-dry enamel	250	--- ¹
Quick-dry primer, sealer and undercoater	200	--- ¹
Reactive penetrating carbonate stone sealer²	--- ¹	500
Reactive penetrating sealer²	--- ¹	350
Recycled coating	250	250
Roof coating	250	250
Rust preventive coating²	400	250
Shellac Clear	730	730
Shellac Opaque	550	550
Specialty primer, sealer and undercoater²	350	100
Stain	250	250
Stone consolidant²	--- ¹	450
Swimming pool coating	340	340
Thermoplastic rubber coating and mastic	550	550
Traffic marking coating	150	100
Traffic marking coating	150	100
Tub and tile refinish	--- ¹	420
Waterproofing membrane	--- ¹	250
Waterproofing sealer	250	--- ¹
Wood coating²	--- ¹	275
Wood preservative	350	350
Zinc-rich primer²	--- ¹	340

1 Classify as follows and apply corresponding limits in Table 1.

- Registers gloss <15 on an 85-degree meter or <5 on a 60-degree meter) – Flat Coating,
- Registers gloss of ≥15 on an 85-degree meter and ≥5 on a 60-degree meter) – Nonflat Coating
- Registers gloss of ≥70 on a 60-degree meter – Nonflat-High Gloss Coating

2 Container must be appropriately labeled. See RCSA 22a-174-41a

3 “Clear Wood Coating – Lacquer” includes lacquer sanding sealer

4 “Clear Wood Coating - Sanding Sealer” does not include lacquer sanding sealer

-END-

NOTICE TO CONTRACTOR - USE OF STATE POLICE OFFICERS

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

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

**NOTICE TO CONTRACTOR - FORM 818 ARTICLE 1.05.19 – FIELD
ERECTOR PREQUALIFICATION**

The following requirements will be incorporated into 1.05 – Control of the Work to be included in Contracts as of the January 2021 Supplements to the Standard Specifications, Form 818:

1.05.19—Field Erector Prequalification: Contractors erecting structural steel for Department projects are required to possess the appropriate AISC Certified Steel Erector (CSE) Certification as follows.

1. For Department bridge and large sign installation projects, Contractors are required to possess the certification stated in the Contract. All Contractors performing structural steel work on new construction or rehabilitation work of bridges will be required to possess CSE certification with a Bridge Erection Endorsement.
2. For Department Facilities projects, CSE certification for Steel-Framed Buildings is required when erecting steel on both new and existing Facilities projects.

Those affected shall plan accordingly.

**NOTICE TO CONTRACTOR - 9.49 – FURNISHING, PLANTING AND
MULCHING TREES, SHRUBS, VINES AND GROUND COVER PLANTS**

The Contractor is hereby notified that Section 9.49 of the *Standard Specifications* in Form 818 has been revised as follows:

1. The Contractor must secure an [Encroachment Permit](#) to work in the plantings area to satisfy the one year warranty requirements.
2. The Encroachment Permit requires a [Permit Bond](#).
3. The Contractor is responsible for the One-Year Establishment Period, 1 year from the date of final acceptance to the satisfactory completion of the planting activities.
4. The Contractor shall secure a Permit Bond in the amount of \$10,000 or 20% of the sum of all plant items, whichever is greater, along with an Encroachment Permit from the Department in order to guarantee the One-Year Establishment Period.

See Article 9.49.03-15 for more information.

NOTICE TO CONTRACTOR - UTILITY COORDINATION & RELOCATION

Specific to Project No. 0130-0184

The proposed temporary relocation and permanent relocation of aerial facilities, temporary utility poles, permanent utility poles and underground facilities are shown on the plans. However, the Contractor is required to coordinate the exact location and timing of all utility relocations with the individual utility owners, and to phase his construction operations as required to accommodate all (temporary and permanent) utility relocations. In addition to field meetings and correspondence, this coordination may include staking of locations, excavation and temporary grading, providing access to existing and future utility pole locations, or other physical work as required to allow for utility relocation work. The Contractor shall engage in the necessary coordination of utility relocations and associated work at no additional cost to the State.

The Contractor's schedule of operations and construction phasing plans shall show the anticipated utility relocation in the sequence of construction.

The following company representatives shall be contacted by the Contractor to coordinate the temporary relocation of overhead utilities, installation of temporary utility pole and permanent utility poles, relocation of the overhead utilities from the temporary location to permanent location and the removal of temporary utility poles a minimum of 30 days prior to the start of any work on this project involving their utilities:

The Connecticut Light and Power Company dba
Eversource Energy-Electric
Transmission
Ms. Susan J. Bellion
Project Siting Specialist
56 Prospect Street
Hartford, CT 06103
Phone: (860) 728-4628
Email: susan.bellion@eversource.com

Eversource Energy – Electric Distribution
Mr. Thomas Woronik
Supervisor – Construction Engineering
22 East High Street
East Hampton, CT 06424
Phone: (860) 267-3891
Email: Thomas.Woronik@eversource.com

Frontier Communications of Connecticut
Ms. Lynne DeLucia
Manager – Engineering & Construction
1441 North Colony Road
Meriden, CT 06450-4101
Phone: (203) 238-5000 Mobile: (860) 967-4389
Email: Lynne.m.delucia@ftr.com

Charter Communications Entertainment I, LLC
Mr. Keith Cournoyer
Construction Supervisor
207 Tuckie Road
North Windham, CT 06526
Phone: (860) 456-8346 EXT: 53029
Email: Keith.Cournoyer@charter.com

NOTICE TO CONTRACTOR - PROTECTION OF UTILITIES

The Contractor shall verify the location of overhead utilities and underground utilities. Construction work within the vicinity of utilities shall be performed in accordance with current safety regulations.

Representatives of the utility companies shall be allowed access to the work, by the Contractor.

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

The Contractor is responsible for notifying “Call Before You Dig” in accordance with Article 1.05.15 prior to commencing any excavation.

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

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

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

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

The Contractor shall perform all work in such a manner that will protect each Utility Company’s facilities from damage.

NOTICE TO CONTRACTOR - UTILITY SPECIFICATIONS

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

NOTICE TO CONTRACTOR - UTILITY COORDINATION & RELOCATION

Specific to Project No. 0080-0131

The proposed temporary relocation and permanent relocation of aerial facilities, temporary utility poles, permanent utility poles and underground facilities are shown on the plans. However, the Contractor is required to coordinate the exact location and timing of all utility relocations with the individual utility owners, and to phase his construction operations as required to accommodate all (temporary and permanent) utility relocations. In addition to field meetings and correspondence, this coordination may include staking of locations, excavation and temporary grading, providing access to existing and future utility pole locations, or other physical work as required to allow for utility relocation work. The Contractor shall engage in the necessary coordination of utility relocations and associated work at no additional cost to the State.

The Contractor's schedule of operations and construction phasing plans shall show the anticipated utility relocation in the sequence of construction.

The following company representatives shall be contacted by the Contractor to coordinate the temporary relocation of overhead utilities, installation of temporary utility pole and permanent utility poles, relocation of the overhead utilities from the temporary location to permanent location and the removal of temporary utility poles a minimum of 30 days prior to the start of any work on this project involving their utilities:

Comcast of Connecticut, Inc
Mr. Jim Bitzas
Regional Construction Director
1110 East Mountain Road
Westfield, MA 01085
Phone: (413) 642-8582
Email: jim_bitzas@cable.comcast.com

AT&T Corporation
Mr. Louis J. Mareello
OSP Field Operations
400 Hamilton Avenue – Mailroom
White Plains, NY 10601
Phone: (914) 467-1097
Mobile: (914) 671-5330
Email: lm5215@att.com

AT&T Consultant
Dave Puchala
Siena Engineering Group
50 Mall Road, Suit 203
Burlington, MA 01803
Phone: (781) 221-8400 ext. 7052
Mobile: (781) 953-7663

The Connecticut Light and Power Company dba
Eversource Energy-Electric
Transmission
Ms. Susan J. Bellion
Project Siting Specialist
56 Prospect Street
Hartford, CT 06103
Phone: (860) 728-4628
Email: susan.bellion@eversource.com

Eversource Energy – Electric Distribution
Mr. Thomas Woronik
Supervisor – Construction Engineering
22 East High Street
East Hampton, CT 06424
Phone: (860) 267-3891
Email: Thomas.Woronik@eversource.com

Frontier Communications of Connecticut
Ms. Lynne DeLucia
Manager – Engineering & Construction
1441 North Colony Road
Meriden, CT 06450-4101
Phone: (203) 238-5000 Mobile: (860) 967-4389
Email: Lynne.m.delucia@ftr.com

Eversource Energy – Gas Distribution
Mr. James Shea
Lead Engineer Gas Project Engineering
107 Selden Street, Mail Stop NUE2
Berlin, CT 06037
Phone: (860) 665-3332
Email: james.shea@eversource.com

Town of Middlebury Public Works Department
Mr. Dan Norton
Director of Public Works
1 Service Road
Middlebury, CT 06762
Phone: (203) 577-4170
Email: publicworks@middlebury-ct.org

Town of Middlebury Water Pollution Control Authority
Mr. Ed Bailly
Crew Leader, Sewer
1212 Whittemore Road
Middlebury, CT 06762
Phone: (203) 758-2747
Email: wpc@middlebury-ct.org

The Connecticut Water Company
Mr. Don Schumacher,
General Manager
450 Heritage Road
Southbury, CT 06488
Phone: (203) 264-8100
Email: dschumacher@ctwater.com

NOTICE TO CONTRACTOR - UTILITY GENERATED SCHEDULE

Specific to Project No. 0130-0184

The attached project specific utility work schedule(s) was provided to the Connecticut Department of Transportation (Department) by the utility companies regarding their identified work on this project.

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

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

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

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

rev. 5/20/2013		UTILITY WORK SCHEDULE	
CTDOT Project Number:	130-184	Town:	Southbury
Project Description:	Replacement/Rehabilitation of Bridge No. 01157		
CTDOT Utilities Engineer:	Latoya Smith		
Phone:	(860)594-2533	Email:	Latoya.Smith@ct.gov
Utility Company:	Charter		
Prepared By:	David Oliveira	Date Prepared:	2020
Phone:	203-304-4001 E. 5420	Email:	david.oliveira@chartercom.com
Scope of Work			
<p>The following is a description of all utility work planned to be completed in conjunction with the CTDOT project. The narrative describes all work to be carried out by the utility or its contractor, including temporary and permanent work required by the project as well as any additional utility infrastructure work the utility intends on performing within the project limits during the construction of the project.</p>			
<p>Three spans of strand, coax and fiber will need to be rebuilt over I-84 on Bucks Hill road in Southbury / Ct. We will need a total of 11 day for this project. That is building to the new pole line, splicing coax and fiber. The wreckout of old coax , strand and fiber to the old pole line.</p>			
Special Considerations and Constraints			
<p>The following describes the limiting factors that must be planned for in the scheduling and performance of the utility work. For example, restrictions on cut-overs, outages, limitations on customer service interruptions (e.g. nights, weekends, holidays), seasonal and environmental shutdown periods, long lead material procurements, etc..</p>			

UTILITY WORK SCHEDULE			
CTDOT Project Number:	130-184		
Utility Company:	Charter		
Prepared By:	David Oliveira	Total Calendar Days:	11
Schedule			
<p>The following schedule identifies each major activity of utility work in sequential order to be performed by the utility or its contractor. The location of each activity of work is identified by the baseline stationing on the CTDOT plans. All activities identify the predecessor activity which must be completed before a utility work activity may progress. The duration provided is the number of calendar days required to complete the utility work activity based on historical information and production rates.</p>			
Location (Station to Station)	Description of Utility Work Activity	Predecessor Activity	Duration (calendar days)
Pole line	Building new coax ,fiber and strand	Rebuild	4
Pole line	Splicing Fiber	Splicing FT	4
Pole line	Coax splicing	Splicing Coax	2
Pole line	Remove / Wreckout the coax , fiber, and strand off the pole line old pole line	Wreck out	1

UTILITY WORK SCHEDULE Rev 08 02 2016			
CTDOT Project Number:	130-184	Town:	SOUTHBURY
Project Description:	REHABILITATION OF BRIDGE NO. 01157 BUCKS HILL ROAD OVER I-84		
CTDOT Utilities Engineer:	LATOYA SMITH		
Phone:	860-5942533	Email:	LATOYA.SMITH@CT.GOV
Utility Company:	FRONTIER COMMUNICATIONS		
Prepared By:	GARY SWANSON	Date Prepared:	5/20/2019
Phone:	203-575-6112	Email:	GARY.SWANSON@FTR.COM
Scope of Work			
<p>The following is a description of all utility work planned to be completed in conjunction with the CTDOT project. The narrative describes all work to be carried out by the utility or its contractor, including temporary and permanent work required by the project as well as any additional utility infrastructure work the utility intends on performing within the project limits during the construction of the project.</p> <p>The rehabilitation of bridge #01157 needs to have the pole line and aerial cables over the bridge relocated away from the bridge. Eversource will relocate poles 27355 and 27356 15 FT away from the bridge. The DOT will provide an access area to reach the temporary pole locations so we can do our work. Eversource, CATV and Frontier will place new cables on new pole line and remove old cables so Eversource can remove old poles. Frontier has (2) 100 pair cables over the bridge. We will replace them with (1) 200 pair cable. Once the bridge is complete Eversource will move the poles back to their original location and we will shift our cable back since the access area will not be maintained by the DOT.</p>			
Special Considerations and Constraints			
<p>The following describes the limiting factors that must be planned for in the scheduling and performance of the utility work. For example, restrictions on cut-overs, outages, limitations on customer service interruptions (e.g. nights, weekends, holidays), seasonal and environmental shutdown periods, long lead material procurements, etc..</p>			

UTILITY WORK SCHEDULE Rev 3/2015

CTDOT Project Number:	130-184				
Utility Company:	Frontier Communications				
Prepared By:	Gary Swanson			Total Working Days:	12

Schedule

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

Location (Station to Station)	Description of Utility Work Activity	Predecessor Activity	Duration (working days)
P-27255 TO P-27356	Place new 200 pair cable from P- 27355 to P-27356 approximately 330 Ft.	Eversource places new poles and both ES and CATV have shifted to new poles	2
P-27255 TO P-27356	Splice in new cable into existing cables. Cut -out old cable.	Once our cable is placed.	2
P-27255 TO P-27356	Add guying at new poles and remove guying from old poles. Remove old cable.	Once splicing has finished the cut-over.	2
P-27255 TO P-27356	Shift cable back to ti's original postion.	Once ES has set the poles back to their original location.	2
P-27255 TO P-27356	Remove old guying and add guying to new poles.	At the same time we shift our cable back.	2
P-27255	Cut-out slack from cables.	Once we have shifted back and completed guying.	2

UTILITY WORK SCHEDULE Rev 3/2015			
CTDOT Project Number:	0130-0184	Town:	Southbury
Project Description:	Superstructure replacement Bridge 01157 Bucks Hill Rd over I84		
CTDOT Utilities Engineer:	Latoya Smith		
Phone:	860-594-2533	Email:	latoya.smith@ct.gov
Utility Company:	Eversource Energy		
Prepared By:	Michael Prentice	Date Prepared:	
Phone:	203-271-4794	Email:	michael.prentice@eversource.co
Scope of Work			
<p>The following is a description of all utility work planned to be completed in conjunction with the CTDOT project. The narrative describes all work to be carried out by the utility or its contractor, including temporary and permanent work required by the project as well as any additional utility infrastructure work the utility intends on performing within the project limits during the construction of the project</p> <p>Temporary Relocation. Eversource will set new poles slightly offset from the existing poles on either side of Bridge 01157. The poles will also be set at least 10 feet from Bucks Hill Rd. Eversource will also install anchors for guying. Eversource will install new conductors to new poles and span the highway. Guying will be installed. State Highway Police will be need to stop traffic in both direction of I-84 to facilitate the installation and removal of conductors. This work will need to be done late night / early morning when traffic is lightest.</p>			
Special Considerations and Constraints			
<p>The following describes the limiting factors that must be planned for in the scheduling and performance of the utility work. For example, restrictions on cut-overs, outages, limitations on customer service interruptions (e.g. nights, weekends, holidays), seasonal and environmental shutdown periods, long lead material procurements, etc..</p> <p>The following must be taken into account when planning the job: Order materials, schedule crews, request switching, hire & schedule contractor crews including traffic control if needed. Inclement weather, possible storm restoration work and other conflicting jobs. State Highway Police will be need to stop traffic in both direction of I-84 to facilitate the installation and removal of conductors.</p>			

UTILITY WORK SCHEDULE Rev 3/2015			
CTDOT Project Number:	0130-0184	Town:	Southbury
Project Description:	Superstructure replacement Bridge 01157 Bucks Hill Rd over I84		
CTDOT Utilities Engineer:	Latoya Smith		
Phone:	860-594-2533	Email:	latoya.smith@ct.gov
Utility Company:	Eversource Energy		
Prepared By:	Michael Prentice	Date Prepared:	
Phone:	203-271-4794	Email:	michael.prentice@eversource.com
Scope of Work			
<p>The following is a description of all utility work planned to be completed in conjunction with the CTDOT project. The narrative describes all work to be carried out by the utility or its contractor, including temporary and permanent work required by the project as well as any additional utility infrastructure work the utility intends on performing within the project limits during the construction of the project.</p>			
<p>Permanent Relocation. Eversource will remove offset poles on either side of Bridge 01157. Eversource will also install anchors for guying. Eversource will install new conductors to existing poles and span the highway. Guying will be installed. State Highway Police will be need to stop traffic in both direction of I-84 to facilitate the installation and removal of conductors. This work will need to be done late night / early morning when traffic is lightest.</p>			
Special Considerations and Constraints			
<p>The following describes the limiting factors that must be planned for in the scheduling and performance of the utility work. For example, restrictions on cut-overs, outages, limitations on customer service interruptions (e.g. nights, weekends, holidays), seasonal and environmental shutdown periods, long lead material procurements, etc..</p>			
<p>The following must be taken into account when planning the job: Order materials, schedule crews, request switching, hire & schedule contractor crews including traffic control if needed. Inclement weather, possible storm restoration work and other conflicting jobs . State Highway Police will be need to stop traffic in both direction of I-84 to facilitate the installation and removal of conductors.</p>			

NOTICE TO CONTRACTOR - RIGHTS OF WAY RESTRICTIONS

The Contractor is hereby advised that at the time of advertising for bids not all the property may be acquired by the State, certain residences and/or business establishments had not been vacated, and asbestos removal by others from buildings to be disposed of had not been completed. A complete listing of the affected properties and the anticipated dates that they will become available is hereinafter provided. The Contractor is further advised that limitations, as enumerated herein below, are imposed which may interfere with the physical construction of the project. Following are statements which will set forth the restrictions on the right of entrance to property and conditions governing construction of the project.

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

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

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

The following is a complete listing of properties which have not been acquired, vacated and asbestos abated as of _____ with the anticipated dates such properties will be acquired and/or vacated and abated.

NOTICE TO CONTRACTOR - HAZARDOUS MATERIALS INVESTIGATIONS

Limited hazardous materials site investigations have been conducted at Bridge No. 01157, Buck Hill Road over I-84, Southbury, Connecticut & Bridge No. 01160, Benson Road over I-84, Middlebury, Connecticut. The scope of inspection was limited to the representative components projected for impact.

Results of the survey identified/presumed lead paint to be present on the structural steel and metal bridge railing components of Bridge Nos. 01157 & 01160. Any paint waste streams from the structural steel and metal bridge railing components at the 2 bridges is to be handled and disposed of as CTDEEP/RCRA hazardous lead waste.

At Bridge No. 01160, no detectable levels of lead were identified in the graffiti paint on the piers/abutments, therefore any paint waste stream generated would be characterized as non-hazardous, non-RCRA waste.

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

At Bridge No. 01157, grey brittle railing caulk (C1) on top of the parapet walls was sampled and found to contain asbestos. Black semi pliable abutment caulk was sampled and found to contain no detectable levels of asbestos.

At Bridge No. 01160, white brittle railing caulk on parapet walls (C1), cement pipe debris (P1) and four (4) cement pipe conduits (P2) were sampled and found to contain asbestos. The cloth bearing pads, black curb caulk, grey rubbery expansion joint caulk, white pipe wrap/black tar, off-white paper with glue under metal pipe wrap, black paper-like pipe wrap, black tar with foam beads, black tar repair pipe wrap and black tar drain pipe were sampled and found to be non-ACM.

No bird/pigeon guano accumulations, bloodborne pathogen (BBP) concerns or other hazardous/regulated items were identified in accessible areas of Bridge Nos. 01157 & 01160.

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

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

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

- Item No. 0020903A – Lead Compliance for Miscellaneous Exterior Tasks
- Item No. 0020801A – Asbestos Abatement

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

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

- HazMat Inspection Letter, Bridge No. 01157, Buck Hill Road over I-84, Southbury, CT, TRC Environmental Corporation, June 2, 2020.
- HazMat Inspection Letter, Bridge No. 01160, Benson Road over I-84, Middlebury, CT, TRC Environmental Corporation, June 2, 2020.

NOTICE TO CONTRACTOR - ELECTRONIC ENGINEERING DATA (EED)

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

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

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

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

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

For a complete list of EED files, see the EED file manifest (PDF) located in the EED_0080-0131.zip and EED_0130-0184.zip file which is posted with the contract PS&E's on the State Contracting portal.

5/1/2020

NOTICE TO CONTRACTOR - 1.05 CONTROL OF THE WORK

1.05.03 – CONFORMITY WITH PLANS AND SPECIFICATIONS (INCLUDING QUALITY CONTROL)

The Contractor is hereby notified that a Quality Management Plan will be required for this Project in accordance with Standard Specifications Article 1.05.03 – Conformity with Plans and Specifications (including Quality Control).

NOTICE TO CONTRACTOR - QUALITY CONTROL PROGRAM

ITEM #0969054A CONTRACTOR QUALITY CONTROL PROGRAM LEVEL 1

This Contract includes the above-noted item and special provision for Contractor Quality Control Program, developed to supplement Article 1.05.03 of the standard specifications.

A minimum lump sum bid amount is included within the special provision.

The Contractor must be aware that the special provision requires that a Quality Control Manager (QCM) be proposed to the Department within thirty (30) days after Contract Award and that the written QC Program be submitted to the Department within forty-five (45) days after Contract Award.

The Contractor must also be aware of the staffing, inspection, reporting and all other requirements of the special provision.

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

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

SECTION 1.02 - PROPOSAL REQUIREMENTS AND CONDITIONS

1.02.01—Contract Bidding and Award:

After the first sentence of the third paragraph, add the Following:

In accordance with the provisions of the Construction Contract Bidding and Award Manual, bidders must be prequalified for **Group No. 9 Intermediate Bridges** to be eligible to bid on this project. Bidders that are not prequalified for this work classification will not be approved to bid on this project.

SECTION 1.03 - AWARD AND EXECUTION OF CONTRACT

Article 1.03.08 - Notice to Proceed and Commencement of Work:

Change the first paragraph to read as follows:

"The Contractor shall commence and proceed with the Contract work on the date specified in a written notice to proceed issued by the Engineer to the Contractor. The date specified will be no later than 45 calendar days after the date of the execution of the Contract by the Department".

SECTION 1.05 - CONTROL OF THE WORK

Replace Article 1.05.02 with the following:

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

1. Plans: The plans prepared by the Department show the details necessary to give a comprehensive idea of the construction contemplated under the Contract. The plans will generally show location, character, dimensions, and details necessary to complete the Project. If the plans do not show complete details, they will show the necessary dimensions and details, which when used along with the other Contract documents, will enable the Contractor to prepare Working Drawings, Shop Drawings or Product Data necessary to complete the Project.

Project submittals shall be delivered to the Department using the Department’s project management system COMPASS. The Contractor shall acquire and maintain access to COMPASS for the delivery of submittals as listed herein. The delivery processes and document tracking procedures shall be performed in accordance with this specification and the [COMPASS Contractor's User Manual](#).

2. Working Drawings: When required by the Contract or when ordered to do so by the Engineer, the Contractor shall prepare and submit the Working Drawings, signed, sealed and dated by a qualified Professional Engineer licensed to practice in the State of Connecticut, for review. The Working Drawings shall be submitted sufficiently in advance of the work detailed, to allow for their review in accordance with the requirements specified in 1.05.02-5 (including any necessary revisions, resubmittal, and final review). There will be no direct payment for furnishing any Working Drawings, procedures or supporting calculations, but the cost thereof shall be considered as included in the general cost of the work.

The Contractor is only required to deliver paper copies that have been stamped with “No Exceptions Noted” or “Exceptions as Noted.” Guidance to the Contractor for the number of properly sized paper copies will be provided by the Department.

All Working Drawing submission documents shall conform to the following requirements:

A. Drawings:

- i. Delivered in a single multi-page PDF file.
- ii. Shall be sized ANSI D (34 inches × 22 inches).
- iii. Contain a border, title block and a rectangular box, 2.25 inches wide × 1.75 inches high, in the lower right hand corner for the Department’s stamp.
- iv. Text height and width shall be 0.125 inch.
- v. All letter characters shall be uppercase.
- vi. Shall be searchable.
- vii. Shall be black and white.
- viii. Cover Page - shall be digitally signed by the Contractor’s Professional Engineer.

- ix. All pages shall include a watermark of the Professional Engineer's stamp in a common area.
- B. Calculations:
- i. Delivered in a single PDF file
 - ii. Shall be sized ANSI A (8.5 inches × 11 inches).
 - iii. Cover Page shall be digitally signed by the Contractor's Professional Engineer.
- C. Supporting Documentation:
- i. Delivered as an independent single PDF file
 - ii. Shall be sized ANSI A (8.5 inches × 11 inches).
- a. Working Drawings for Permanent Construction: The Contractor shall supply to the Department a certificate of insurance in accordance with 1.03.07 at the time that the Working Drawings for the Project are submitted.
- The Contractor's designer, who prepares the working drawings, shall secure and maintain at no direct cost to the State a Professional Liability Insurance Policy for errors and omissions in the minimum amount of \$2,000,000 per error or omission. The Contractor's designer may elect to obtain a policy containing a maximum \$250,000 deductible clause, but if the Contractor's designer should obtain a policy containing such a clause, they shall be liable to the extent of at least the deductible amount. The Contractor's designer shall obtain the appropriate and proper endorsement of its Professional Liability Policy to cover the indemnification clause in this Contract, as the same relates to negligent acts, errors or omissions in the Project work performed by them. The Contractor's designer shall continue this liability insurance coverage for a period of
- (i) 3 years from the date of acceptance of the work by the Engineer, as evidenced by a State of Connecticut, Department of Transportation form entitled "Certificate of Acceptance of Work," issued to the Contractor; or
 - (ii) 3 years after the termination of the Contract, whichever is earlier, subject to the continued commercial availability of such insurance.
- b. Working Drawings for Temporary Construction: The Contractor shall submit drawings, calculations, procedures and other supporting data to the Department in accordance with this Specification, with the exception of requirements defined under a. Working Drawings for Permanent Construction.

3. Shop Drawings: When required by the Contract, or when ordered to do so by the Engineer, the Contractor shall prepare and deliver Shop Drawings to the Department for review.

Shop Drawings shall be submitted sufficiently in advance of the work detailed, to allow for their review in accordance with the requirements specified in 1.05.02-5 (including any necessary revisions, resubmittal, and final review). There will be no direct payment for furnishing any Shop Drawings but the cost thereof shall be considered as included in the general cost of the work.

The Contractor is only required to deliver paper copies that have been stamped with “No Exceptions Noted” or “Exceptions as Noted.” Guidance to the Contractor for the number of properly sized paper copies will be provided by the Department.

Shop Drawing submission documents shall conform to the following requirements:

- A. Delivered in a single multi-page PDF file.
- B. Shall be sized ANSI D (34 inches × 22 inches).
- C. Contain a border, title block and a rectangular box, 2.25 inches wide × 1.75 inches high, in the lower right hand corner for the Department’s stamp.
- D. Text height and width shall be 0.125 inch.
- E. All letter characters shall be uppercase.
- F. Shall be searchable.
- G. Shall be black and white.

4. Product Data: When required by the Contract, or when ordered to do so by the Engineer, the Contractor shall prepare and deliver Product Data to the Department for review.

Product Data shall be submitted sufficiently in advance of the work detailed, to allow for their review in accordance with the requirements specified in 1.05.02-5 (including any necessary revisions, resubmittal, and final review). There will be no direct payment for furnishing any Product Data but the cost thereof shall be considered as included in the general cost of the work.

The Contractor shall submit the Product Data in a single submittal for each element of construction.

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

The Contractor is only required to deliver paper copies that have been stamped with “No Exceptions Noted” or “Exceptions as Noted.” Guidance to the Contractor for the number of properly sized paper copies will be provided by the Department.

Product Data submission documents shall conform to the following requirements:

- A. Delivered in a single PDF file
- B. Shall be sized ANSI A (8.5 inches × 11 inches).
- C. Marked to indicate applicable choices and options.
- D. Where non-applicable information and products are included, notations shall be made to clearly delineate applicable from non-applicable information.

5. Submittal Preparation and Processing – Review Timeframes: If the Department deems a submittal incomplete or unacceptable because not all the required documents were attached, documents are incomplete, or are in the incorrect format, the Department will send the submittal back to the Contractor before reviewing. When a submittal is sent back as incomplete, the associated documents have not been reviewed and the review process and any associated timeframe requirements have not begun.

The Contractor shall allow 30 calendar days for submittal review by the Department, from the date receipt is acknowledged by the Department. For any submittals stamped with “Revise and Resubmit” or “Rejected,” the Department is allowed an additional 20 calendar days for review of any resubmissions.

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

The furnishing of Shop Drawings, Working Drawings or Product Data, or any comments or suggestions by the Designer or Engineer concerning Shop Drawings, Working Drawings or Product Data, shall not relieve the Contractor of any of its responsibility for claims by the State or by third parties, as per 1.07.10.

The furnishing of the Shop Drawings, Working Drawings and Product Data shall not serve to relieve the Contractor of any part of its responsibility for the safety or the successful completion of the Project construction.

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

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

- d. If submittals are marked “Rejected,” the Contractor shall prepare and submit a new submittal in accordance with the Department’s notations. The resubmissions require an additional review and determination by the Department. The Contractor shall allow an additional review period as specified in 1.05.02-5.

SECTION 1.07 - LEGAL RELATIONS AND RESPONSIBILITIES

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

Add the following sentence to the last paragraph:

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

SECTION 1.08 - PROSECUTION AND PROGRESS

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 permitted to perform any work, which will interfere with the described traffic operations on all project roadways as follows:

Route I-84

The Contractor shall not perform any work that will interfere with traffic operations during the below State observed Legal Holidays and Legal Holiday Periods.

A. On the following State observed Legal Holidays:

New Year's Day	Labor Day
Good Friday	Thanksgiving Day
Memorial Day	Christmas Day
Independence Day	

B. During the following Legal Holiday Periods:

- i. When an above Legal Holiday is celebrated on a Sunday or Monday: From 6:00 a.m. the immediately preceding Friday to 6:00 a.m. the immediately following Tuesday.
- ii. When an above Legal Holiday is celebrated on a Tuesday, Wednesday, or Thursday: From 6:00 a.m. the day before to 6:00 a.m. the day after, except Thanksgiving (see below for Thanksgiving specific restrictions).
- iii. When an above Legal Holiday is celebrated on a Friday or Saturday: From 6:00 a.m. the immediately preceding Thursday to 6:00 a.m. the immediately following Monday.
- iv. Thanksgiving: From 6:00 a.m. the Wednesday before to 6:00 a.m. the Monday after.

During all other times:

- A. The Contractor shall maintain and protect traffic as shown on the accompanying "Limitation of Operations" charts, which dictate the maximum number of lanes allowed to closed and the allowable hours for implementing a rolling roadblock operation for each day of the week.
- B. The Contractor will be allowed to halt traffic for a period not to exceed 10 minutes to actively perform necessary work for the erection and setting of structural steel, and for the removal of the existing bridge superstructures, as approved by the Engineer, between 12:01 a.m. and 5:00 a.m. during all non-Legal Holiday Periods.
- C. The Contractor will be allowed to halt traffic on I-84 in the Eastbound and Westbound directions at Benson Road (01160) and Bucks Hill Road (01157) for a period not to exceed 20 minutes to perform necessary work for the installation of new overhead wires, and for the removal of old overhead wires during the utility relocation phase, as approved by the Engineer, between 12:01 a.m. and 5:00 a.m on Monday, Tuesday, Wednesday and Thursday during all non-Legal Holiday days periods

Benson Road

No hourly restrictions

Additional Restrictions:

- A. The Contractor will be allowed to close Benson Road and detour traffic for a duration that shall not exceed 35 consecutive weeks and shall not take place during a Legal Holiday or Legal Holiday Period.
- B. The Contractor shall notify the Engineer and the Emergency first responders at least 14 days in advance of the start of the Benson Road closure.

Bucks Hill Road

No hourly restrictions

Additional Restrictions:

- A. The Contractor will be allowed to close Bucks Hill Road and detour traffic for a duration that shall not exceed 35 consecutive weeks and shall not take place during a Legal Holiday or Legal Holiday Period.
- B. The Contractor shall notify the Engineer and the Emergency first responders at least 14 days in advance of the start of the Bucks Hill Road closure.

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.

Limitation of Operations Chart – Maximum Number of Lanes Allowed to be Closed and Hours Allowed for a Rolling Roadblock (RRB)

Route: I-84 WB (Middlebury & Southbury) Number of Through Lanes: 2								Route: I-84 EB (Middlebury & Southbury) Number of Through Lanes: 2							
Hour Beginning	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Hour Beginning	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Mid	1*	1*	1*	1*	1*	1*	1*	Mid	1*	1*	1*	1*	1*	1*	1*
1 AM	1*	1*	1*	1*	1*	1*	1*	1 AM	1*	1*	1*	1*	1*	1*	1*
2 AM	1*	1*	1*	1*	1*	1*	1*	2 AM	1*	1*	1*	1*	1*	1*	1*
3 AM	1*	1*	1*	1*	1*	1*	1*	3 AM	1*	1*	1*	1*	1*	1*	1*
4 AM	1*	1*	1*	1*	1*	1*	1*	4 AM	1*	1*	1*	1*	1*	1*	1*
5 AM	1*	1*	1*	1*	1*	1*	1*	5 AM	1	1	1	1	1	1*	1*
6 AM	0	0	0	0	0	1*	1*	6 AM	0	0	0	0	0	1	1*
7 AM	0	0	0	0	0	1	1*	7 AM	0	0	0	0	0	S	1*
8 AM	0	0	0	0	0	S	S	8 AM	0	0	0	0	0	S	1*
9 AM	S	S	S	S	S	S	S	9 AM	0	0	0	0	0	S	1
10 AM	S	S	S	S	S	S	S	10 AM	S	S	S	S	S	S	S
11 AM	S	S	S	S	S	S	S	11 AM	S	S	S	S	S	S	S
Noon	S	S	S	S	S	S	S	Noon	S	S	S	S	S	S	S
1 PM	S	S	S	S	S	S	S	1 PM	S	S	S	S	S	S	S
2 PM	S	S	S	S	S	S	S	2 PM	S	S	S	S	S	S	S
3 PM	S	S	S	S	S	S	S	3 PM	S	S	S	S	S	S	S
4 PM	0	0	0	0	0	S	S	4 PM	0	0	0	0	0	S	S
5 PM	0	0	0	0	0	S	S	5 PM	0	0	0	0	0	S	S
6 PM	0	0	0	0	0	1	S	6 PM	0	0	0	0	0	S	S
7 PM	S	S	S	S	S	S	S	7 PM	S	S	S	S	S	S	S
8 PM	S	S	S	S	S	S	S	8 PM	1	1	1	S	S	S	S
9 PM	1	1	1	S	S	S	1	9 PM	1*	1*	1*	1	1	1	S
10 PM	1*	1*	1*	1	1	1	1	10 PM	1*	1*	1*	1*	1*	1*	1*
11 PM	1*	1*	1*	1*	1*	1*	1*	11 PM	1*	1*	1*	1*	1*	1*	1*

On Legal Holidays and within Legal Holiday Periods, all hours shall be ‘0.’

“0” = No closures allowed = all available travel lanes, including exit only lanes, climbing lanes, gore areas, and all available shoulder widths shall be open to traffic during this time period.

“S” = Shoulders are allowed to be closed = all available travel lanes, including exit only lanes, climbing lanes, and gore areas shall be open to traffic during this time period.

“1” = One lane closure is allowed. Adjacent shoulder(s), climbing lanes, and/or gore areas may also be closed.

“2” = Two lane closure is allowed. Adjacent shoulder(s) and/or gore areas may also be closed.

“*” = Signifies those hours where a rolling roadblock may be implemented.

SECTION 1.08 - PROSECUTION AND PROGRESS

Article 1.08.07 - Determination of Contract Time:

Delete the second, third and fourth paragraphs and replace them with the following:

When the contract time is on a calendar day basis, it shall be the number of consecutive calendar days stated in the contract, INCLUDING the time period from December 1 through March 31 of each year. The contract time will begin on the effective date of the Engineer's order to commence work, and it will be computed on a consecutive day basis, including all Saturdays, Sundays, Holidays, and non-work days.

1.08.08 - Extension of Time:

Delete the sixth paragraph, "If an approved extension of Contract time.... the following April 1".

Article 1.08.09 - Failure to Complete Work on Time:

Delete the second paragraph, "If the last day...the project is substantially completed" and replace it with "Liquidated damages as specified in the Contract shall be assessed against the Contractor per calendar day from that day until the date on which the project is substantially completed."

SECTION 5.21 - ELASTOMERIC BEARING PADS

Section 5.21 is supplemented and amended as follows:

5.21.03 – Construction Methods:

Replace Subarticle 4 and 5 as follows:

4. The elastomeric bearing pads shall be bonded to the steel sole plate, as shown on the plans by vulcanization. All contact surfaces to which the vulcanization is to be applied shall be free of oil, paint, lacquer, galvanizing, mill scale, and rust.

5. The elastomeric bearings with sole plates and shear plates shall be attached to the girder prior to metallization. Metallizing shall be done in accordance with the special provision “Metallizing Structural Steel (Site No. X)”. The neoprene bearing pad shall be protected at all times from damage from surface preparation of the steel and from the heat from the thermal spray of molten zinc. The neoprene shall also be shielded from overspray of the urethane coating system. The sole plates shall be metallized.

5.21.05 – Basis of Payment:

Replace as follows:

This work will be paid for at the Contract unit price per cubic inch of "Elastomeric Bearing Pads," complete in place, which price shall include furnishing and installing elastomeric bearings vulcanized to steel, shipping of bearings for metallizing, and all materials, equipment, tools, labor and work incidental thereto, including the cost of furnishing test pads.

The cost of metallizing and coating the steel sole plate, load plates and shear plates shall be included in the item, “Metallizing Structural Steel (Site No. X).”

<u>Pay Item</u>	<u>Pay Unit</u>
Elastomeric Bearing Pads	C.I.

SECTION 12.00 - GENERAL CLAUSES FOR HIGHWAY SIGNING

Description:

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

12.00.07 – Global Positioning System (GPS) coordinates for signs:

The Contractor shall obtain and provide to the Engineer sign installation data, including Global Positioning System (GPS) latitude and longitude coordinates, for all new permanent State owned and maintained signs (temporary and construction signs are not to be included) installed in the project. The Engineer shall forward the sign data to the Division of Traffic Engineering for upload into the Highway Sign Inventory and Maintenance Management Program (SIMS). Sign data submissions or questions relating to SIMS or GPS shall be sent to DOT-SignInventory@ct.gov.

The horizontal datum is to be set to the State Plane Coordinate System, North American Datum of 1983 (NAD83) in feet. The minimum tolerance must be within 10 feet. The format of the GPS information shall be provided in a Microsoft Office compatible spreadsheet (Excel) file with data for each sign. The record for each sign installed is to be compatible with the anticipated CTDOT Sign Inventory and Management System (CTSIMS). The following format shall be used. However, the data fields noted by “#” are not required for the project submission. These entries will be completed as part of the Traffic Engineering CTSIMS data upload.

The cost of this work shall be included in the cost of the respective sign face – sheet aluminum and sign face – extruded aluminum items. The receipt of this electronic database must be received and accepted by the Engineer prior to final payment for items involving permanent highway signing. The electronic database information shall detail information regarding the sign actually installed by the project.

<u>Field Number</u>	<u>Type</u>	<u>size</u>	<u>Description</u>
1	text	20	Record Number (starting at 1...)
2	text	20	Sign Catalog Number
# 3	text	10	Size Height
# 4	text	10	Size Width
5	text	25	Legend
# 6	text	10	Background Color
# 7	text	10	Copy Color
8	Link	25	Material (see acceptable categories)
9	text	30	Comments if any
# 10	text	20	MUTCD Type
11	text	15	Town
12	text	5	Route
13	text	5	Route direction

#	14	text	10	Highway Log Mileage
	15	text	15	Latitude
	16	text	15	Longitude
	17	text	25	Mounting Type
	18	text	25	Reflective Sheeting Type
	19	date	25	Date Installed
	20	text	10	Number of Posts
	21	text	255	Sheeting Manufacturer name and address
	22	text	15	State Project Number (or)
	23	text	15	Encroachment Permit number.
	24	Graphic	*	Sign Picture Graphic.

* Graphics provided shall be representative of the sign supplied and be in color. Graphic formats shall be either JPG or TIFF and provided with a recommended pixel density of 800 x 600. The graphic shall be inserted in the supplied media in field 24 for each sign.

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

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

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

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

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

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

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

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

In addition, the report shall include:

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

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

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

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

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

B. Subcontract Requirements

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

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

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

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

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

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

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

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

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

“The subcontractor/supplier/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 #0020801A - ASBESTOS ABATEMENT

Description:

Work under this item shall include the abatement of asbestos containing materials (ACM) and associated work by persons who are knowledgeable, qualified, trained and licensed in the removal, treatment, handling, and disposal of ACM and the subsequent cleaning of the affected environment. ACM shall include material composed of any type of asbestos in amounts greater than one percent (1%) by weight. The Contractor performing this work shall possess a valid Asbestos Abatement Contractor license issued by the Connecticut Department of Public Health (CTDPH).

These Specifications govern all work activities that disturb asbestos containing materials. All activities shall be performed in accordance with, but not limited to, the current revision of the OSHA General Industry Standard for Asbestos (29 CFR 1926.1001), the OSHA Asbestos in Construction Regulations (29 CFR 1926.1101), the USEPA Asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP) Regulations (40 CFR Part 61 Subpart M), the CTDPH Standards for Asbestos Abatement, Licensure and Training (19a-332a-1 through 16, 20-440-1 through 9 & 20-441), and the CTDEEP Special Waste Disposal Regulations (22a-209-8(i)).

The asbestos abatement work shall include the removal and disposal of all ACM as identified on the Contract Plans and Specifications prior to the planned renovation/demolition project. This Item 0020801A – Asbestos Abatement was designed by Mr. Stephen Arienti, a State of Connecticut licensed Asbestos Project Designer (#000284).

Deviations from these Specifications require the written approval of the Engineer.

Materials:

All materials shall be delivered to the job site in the original packages, containers, or bundles bearing the name of the manufacturer, the brand name and product technical description.

No damaged or deteriorating materials shall be used. If material becomes contaminated with asbestos, the material shall be decontaminated or disposed of as asbestos-containing waste material. The cost to decontaminate and dispose of this material shall be at the expense of the Contractor.

Fire retardant polyethylene sheet shall be in roll size to minimize the frequency of joints, with factory label indicating four (4) or six (6) mil thickness.

Six (6) mil polyethylene disposable bags shall have pre-printed OSHA/EPA/DOT labels and shall be transparent.

Tape (or equivalent) capable of sealing joints in adjacent polyethylene sheets and for the attachment of polyethylene sheets to finished or unfinished surfaces must be capable of adhering under both dry and wet conditions.

Surfactant is a chemical wetting agent added to water to improve penetration and shall consist of fifty (50) percent polyoxyethylene ether and fifty (50) percent polyoxyethylene ester, or equivalent. The surfactant shall be mixed with water to provide a concentration one (1) ounce surfactant to five (5) gallons of water, or as directed by the manufacturer.

Spray equipment must be capable of mixing necessary chemical agents with water, generating sufficient pressure and volume; and equipped with adequate hose length to access all necessary work areas.

Drills, saws, sanders, grinders, wire brushes and needle-gun type removal equipment shall be equipped with a High Efficiency Particulate Air (HEPA) filtered vacuum dust collection system.

Containers for storage, transportation and disposal of asbestos containing waste material shall be impermeable and both air and watertight.

Labels and warning signs shall conform to OSHA 29 CFR 1926.1101, USEPA 40 CFR Part 61.152, and USDOT 49 CFR Part 172 as appropriate.

Encapsulant, a material used to chemically entrap asbestos fibers to prevent these fibers from becoming airborne, shall be of the type which has been approved by the Engineer. Use shall be in accordance with manufacturer's printed technical data. The encapsulant shall be clear and must be compatible with new materials being installed, if any.

Any planking, bracing, shoring, barricades and/or temporary sheet piling, necessary to appropriately perform work activities shall conform to all applicable federal, state and local regulations.

Air filtration devices and vacuum units shall be equipped with HEPA filters.

Construction Methods:

(1) Pre-Abatement Submittals and Notices

- (a) The scope of work for this project includes the removal of exterior non-friable ACM, which is not defined as "Asbestos Abatement" under the CTDPH Asbestos Abatement Standards (19a-332a-1) nor as Regulated asbestos containing materials (RACM) under the EPA Asbestos NESHAP. Therefore, the Contractor is **not required to submit an Asbestos Abatement Notification to CTDPH or EPA, prior to the commencement of work, so long as work practices will not render more than 25 square feet (SF) (CTDPH) or 160 SF (EPA) of the exterior non-friable ACM into a friable state.**

- (b) Fifteen (15) working days prior to the commencement of asbestos abatement work, the Contractor shall submit to the Engineer for review and acceptance and/or acknowledgment of the following:
1. Permits and licenses for the removal of asbestos-containing or contaminated materials, including a CTDPH valid asbestos removal contractor's license.
 2. Documentation dated within the previous twelve (12) months, certifying that all employees have received USEPA Model Accreditation Plan approved asbestos worker/supervisor training in the proper handling of materials that contain asbestos; understand the health implications and risks involved, including the illnesses possible from exposure to airborne asbestos fibers; understands the use and limits of respiratory equipment to be used; and understands the results of monitoring of airborne quantities of asbestos as related to health and respiratory equipment as indicated in 29 CFR 1926.1101 on an initial and annual basis, and copies of all employees CTDPH asbestos worker and/or supervisor licenses.
 3. Documentation from the Contractor, typed on company letterhead and signed by the Contractor, certifying that all employees listed therein have received the following:
 - a. medical monitoring within the previous twelve (12) months, as required in 29 CFR 1926.1101;
 - b. respirator fit testing within the previous twelve (12) months as detailed in 29 CFR 1910.134 (for all employees who must also don a tight-fitting face piece respirator).
 4. Copies of the EPA/State-approved certificates for the proposed asbestos landfill.
- (c) No abatement shall commence until a copy of all required submittals have been received and found acceptable to the Engineer. Those employees added to the Contractor's original list will be allowed to perform work only upon submittal to, and receipt of, all required paperwork by the Engineer.

(2) Asbestos Abatement Provisions:

(a) General Requirements

The Abatement Contractor/Subcontractor shall possess a valid State of Connecticut Asbestos Contractor License. Should any portion of the work be subcontracted, the subcontractor must also possess a valid State of Connecticut Asbestos Contractor License. The Asbestos Abatement Site Supervisor employed by the Contractor shall be in control on the job site at all times during asbestos abatement work. All employees of the Contractor who shall perform work (i.e. Asbestos Abatement Site Supervisor, Asbestos Abatement Worker) shall be properly certified/licensed by the State of Connecticut to perform such duties.

All labor, materials, tools, equipment, services, testing, insurance (with specific coverage for work on asbestos), and incidentals which are necessary or required to perform the work in accordance with applicable governmental regulations, industry standards and codes, and these Specifications shall be provided by the Contractor. The Contractor shall be prepared to work all shifts and weekends throughout the course of this project.

Prior to beginning work, the Engineer and Contractor shall perform a visual survey of each work area and review conditions at the site for safety reasons. In addition, the Contractor shall instruct all workers in all aspects of personnel protection, work procedures, emergency evacuation procedures and use of equipment including procedures unique to this project.

The Contractor shall, when necessary, provide temporary power and adequate lighting and ensure safe installation of electrical equipment, including ground fault protection and power cables, in compliance with applicable electrical codes and OSHA requirements. The Contractor is responsible for proper connection and installation of electrical wiring.

If sufficient electrical service is unavailable, the Contractor may need to supply electrical power to the site by fuel operated generator(s). Electrical power supply shall be sufficient for all equipment required for this project in operation throughout the duration of the project.

Water service may not be available at the site. Contractor shall supply sufficient water for each shift to operate the decontamination shower units as well as to maintain the work areas adequately wet.

Ladders and/or scaffolds shall be in compliance with OSHA requirements, and of adequate length, strength and sufficient quantity to support the scope of work. Use of ladders/scaffolds shall be in conformance with OSHA 29 CFR 1926 Subpart L and X requirements.

Work performed at heights exceeding six feet (6') shall be performed in accordance with the OSHA Fall Protection Standard 29 CFR 1926 Subpart M including the use of fall arrest systems as applicable.

Data provided regarding asbestos sampling conducted throughout the structure(s) is for informational purposes only. Under no circumstances shall this information be the sole means used by the Contractor for determining the presence, location and/or quantity of all asbestos containing materials. The Contractor shall verify all field conditions affecting performance of the work as described in these Specifications in accordance with OSHA, USEPA, USDOT, DEEP standards. Compliance with the applicable requirements is solely the responsibility of the Contractor.

The Engineer will provide a Project Monitor to oversee the activities of the Contractor. No asbestos work shall be performed until the Project Monitor is on-site. Pre-abatement, during abatement and post-abatement air sampling will be conducted as deemed necessary by the Project Monitor. Waste stream testing will be performed, as necessary, by the Project Monitor prior to waste disposal.

(b) Set-Up

Pre-clean the work areas using HEPA filtered equipment (vacuum) and/or wet methods as appropriate, collecting and properly containing all loose debris as asbestos-containing/asbestos contaminated waste. Vacuum units, of suitable size and capabilities for the project, shall have HEPA filters capable of trapping and retaining at least 99.97 percent of all monodispersed particles of three micrometers in diameter or larger. Do not use methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters.

The Contractor shall establish a remote Worker Decontamination Enclosure System consisting of Equipment Room, Shower Room and Clean Room in series, as detailed below. Access to the Regulated Area shall only be through this enclosure.

Access between rooms in the Worker Decontamination Enclosure System shall be through airlocks. Other effective designs are permissible. The Clean Room, Shower Room and Equipment Room located within the Worker Decontamination Enclosure, shall be contiguously connected with taped airtight edges.

The Clean Room shall be adequately sized to accommodate workers and shall be equipped with a suitable number of hooks, lockers, shelves, etc., for workers to store personal articles and clothing. Changing areas of the Clean Room shall be suitably screened from areas occupied by the public.

The Shower Room shall be of sufficient capacity to accommodate the number of workers. One shower stall shall be provided for each eight (8) workers. Showers shall be equipped with hot and cold or warm running water through the use of electric hot water heaters supplied by the Contractor. No worker or other person shall leave a Regulated Area without showering. Shower water shall be collected and filtered using best available technology and disposed of in an approved sanitary drain. Shower stalls and plumbing shall include sufficient hose length and drain system or an acceptable alternate.

The Contractor shall ensure that no personnel or equipment be permitted to leave the Regulated Area until proper decontamination procedures (including HEPA vacuuming, wet wiping and showering) to remove all asbestos debris have occurred.

Post warning signs meeting the specifications of OSHA 29 CFR 1910.1001 and 29 CFR 1926.1101 at each Regulated Area. In addition, signs shall be posted at all approaches to Regulated Areas so that an employee may read the sign and take the necessary protective steps before entering the area. Additional signs may require posting following construction of workplace enclosure barriers.

Alternate set up requirements for exterior non-friable asbestos abatement procedures

In lieu of the establishment of a negative pressure enclosure (NPE) system as described by CTDPH Sections 19a-332a-5(c), 5(d), 5(e), and 5(h), non-friable ACM will be removed from exterior work areas within an outdoor Regulated Area(s). The regulated work area will be established by the use of appropriately labeled barrier tape and postings in compliance with CTDPH 19a-332a-5(a) as well as OSHA 29 CFR 1926.1101. A remote personnel

decontamination unit as specified in Section 19a-332a-6 will be required. This method shall only be utilized provided exposure assessment air sampling data collected during the removal of the exterior non-friable materials indicates that the exposure levels during removal of such materials do not exceed 0.1 asbestos f/cc. Should exposure assessment air sampling data exceed this level, and engineering efforts to reduce the airborne fiber levels not be successful in reducing the levels to less than 0.1 f/cc, removal shall occur within these areas under full containment conditions.

(c) Personnel Protection

The Contractor shall utilize all appropriate engineering controls and safety and protective equipment while performing the work in accordance with OSHA, USEPA, USDOT, CTDEEP and CTDPH regulations.

The Contractor shall provide and require all workers to wear protective clothing in the Regulated Areas where asbestos fiber concentrations may reasonably be expected to exceed the OSHA established Permissible Exposure Limits (PEL) or where asbestos contamination exists. Protective clothing shall include impervious coveralls with elastic wrists and ankles, head covering, gloves and foot coverings.

Respiratory protection shall be provided and shall meet the requirements of OSHA as required in 29 CFR 1910.134, and 29 CFR 1926.1101 as well as the requirements of the CTDPH regulations. A formal respiratory protection program must be implemented in accordance with 29 CFR 1926.1101 and 29 CFR 1910.134. The Contractor shall provide respirators from among those approved as being acceptable for protection by the National Institute for Occupational Safety and Health (NIOSH) under the provisions of 30 CFR Part 11.

All other necessary personnel protective equipment (i.e. hardhat, work boots, safety glasses, hearing protection, etc.) required to perform the asbestos abatement work activities shall conform to all applicable federal, state and local regulations.

All other qualified and authorized persons entering into a Regulated Area (i.e. Project Monitor, Regulatory Agency Representative) shall adhere to the requirements of personnel protection as stated in this section.

(d) Asbestos Abatement Procedures

The Asbestos Abatement Site Supervisor, as the OSHA Competent Person shall be at the site at all times.

The Contractor shall not begin abatement work until authorized by the Project Monitor, following a pre-abatement visual inspection.

All workers and authorized persons shall enter and leave the Regulated Area through the Worker Decontamination Enclosure System, leaving contaminated protective clothing in the Equipment Room for reuse or disposal of as asbestos contaminated waste. No one shall eat, drink, smoke, chew gum or tobacco, or apply cosmetics while in a Regulated Area.

The following details the extent of each phase of operation designated for this project. Phase areas may be combined or divided at the direction of the Engineer. Proceed through the sequencing of the work phases under the direction of the Engineer.

Bridge No. 01157, Buck Hill Road over I-84, Southbury, CT

Includes the removal of:

- **Grey brittle railing caulk (C1) on top of the parapet walls**

A regulated area(s) shall be established at the perimeter of the work area(s), and access shall be controlled by the Contractor. A remote personnel decontamination unit shall be utilized. Removal shall be undertaken in accordance with OSHA Class II and USEPA Asbestos NESHAP requirements.

Bridge No. 01160, Benson Road over I-84, Middlebury, CT

Includes the removal of:

- **White brittle railing caulk on parapet walls (C1)**
- **Cement pipe debris (southside of bridge) (P1)**
- **Cement pipe conduits under bridge (4 conduits) (P2)**

A regulated area(s) shall be established at the perimeter of the work area(s), and access shall be controlled by the Contractor. A remote personnel decontamination unit shall be utilized. Removal shall be undertaken in accordance with OSHA Class II and USEPA Asbestos NESHAP requirements.

During removal, the Contractor shall spray asbestos materials with amended water using airless spray equipment capable of providing a "mist" application to reduce the release of airborne fibers. Spray equipment shall be capable of mixing wetting agent with water and capable of generating sufficient pressure and volume. Hose length shall be sufficient to reach all of the Regulated Area. Do not "flood" the area with hose type water supply equipment with the potential to create water releases and/or run-off from the regulated area.

The Contractor shall continue to spray the asbestos materials with amended water, as necessary, throughout removal activities to ensure the asbestos materials remain adequately wet. The asbestos materials shall not be allowed to dry out.

In order to minimize airborne asbestos concentrations inside the Regulated Area, the Contractor shall remove the adequately wetted asbestos in manageable sections. In addition, asbestos materials removed from any elevated level shall be carefully lowered to the floor.

The Contractor shall promptly place the adequately wet asbestos material in disposal containers (six (6) mil polyethylene bags/fiber drum/poly-lined dumpsters, etc.) as it is removed. Large

components removed intact may be wrapped in two (2) layers of six (6) mil polyethylene sheeting secured with tape. As the disposal containers are filled, the Contractor shall promptly seal the containers, apply caution labels and clean the containers before transportation from the regulated area. Bags shall be securely sealed to prevent accidental opening and leakage by taping in gooseneck fashion. Small components and asbestos-containing waste with sharp-edged components (e.g. nails, screws, metal lath, tin sheeting) which could tear polyethylene bags and sheeting shall be placed in clean drums and sealed with locking ring tops. All waste containers shall be leak-tight, (typically consisting of two layers of 6 mil poly (or bags)), and shall be properly labeled and placarded with OSHA Danger labels, DOT shipping labels, markings and placards and USEPA NESHAP generators labels. Containers shall be decontaminated by wet cleaning and HEPA vacuuming prior to exiting the regulated area.

If at any time during asbestos removal, the Project Monitor should suspect contamination of areas outside the Regulated Area, the Contractor shall immediately stop all abatement work and take steps to decontaminate these areas and eliminate causes of such contamination. Unprotected individuals shall be prohibited from entering contaminated areas until air sampling and/or visual inspections determine decontamination.

After completion of abatement work, all surfaces from which asbestos has been removed shall be wet brushed, using a nylon brush, wet wiped and sponged or cleaned by an equivalent method to remove all visible material (wire brushes are not permitted). During this work the surfaces being cleaned shall be kept wet. Cleaning shall also include the use of HEPA filtered vacuum equipment.

The Contractor shall also remove and containerize all visible accumulations of asbestos-containing and/or asbestos-contaminated debris which may have splattered or collected on the polyethylene engineering controls/barriers.

The Contractor shall remove contamination from the exteriors of the scaffolding, ladders, extension cords, hoses and other equipment inside the Regulated Area. Cleaning may be accomplished by brushing, HEPA vacuuming and/or wet cleaning. The Contractor shall wet wipe the Regulated Area using cotton rags or lint free paper towels. Rags and towels shall be disposed of after each use. Workers should avoid the use of dirty rags to insure proper cleaning of surfaces. Waste water shall be filtered using best available technology into leak-proof containers prior to being transported to a sanitary sewer for discharge.

Once the Regulated Area surfaces have dried, the Project Monitor shall perform a thorough post abatement visual inspection utilizing protocols from the ASTM Standard E1368-90 *Standard Practice for Visual Inspection of Asbestos Abatement Projects*. All surfaces within the Regulated Area, including but not limited to ledges, beams, and hidden locations shall be inspected for visible residue. Evidence of asbestos contamination identified during this inspection will necessitate further cleaning as heretofore specified. The area shall be re-cleaned at the Contractor's expense, until the standard of cleaning is achieved.

Once the area has received a satisfactory post-abatement visual inspection, any equipment, tools or materials not required for completion of the work, shall be removed by the Contractor from the Regulated Area.

(e) Air Monitoring Requirements

1. The Contractor shall:
 - a. Provide air monitoring equipment including sample filter cassettes of the type and quantity required to properly monitor operations and personnel exposure surveillance throughout the duration of the project.
 - b. Conduct personnel exposure assessment air sampling, as necessary, to assure that workers are using appropriate respiratory protection in accordance with OSHA Standard 1926.1101. Documentation of air sampling results must be recorded at the work site within twenty-four (24) hours and shall be available for review until the job is complete.

2. The Project Monitor, acting as the representative of the Engineer during abatement activities, will:
 - a. Collect air samples in accordance with the current revision of the NIOSH 7400 Method of Air Sampling for Airborne Asbestos Fibers while overseeing the activities of the Abatement Contractor. Frequency and duration of the air sampling during abatement will be representative of the actual conditions at the abatement site. The size and configuration of the asbestos project will be a factor in the number of samples required to monitor the abatement activities and shall be determined by the Project Monitor. The following schedule of samples may be collected by the Project Monitor:
 1. Pre-Abatement (Optional)
 - a. Background areas
 - b. Area(s) adjacent to Work Area(s)
 - c. Work Area(s)

 2. During Abatement (Optional)
 - a. Within Regulated Area(s)
 - b. Area(s) adjacent to Regulated Areas(s)
(exterior to critical barriers)
 - c. At the Decontamination Enclosure System

Abatement Activity	Pre- Abatement	During Abatement	Post- Abatement
Exterior Friable/Non-Friable	---	PCM	---

If air samples collected outside of the Regulated Area during abatement activities indicate airborne fiber concentrations greater than original background levels, or greater than 0.1 f/cc, as

determined by Phase Contrast Microscopy, whichever is larger, an examination of the Regulated Area perimeter shall be conducted and the integrity of barriers shall be restored. Cleanup of surfaces outside the Regulated Area using HEPA vacuum equipment or wet cleaning techniques shall be done prior to resuming abatement activities.

(f) Post Abatement Work Area Deregulation

The Contractor shall remove all remaining polyethylene, including critical barriers, drop-cloths, and Decontamination Enclosure Systems. HEPA vacuum and/or wet wipe any visible residue which is uncovered during this process. All waste generated during this disassembly process shall be discarded as ACM waste.

A final visual inspection of the work area shall be conducted by the Competent Person and the Project Monitor to ensure that all visible accumulations of suspect materials have been removed and that no equipment or materials associated with the abatement project remain.

The Contractor shall restore all work areas and auxiliary areas utilized during work to conditions equal to or better than original. Any damage caused during the performance of the work activity shall be repaired by the Contractor at no additional expense to the Engineer.

(g) Waste Disposal

Unless otherwise specified, all removed materials and debris resulting from execution of this project shall become the responsibility of the Contractor and removed from the premises. Materials not scheduled for reuse shall be removed from the site and disposed of in accordance with all applicable Federal, State and Local requirements.

Waste removal dumpsters and cargo areas of transport vehicles shall be lined with a layer of six (6) mil polyethylene sheeting to prevent contamination from leaking or spilled containers. Floor sheeting shall be installed first, and shall be extended up sidewalls 12-inches. Wall sheeting shall overlap floor sheeting 24-inches and shall be taped into place.

OSHA "Danger" signs must be attached to vehicles used to transport asbestos-containing waste prior to loading ACM waste. The signs must be posted so that they are plainly visible.

Ensure all waste containers (bags, drums, etc.) are properly packed, sealed and labeled with USEPA NESHAP generator labels, OSHA danger labels and DOT shipping labels. For each shipment of ACM waste, the Contractor shall complete an EPA-approved asbestos waste shipment record.

Authorized representatives signing waste shipment records on behalf of the generator must have USDOT Shipper Certification training in accordance with HMR 49 CFR Parts 171-180.

Transport vehicles hauling ACM waste shall have appropriate USDOT placards visible on all four (4) sides of the vehicle.

The Contractor shall dispose of asbestos-containing and/or asbestos contaminated material at an EPA authorized site and must be in compliance with the requirements of the Special Waste Provisions of the Office of Solid Waste Management, Department of Energy & Environmental Protection, State of Connecticut, or other designated agency having jurisdiction over solid waste disposal.

Any asbestos-containing and/or asbestos-contaminated waste materials which also contain other hazardous contaminants shall be disposed of in accordance with the EPA’s Resource Conservation and Recovery Act (RCRA), CTDEEP and ConnDOT requirements. Materials may be required to be stored on-site and tested by the Project Monitor to determine proper waste disposal requirements.

(h) Project Closeout Data:

1. Provide the Engineer, within 30 days of completion of asbestos abatement, a compliance package; which shall include, but not be limited to, the following:
 - a. Asbestos Abatement Site Supervisor job log;
 - b. OSHA personnel air sampling data;
 - c. Completed waste shipment records.

The Contractor shall submit the original completed waste shipment records to the Engineer.

Method of Measurement:

No measurement will be made for the work in this Section. The completed work shall be paid as a lump sum.

Basis of Payment:

The lump sum bid price for this item shall include the specialty services of the Asbestos Removal Contractor including: labor, materials, equipment, insurance, permits, notifications, submittals, personal air sampling, personal protection equipment, temporary enclosures, utility costs, incidentals, fees and labor incidental to the removal, transport and disposal of ACM, including close out documentation.

Final payment for asbestos abatement will not be made until all the project closeout data submittals have been completed (including waste shipment record(s) signed by an authorized disposal facility representative) and provided to the Engineer. Once the completed package has been received in its entirety, the Engineer will make the final payment to the Contractor.

<u>Pay Item</u>	<u>Pay Unit</u>
Asbestos Abatement	Lump Sum

ITEM #0020903A - LEAD COMPLIANCE FOR MISCELLANEOUS EXTERIOR TASKS

Description:

Work under this item shall include the special handling measures and work practices required for miscellaneous exterior tasks that impact materials containing or covered by lead paint. Lead paint includes paint found to contain **any** detectable amount of lead by Atomic Absorption Spectrophotometry (AAS) or X-Ray Fluorescence (XRF). Examples of typical miscellaneous exterior tasks includes; work impacting signs, guiderails, minor bridge rehabilitation, catenary structures, canopy structures, spot/localized paint removal, etc.

All activities shall be performed in accordance with the OSHA Lead in Construction Regulations (29 CFR 1926.62), the USEPA RCRA Hazardous Waste Regulations (40 CFR Parts 260 through 274), and the CTDEEP Hazardous Waste Regulations (RCSA 22a-209-1 and 22a-449(c)).

All activities shall be performed by individuals with appropriate levels of OSHA lead awareness and hazard communication training and shall supervised by the Contractors Competent Person on the job site at all times. The Contractors Competent Person is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Deviations from these Specifications require the written approval of the Engineer.

Materials:

All materials shall be delivered to the job site in the original packages, containers, or bundles bearing the name of the manufacturer, the brand name and product technical description, with MSDS sheets as applicable.

No damaged or deteriorating materials shall be used. If material becomes contaminated with lead, the material shall be decontaminated or disposed of as lead-containing waste material. The cost to decontaminate and dispose of this material shall be at the expense of the Contractor.

The following material requirements are to be met if to be used during the work:

Fire retardant polyethylene sheet shall be in roll size to minimize the frequency of joints, with factory label indicating minimum six (6) mil thickness.

Polyethylene disposable bags shall be minimum six (6) mils thick.

Tape (or equivalent) product capable of sealing joints in adjacent polyethylene sheets and for the attachment of polyethylene sheets to finished or unfinished surfaces must be capable of adhering under both dry and wet conditions.

Cleaning Agents and detergent shall be lead specific, such as TriSodium Phosphate (TSP).

Chemical strippers and chemical neutralizers shall be compatible with the substrate as well as with each other. Such chemical stripper shall contain less than 50% Volatile Organic Compounds (VOCs) by weight in accordance with RCSA 22a-174-40 Table 40-1.

Labels and warning signs shall conform to 29 CFR 1926.62, 40 CFR 260 through 274 and 49 CFR 172 as appropriate.

Air filtration devices and vacuum units shall be equipped with High-Efficiency Particulate Air (HEPA) filters.

Construction Methods:

(1) Pre-Abatement Submittals and Notices

A. Prior to the start of **any** work on a contiguous per site basis that will generate hazardous lead waste above conditionally exempt small quantities (greater than 100 kg/month or greater than 1000 kg at any time), the Contractor shall obtain from the Engineer on a contiguous per site basis a temporary EPA Hazardous Waste Generators ID number, unless otherwise directed by the Engineer. Temporary EPA ID numbers are good for six months from the date they are issued and can be extended once, for a maximum of six months and can't be used for longer than one year. The Contractor will be responsible for notifying the Engineer when an extension is needed.

B. Fifteen (15) working days prior to beginning work that impacts lead paint, the Contractor shall submit the following to the Engineer:

1. Work plan for work impacting lead paint including engineering controls, methods of containment of debris and work practices to be employed, as needed, to minimize employee exposure and prevent the spread of lead contamination outside the Regulated Area.
2. Copies of all employee certificates, dated within the previous twelve (12) months, relating to OSHA lead awareness and hazard communication training and training in the use of lead-safe work practices. SSPC training programs may be accepted as meeting these requirements if it can be demonstrated that such training addressed all required topics.

This information shall be updated and resubmitted annually, or as information changes, for the duration of the activities impacting lead to verify continued compliance.

3. Name and qualifications of Contractor's OSHA Competent Person under 29 CFR 1926.62.
4. Documentation from the Contractor, typed on company letterhead and signed by the Contractor, certifying that all employees listed therein have received the following:
 - a. medical monitoring within the previous twelve (12) months, as required in 29 CFR 1926.62;
 - b. biological monitoring within the previous six (6) months, as required in 29 CFR 1926.62;
 - c. respirator fit testing within the previous twelve (12) months, as required in 29 CFR 1910.134 (for those who don a tight-fitting face piece respirator)

This information shall be updated and resubmitted annually, or as information changes, for the duration of the activities impacting lead to verify continued compliance.

5. Names of the proposed non-hazardous construction and demolition (C&D) lead debris bulky waste disposal facility (CTDEEP-permitted Solid Waste landfill).
6. Names of the proposed scrap metal recycling facilities. The Contractor shall submit to the Engineer all documentation necessary to demonstrate the selected facility is able to accept lead-painted scrap metal.
7. Names of the proposed hazardous waste disposal facility (selected from the Department approved list provided herein), and copies of each facilities acceptance criteria and sampling frequency requirements.
8. Copies of the proposed hazardous waste transporters current USDOT Certificate of Registration for Hazardous Materials Transport, and the proposed transporters current Hazardous Waste Transporter Permits for the State of Connecticut and the waste destination State.
9. Negative exposure assessments conducted within the previous 12 months documenting that employee exposure to lead for each task is below the OSHA Action Level of $30 \mu\text{g}/\text{m}^3$. If a negative exposure assessment has not been conducted, the Contractor shall submit its air monitoring program for the work tasks as part of the Work Plan. Until a negative exposure assessment is developed for each task impacting lead paint, the Contractor shall ensure that all workers and authorized persons entering the Regulated Area wear protective clothing and respirators in accordance with OSHA 29 CFR 1926.62.

No activity shall commence until all required submittals have been received and found acceptable to the Engineer. Those employees added to the Contractor's original list will be allowed to perform work only upon submittal of acceptable documentation to, and review by, the Engineer.

Contractor shall provide the Engineer with a minimum of 48 hours notice in advance of scheduling, changing or canceling work activities.

(2) Lead Abatement Provisions

A. General Requirements:

All employees of the Contractor who perform work impacting lead paint shall be properly trained to perform such duties. In addition, the Contractor shall instruct all workers in all aspects of personnel protection, work procedures, emergency evacuation procedures and use of equipment including procedures unique to this project.

Contractor shall provide all labor, materials, tools, equipment, services, testing, and incidentals which are necessary or required to perform the work in accordance with applicable governmental regulations, industry standards and codes, and these Specifications.

Prior to beginning work, the Engineer and Contractor shall perform a visual survey of each work area and review conditions.

As necessary, the Contractor shall:

Shut down and lock out electrical power, including all receptacles and light fixtures, where feasible. The use or isolation of electrical power will be coordinated with all other ongoing uses of electrical power at the site.

If adequate electrical supply is not available at the site, the Contractor shall supply temporary power. Such temporary power shall be sufficient to provide adequate lighting and power the Contractor's equipment. The Contractor is responsible for proper connection and installation of electrical wiring and shall ensure safe installation of electrical equipment in compliance with applicable electrical codes and OSHA requirements.

If water is not available at the site for the Contractor's use, the Contractor shall supply sufficient water for each shift to operate the wash facility/decontamination shower units in addition to the water needed at the work area.

The Engineer may provide a Project Monitor to monitor compliance of the Contractor and protect the interests of the Department. In such cases, no activity impacting lead paint shall be performed until the Project Monitor is on-site. Where no Project Monitor will be provided, Contractor shall proceed at the direction of the Engineer. Environmental sampling, including ambient air sampling, TCLP waste stream sampling, and dust wipe sampling, will be conducted by the State as it deems necessary throughout the project. Air monitoring to comply with the Contractor's obligations under OSHA remains solely responsibility of the Contractor.

If at any time, procedures for engineering, work practice, administrative controls or other topics

are anticipated to deviate from those documented in the submitted and accepted Lead Work Plan, the Contractor shall submit a modification of its existing plan for review and acceptance by the Engineer prior to implementing the change.

If air samples collected outside of the Regulated Area during activities impacting lead paint indicate airborne lead concentrations greater than original background levels or $30 \mu\text{g}/\text{m}^3$, whichever is larger, or if at any time visible emissions of lead paint extend out from the Regulated Area, an examination of the Regulated Area shall be conducted and the cause of such emissions corrected. Cleanup of surfaces outside the Regulated Area using HEPA vacuum equipment or wet cleaning techniques shall be done prior to resuming work.

Work outside the initial designated area(s) will not be paid for by the Engineer. The Contractor will be responsible for all costs incurred from these activities including repair of any damage.

B. Regulated Area

The Contractor shall establish a Regulated Area through the use of appropriate barrier tape or other means to control unauthorized access into the area where activities impacting lead paint are occurring. Warning signs meeting the requirements of 29 CFR 1926.62 shall be posted at all approaches to Regulated Areas. These signs shall read:

DANGER
LEAD WORK AREA
MAY DAMAGE FERTILITY OR THE UNBORN CHILD
CAUSES DAMAGE TO THE CENTRAL NERVOUS SYSTEM
DO NOT EAT, DRINK, OR SMOKE IN THIS AREA

The Contractor shall implement appropriate engineering controls such as poly drop cloths, local exhaust ventilation, wet dust suppression methods, etc. as necessary, and as approved by the Engineer, to prevent the spread of lead contamination beyond the Regulated Area in accordance with the Contractor's approved work plan. Should the previously submitted work plan prove to be insufficient to contain the contamination, the Contractor shall modify its plan and submit it for review by the Engineer.

C. Wash Facilities:

The Contractor shall provide handwash facilities in compliance with 29 CFR 1926.51(f) and 29 CFR 1926.62 regardless of airborne lead exposure.

If employee exposure to airborne lead exceeds the OSHA Permissible Exposure Limit of 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), shower rooms must be provided. The Shower Room shall be of sufficient capacity to accommodate the number of workers. One shower stall shall be provided for each eight (8) workers. Showers shall be equipped with hot and cold or warm running water. Shower water shall be collected and filtered using best available technology and disposed of in accordance with all Federal, State and local laws, regulations and ordinances.

D. Personal Protection:

The Contractor shall initially determine if any employee performing construction tasks impacting lead paint may be exposed to lead at or above the OSHA Action Level of 30 $\mu\text{g}/\text{m}^3$. Assessments shall be based on initial air monitoring results as well as other relevant information. The Contractor may rely on historical air monitoring data obtained within the past 12 months under workplace conditions closely resembling the process, type of material, control methods, work practices and environmental conditions used and prevailing in the Contractors current operations to satisfy the exposure assessment requirements. Monitoring shall continue as specified in the OSHA standard until a negative exposure assessment is developed.

Until a negative exposure assessment is developed for each task impacting lead paint, the Contractor shall ensure that all workers and authorized person entering the Regulated Area wear protective clothing and respirators in accordance with OSHA 29 CFR 1926.62. Protective clothing shall include impervious coveralls with elastic wrists and ankles, head covering, gloves and foot coverings. Sufficient quantities shall be provided to last throughout the duration of the project.

Protective clothing provided by the Contractor and used during chemical removal operations shall be impervious to caustic materials. Gloves provided by the Contractor and used during chemical removal shall be of neoprene composition with glove extenders.

Respiratory protective equipment shall be provided and selection shall conform to 42 CFR Part 84, 29 CFR Part 1910.134, and 29 CFR Part 1926.62. A formal respiratory protection program must be implemented in accordance with 29 CFR Part 1926.62 and Part 1910.134.

E. Air Monitoring Requirements

The Contractor shall:

1. Provide air monitoring equipment including sample filter cassettes of the type and quantity required to properly monitor operations and personnel exposure surveillance throughout the duration of the project.
2. Conduct initial exposure monitoring to determine if any employee performing construction tasks impacting lead paint may be exposed to lead at or above the OSHA Action Level of 30 micrograms per cubic meter. Monitoring shall continue as specified in the OSHA standard until a negative exposure assessment is developed.
3. Conduct personnel exposure assessment air sampling, as necessary, to assure that workers are using appropriate respiratory protection in accordance with OSHA Standard 1926.62. Documentation of air sampling results must be recorded at the work site within twenty-four (24) hours and shall be available for review until the job is complete.

F. Lead Abatement Procedures

The Contractor's Competent Person shall be at the job site at all times during work impacting lead.

Work impacting lead paint shall not begin until authorized by the Engineer, following a pre-work visual inspection by the Project Monitor or Engineer to verify existing conditions.

Any activity impacting lead painted surfaces shall be performed in a manner which minimizes the spread of lead dust contamination and generation of airborne lead.

The Contractor shall conduct exposure assessments for all tasks which impact lead paint in accordance with 29 CFR 1926.62(d) and shall implement appropriate personal protective equipment until negative exposure assessments are developed.

All work impacting the materials identified below shall be conducted within an established Regulated Area with a remote wash facility/decontamination system in accordance with "C. Wash Facilities" and the OSHA Lead in Construction Standard. In accordance with 29 CFR 1926.62, engineering controls and work practices shall be utilized to prevent the spread of lead dust and debris beyond the Regulated Area and limit the generation of airborne lead. All wastes containing lead paint shall be properly contained and secured for storage, transportation and disposal.

The Contractor shall ensure proper entry and exit procedures for workers and authorized persons who enter and leave the Regulated Area. All workers and authorized persons shall leave the Regulated Area and proceed directly to the wash or shower facilities where they will HEPA vacuum gross debris from work suit, remove and dispose of work suit, wash and dry face and hands, and vacuum clothes. Lead chips and dust must not be removed by blowing or shaking of clothing. Wash water shall be collected, filtered, and disposed of in accordance with Federal, State and local water discharge standards. Any permit required for such discharge shall be the responsibility of the Contractor.

No one shall eat, drink, smoke, chew gum or tobacco, or apply cosmetics while in the Regulated Area.

Data from the limited lead testing performed by the Engineer is documented in the reports listed in the "Notice to Contractor – Hazardous Materials Investigations" or is presented herein. Under no circumstances shall this information be the sole means used by the Contractor for determining the extent of lead painted materials. The Contractor shall be responsible for verification of all field conditions affecting performance of the work as described in these Specifications in accordance with OSHA, USEPA, USDOT and CTDEEP standards. Compliance with the applicable requirements is solely the responsibility of the Contractor.

The following details the extent of each phase of operation designated for this project. Phase areas may be combined or divided at the direction of the Engineer. Proceed through the sequencing of the work phases under the direction of the Engineer.

Bridge No. 01157, Buck Hill Road over I-84, Southbury, CT

- Lead paint was identified/presumed on the structural steel and metal bridge railing components of Bridge No. 01157.

Girders, Bearings, Rockers, Diaphragms, Crossbeams, Connection Plates, etc.	Metal	Grey	Presumed
Bridge railing components	Metal	Grey	9.6-13.5 mg/cm²

- Any paint waste generated from the structural steel bridge components is presently presumed to be CTDEEP/RCRA hazardous lead waste.
- TCLP waste stream sampling/analysis of the metal bridge railing components characterized the paint waste as CTDEEP/RCRA hazardous lead waste.

Paint debris (structural steel components)	Presumed
Paint debris (metal bridge railing components)	270 mg/L

Bridge No. 01160, Benson Road over I-84, Middlebury, CT

- Lead paint was identified on the structural steel and metal bridge railing components of Bridge No. 01160.
- No detectable levels of lead were identified in the cover up graffiti paint on the piers/abutment at Bridge No. 01160

Girders, Bearings, Rockers, Diaphragms, Crossbeams, Connection Plates, etc.	Metal	Tan/Beige & Grey	0.2-30.1
Bridge railing components	Metal	Grey	10.8-17.6 mg/cm²
Cover up graffiti paint	Concrete	Grey	0.0 mg/cm² ND<0.10% by weight

- TCLP waste stream sampling/analysis of the structural steel/metal bridge railing components characterized the paint waste as CTDEEP/RCRA hazardous lead waste.

Paint debris (structural steel components)	490 mg/L
Paint debris (metal bridge railing components)	190 mg/L

- **Since no detectable amounts of lead in paint was identified in the cover up graffiti paint on the piers/abutment, any paint waste generated would be non-hazardous, non-RCRA lead waste.**

While conducting work to the bridges, where it is necessary to impact the lead painted metal, the Contractor shall either:

- a. Remove the paint to be impacted prior to impacting the metal in accordance with OSHA Lead in Construction Standard 29CFR 1926.62, or**
- b. Impact the metal using mechanical means with the paint in place in accordance with OSHA Lead in Construction Standard 29CFR 1926.62.**

The Contractor shall submit a Work Plan to ConnDOT outlining the exact procedures that will be used to perform the work, contain the spread of lead debris and protect the employees performing the required renovation work impacting the lead paint. No work shall be started by the Contractor until the Work Plan is approved by the Engineer.

All work impacting the lead paint materials shall be conducted within an established Regulated Area with a remote wash facility/decontamination system in accordance with “C. Wash Facilities” and the OSHA Lead in Construction Standard. In accordance with 29 CFR 1926.62, engineering controls and work practices shall be utilized to prevent the spread of lead dust and debris beyond the Regulated Area and limit the generation of airborne lead. All wastes containing lead paint shall be properly contained and secured for storage, transportation and disposal.

At Bridge Nos 01157 & 01160, the Engineer has presumed/characterized the paint waste streams associated with the structural steel and metal bridge railing components as CTDEEP/RCRA Hazardous waste. If the paint is removed from the metal surfaces, the paint shall be handled and disposed of in accordance with USEPA/CTDEEP Hazardous Waste Regulations as described under this Item 0020903A.

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

Should lead contamination be discovered outside of the Regulated Area, the Contractor shall immediately stop all work in the Regulated Area, eliminate causes of such contamination and take steps to decontaminate non-work areas.

Special Requirements:

- 1. Demolition/Renovation:**

- a. Demolish/renovate in a manner which minimizes the spread of lead contamination and generation of lead dust.
 - b. Implement dust suppression controls, such as misters, local exhaust ventilation, etc. to minimize the generation of airborne lead dust.
 - c. Segregate work areas from non-work areas through the use of barrier tape, drop cloths, etc.
 - d. Clean up immediately after renovation/demolition has been completed
2. Chemical Removal:
- a. Apply chemical stripper in quantities and for durations specified by manufacturer.
 - b. Where necessary, scrape lead paint from surface down to required level of removal (i.e. stabilized surface, bare substrate with no trace of residual pigment, etc.). Use sanding, hand scraping, and dental picks to supplement chemical methods as necessary.
 - c. Apply neutralizer compatible with substrate and chemical agent to substrate following removal in accordance with manufacturer's instructions.
 - d. Protect adjacent surfaces from damage from chemical removal.
 - e. Maintain a portable eyewash station in the work area.
 - f. Wear respirators that will protect workers from chemical vapors.
 - g. Do not apply caustic agents to aluminum surfaces.
3. Mechanical Paint Removal:
- a. Provide sanders, grinders, rotary wire brushes, or needle gun removers equipped with a HEPA filtered vacuum dust collection system. Cowling on the dust collection system for orbital-type tools must be capable of maintaining a continuous tight seal with the surface being abated. Cowling on the dust collection system for reciprocating-type tools shall promote an effective vacuum flow of loosened dust and debris. Inflexible cowlings may be used on flat surfaces only. Flexible contoured cowlings are required for curved or irregular surfaces.
 - b. Provide HEPA vacuums that are high performance designed to provide maximum static lift and maximum vacuum system flow at the actual operating vacuum

condition with the shroud in use. The HEPA vacuum shall be equipped with a pivoting vacuum head.

- c. Remove lead paint from surface down to required level of removal (i.e. stabilized surface, bare substrate with no trace of residual pigment, etc.). Use chemical methods, hand scraping, and dental picks to supplement abrasive removal methods as necessary.
 - d. Protect adjacent surfaces from damage from abrasive removal techniques.
 - e. “Sandblasting” type removal techniques shall not be allowed.
4. Component Removal/Replacement:
- a. Wet down components which are to be removed to reduce the amount of dust generated during the removal process.
 - b. Remove components utilizing hand tools, and follow appropriate safety procedures during removal. Remove the components by approved methods which will provide the least disturbance to the substrate material. Do not damage adjacent surfaces.
 - c. Clean up immediately after component removals have been completed. Remove any dust located behind the component removed.

G. Prohibited Removal Methods:

The use of heat guns in excess of 700 degrees Fahrenheit to remove lead paint is prohibited.

The use of sand, steel grit, air, CO₂, baking soda, or any other blasting media to remove lead or lead paint without the use of a HEPA ventilated contained negative pressure enclosure is prohibited.

Power/pressure washing shall not be used to remove lead paint.

Compressed air shall not be utilized to remove lead paint.

Chemical strippers containing Methylene Chloride are prohibited. Any chemical stripping may be prohibited on a project by project basis.

Power tool assisted grinding, sanding, cutting, or wire brushing of lead paint without the use of cowed HEPA vacuum dust collection systems is prohibited.

Lead paint burning, busting of rivets painted with lead paint, welding of materials painted with lead paint, and torch cutting of materials painted with lead paint is prohibited. Where cutting,

welding, busting, or torch cutting of materials is required, lead paint in the affected area must be removed first.

Chemical stripping of coatings from bridge components is generally prohibited unless specifically allowed on a project by project basis.

H. Clean-up and Visual Inspection:

The Contractor shall remove and containerize all lead waste material and visible accumulations of debris, paint chips and associated items.

During clean-up the Contractor shall utilize rags and sponges wetted with lead-specific detergent and water as well as HEPA filtered vacuum equipment.

The Engineer will conduct a visual inspection of the work areas in order to document that all surfaces have been maintained as free as practicable of accumulations of lead in accordance with 29 CFR 1926.62(h). If visible accumulations of waste, debris, lead paint chips or dust are found in the work area, the Contractor shall repeat the cleaning, at the Contractor's expense, until the area is in compliance. The visual inspection will detect incomplete work, damage caused by the abatement activity, and inadequate clean up of the work site.

I. Post-Work Regulated Area Deregulation:

Following an acceptable visual inspection, any engineering controls implemented may be removed.

A final visual inspection of the work area shall be conducted by the Competent Person and the Project Monitor or Engineer to ensure that all visible accumulations of suspect materials have been removed and that no equipment or materials associated with the lead paint removal remain. If this final visual inspection is acceptable, the Contractor will reopen the Regulated Area and remove all signage.

The Contractor shall restore all work areas and auxiliary areas utilized during work to conditions equal to or better than original. Any damage caused during the performance of the work activity shall be repaired by the Contractor at no additional expense to the State.

J. Waste Disposal/Recycling:

Non-metallic building debris waste materials tested and found to be non-hazardous Construction and Demolition (C&D) bulky waste shall be disposed of properly at a CTDEEP approved Solid Waste landfill as described under this Item 0020903A.

Metallic debris shall be segregated and recycled as scrap metal at an approved metal recycling facility.

Concrete, brick, etc. coated with any amount of lead paint cannot be crushed, recycled or buried on-site to minimize waste disposal unless tested and found to meet the RSR GA/Residential standards.

Hazardous lead debris shall be disposed of as described under this Item 0020903A.

The Contractor shall comply with the latest requirements of the USEPA RCRA Hazardous Waste Regulations 40 CFR 260-274 and the DEEP Hazardous/Solid Waste Management Standards 22a-449(c).

Hazardous lead debris shall be transported from the Project by a licensed hazardous waste transporter approved by the Department and disposed of at an EPA-permitted and Department-approved hazardous waste landfill within 90 days from the date of generation.

The Contractor must use one or more of the following Department-approved disposal facilities for the disposal of hazardous waste:

Clean Earth of North Jersey, Inc., (CENJ) 115 Jacobus Avenue, South Kearny, NJ 07105 Phone: (973) 344-4004; Fax: (973) 344-8652	Clean Harbors Environmental Services, Inc. 2247 South Highway 71, Kimball, NE 69145 Phone: (308) 235-8212; Fax: (308) 235-4307
Clean Harbors of Braintree, Inc. 1 Hill Avenue, Braintree, MA 02184 Phone: (781) 380-7134; Fax: (781) 380-7193	ACV Enviro(CycleChem)(General Chem Co) 217 South First Street, Elizabeth, NJ 07206 Phone: (908) 355-5800; Fax (908) 355-0562
Triumverate (EnviroSafe Corp Northeast) (Jones Environmental Services (NE), Inc.) 263 Howard Street, Lowell, MA 01852 Phone: (978) 453-7772; Fax: (978) 453-7775	US Ecology Environmental Quality Detroit, Inc. 1923 Frederick Street, Detroit, MI 48211 Phone: (800) 495-6059; Fax: (313) 923-3375
Stericycle (Republic Environmental Systems) 2869 Sandstone Drive, Hatfield, PA 19440 Phone: (215) 822-8995; Fax: (215) 997-1293	Clean Harbors – Spring Grove Facility 4879 Spring Grove Ave, Cincinnati OH 45322 Phone: (513) 681-6242; Fax: (513) 681-0869
Envirite of PA (US Ecology) 730 Vogelsong Road, York, PA 17404 Phone: (717) 846-1900; Fax: (717) 854-6757	Stablex, Canada, Inc. 760 Industrial Bl, Blainville Quebec J7C3V4 Phone: (451) 430-9230; Fax: (451) 430-4642
Environmental Quality Company: Wayne Disposal Facility 49350 North I-94 Service Drive Belleville, MI 48111 Phone: (800) 592-5489; Fax: (800) 592-5329	Stericycle (Northland Environmental, Inc.) (PSC Environmental Systems) 275 Allens Avenue, Providence, RI 02905 Phone: (401) 781-6340; Fax: (401) 781-9710

No facility may be substituted for the one(s) designated in the Contractor's submittal without the Engineer's prior approval. If the material cannot be accepted by any of the Contractor's designated facilities, the Department will supply the Contractor with the name(s) of other acceptable facilities.

Prior to the generation of any hazardous waste, the Contractor shall notify the Engineer of its selected hazardous waste transporter and disposal facility. The Contractor must submit to the Engineer (1) the transporter's current US DOT Certificate of Registration and (2) the transporter's current Hazardous Waste Transporter Permits for the State of Connecticut, the hazardous waste destination state and any other applicable states. The Engineer will then obtain on a contiguous per site basis a temporary EPA Generators ID number for the site that he will forward to the Contractor. Any changes in transporter or facility shall be immediately forwarded to the Engineer for review.

Handling, storage, transportation and disposal of hazardous waste materials generated as a result of execution of this project shall comply with all Federal, State and Local regulations including the USEPA RCRA Hazardous Waste Regulations (40 CFR Parts 260-271), the CTDEEP Hazardous Waste Regulations (22a-209 and 22a-449(c)), and the USDOT Hazardous Materials Regulations (49 CFR Part 171-180).

All debris shall be contained and collected daily or more frequently as directed by the Engineer, due to debris buildup. Debris shall be removed by HEPA vacuum collection. Such debris and paint chips shall be stored in leak-proof storage containers in the secured storage site, or as directed by the Engineer. The storage containers and storage locations shall be reviewed by the Engineer and shall be located in areas not subject to ponding. Storage containers shall be placed on pallets and closed and covered with tarps at all times except during placement, sampling and disposal of the debris.

Hazardous waste materials are to be properly packed and labeled for transport by the Contractor in accordance with EPA, CTDEEP and USDOT regulations. The disposal of debris characterized as hazardous waste shall be completed within 90 calendar days of the date on which it began to be accumulated in the lined containers. Storage of containers shall be in accordance with current DEEP/EPA procedures.

The Contractor shall label hazardous waste storage containers with a 6-inch square, yellow, weatherproof, Hazardous Waste sticker in accordance with USDOT regulations.

Materials other than direct paint related debris which are incidental to the paint removal work activities (tarps, poly, plywood, PPE, gloves, decontamination materials, etc.) which may be contaminated with lead, shall be stored separately from the direct paint debris, and shall be sampled by the Engineer for waste disposal characterization testing. Such materials characterized as hazardous shall be handled/disposed of as described herein, while materials characterized as non-hazardous shall be disposed of as non-hazardous CTDEEP Solid Waste.

Direct paint related debris materials not previously sampled and characterized for disposal, which may be originally presumed to be hazardous waste, shall also be stored separately and sampled by the Engineer for ultimate waste disposal characterization testing and handled/disposed of based on that testing.

Project construction waste materials unrelated to the paint removal operations shall NOT be combined/stored with paint debris waste and/or incidental paint removal materials as they are not lead contaminated and shall NOT be disposed of as hazardous waste. The Engineer's on-site Inspectors shall conduct inspections to verify materials remain segregated.

The Contractor shall obtain and complete all paperwork necessary to arrange for material disposal, including disposal facility waste profile sheets. It is solely the Contractor's responsibility to co-ordinate the disposal of hazardous materials with its selected treatment/recycling/disposal facility(s). Upon receipt of the final approval from the facility, the Contractor shall arrange for the loading, transport and treatment/recycling/disposal of the materials in accordance with all Federal and State regulations. **No claim will be considered based on the failure of the Contractor's disposal facility(s) to meet the Contractor's production rate or for the Contractor's failure to select sufficient facilities to meet its production rate.**

The Contractor shall process the hazardous waste such that the material conforms with the requirements of the selected treatment/disposal facility, including but not limited to specified size and dimension. Refusal on the part of the treatment/disposal facility to accept said material solely on the basis of non-conformance of the material to the facility's physical requirements is the responsibility of the Contractor and no claim for extra work shall be accepted for reprocessing of said materials to meet these requirements.

All DOT shipping documents, including the Uniform Hazardous Waste Manifests utilized to accompany the transportation of the hazardous waste material shall be prepared by the Contractor and reviewed/signed by an authorized agent representing ConnDOT, as Generator, for each load of hazardous material that is packed to leave the site. The Contractor shall not sign manifests on behalf of the State as Generator. The Contractor shall forward the appropriate original copies of all manifests to the Engineer the same day the material leaves the Project site.

Materials not related to lead paint removal and/or characterized as non-hazardous waste shall NOT be shipped for hazardous waste disposal in accordance with USEPA RCRA hazardous waste minimization requirements.

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

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

- All vehicles departing the site are to be properly logged to show the vehicle identification, driver's name, time of departure, destination, and approximate volume, and contents of materials carried. Vehicles shall display the proper USDOT placards for the type and quantity of waste;

- No materials shall leave the site unless a disposal facility willing to accept all of the material being transported has agreed to accept the type and quantity of waste;
- Documentation must be maintained indicating that all applicable laws have been satisfied and that the materials have been successfully transported and received at the disposal facility; and,
- The Contractor shall segregate the waste streams (i.e. concrete, wood, etc.) as directed by the receiving disposal facility.

Any spillage of debris during disposal operations during loading, transport and unloading shall be cleaned up in accordance with EPA 40 CFR 265 Subparts C & D, at the Contractor's expense.

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

K. Project Closeout Data:

Provide the Engineer, within thirty (30) days of completion of the project site work, a compliance package; which shall include, but not be limited to, the following:

1. Competent persons (supervisor) job log;
2. OSHA-compliant personnel air sampling data;
3. Completed waste shipment papers for non-hazardous lead construction and demolition (C&D) waste disposal or recycling and scrap metal recycling.
4. Copies of completed Hazardous Waste Manifests (signed by authorized disposal facility representative).

Method of Measurement:

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

Basis of Payment:

The lump sum price bid for this item shall include: services, materials, equipment, all permits, notifications, submittals, personal air sampling, personal protection equipment, temporary enclosures, incidentals, fees and labor incidental to activities impacting lead removal, treatment and handling of lead contaminated materials, and the transport and disposal of any hazardous and/or non-hazardous, non-RCRA lead waste.

Final payment will not be made until all project closeout data submittals have been completed and provided to the Engineer. Once the completed package has been received in its entirety and accepted by the Engineer, final payment will be made to the Contractor.

<u>Pay Item</u>	<u>Pay Unit</u>
Lead Compliance for Miscellaneous Exterior Tasks	Lump Sum

ITEM #0204151A - HANDLING WATER

Description: Work under this item shall consist of designing, furnishing, installing, maintaining, removing and disposing of a temporary water handling system. This may include water-handling-cofferdams (temporary barriers), bypass pipes, bypass pumps/hoses, temporary energy dissipation, sumps, drainage channels, and equipment and work necessary for dewatering.

A temporary water handling system redirects surface water beyond, through, or around the limits of construction to allow work to be done in the dry.

The existing drainage ditch located at Station 16+00 LT, which conveys water from a 15" RCP from the south, a paved ditch from the west, and a paved leak-off from Bucks Hill Road, to a 30" CMP is to be temporarily filled to provide access for a utility pole relocation. The purpose of this item is to allow these three points of water entry to continue to flow into the 30" CMP and be conveyed away from the construction site.

PLN-01 in the 02.02.-Highways Subset shows a suggested plan for allowing water to flow through this area. The suggested work includes installing a Type "C-L" Drop Inlet in front of the headwall for the 30" CMP outlet at approximately Station 16+20 LT. This Drop Inlet will receive a temporary pipe from the paved ditch to the west, a temporary pipe from the 15" CMP outlet to the south and surface runoff from a proposed temporary swale formed in the crushed stone access road.

The swale will be constructed using the 2" crushed stone and a layer of geotextile. This swale will convey water from the roadway, that initially flowed into the existing ditch by way of a paved leaked-off, to the Type "C-L" Drop Inlet.

As described in the Construction Methods section, the Contractor shall describe and detail the proposed work and submit for review.

Materials: The materials required for this work shall be as shown on the plans, on the accepted working drawings, or as ordered by the Engineer.

Construction Methods: The Contractor shall prepare and submit written procedures for handling water. Working drawings, in accordance with Article 1.05.02, shall also be prepared and submitted.

The Contractor shall consider stream conditions and water elevations associated with the Site to determine the type of temporary water handling system required to redirect water away from work being performed. The system shall be designed to be compatible with the stage construction and Maintenance and Protection of Traffic, as indicated in the Contract, and shall conform to Section 1.10.

The Contractor shall be responsible for maintenance of the water handling system. If the system becomes damaged or displaced during construction, the system shall be corrected as required.

Unless otherwise provided or directed, all temporary water handling system components shall be removed and disposed of in an acceptable manner when no longer required.

Method of Measurement: The work under this item, being paid on a lump sum basis, will not be measured for payment.

Basis of Payment: This work will be paid for at the Contract lump sum price for “Handling Water” complete and accepted, which price shall include designing (including submittals and working drawings), furnishing, installing, maintaining, removing, and disposing of all temporary water handling system components as are necessary for completion of the work. This price shall include all materials, equipment, tools, labor and work incidental thereto.

A schedule of values for payment shall be submitted to the Engineer for review and comment.

Pay Item	Pay Unit
Handling Water	l.s.

ITEM #0404101A - BITUMINOUS CONCRETE PATCHING - PARTIAL DEPTH

Description: This work shall consist of sawcutting, removing and properly disposing of deteriorated bituminous concrete pavement, regrading and recompacting the existing granular base, cleaning and application of tack coat on the vertical faces of the sawcut, and placement of Hot-Mix Asphalt (HMA) or an equivalent Polymer Modified Asphalt (PMA) at the same thickness as surrounding pavement (minimum 6 inches) and as shown on the plans.

Materials: Materials for this work shall meet the requirements of Section M.04 and shall consist of the following:

1. HMA S0.5, HMA S0.375 (when requested by the Contractor and approved by the Engineer at least 5 days in advance), or an equivalent PMA. All HMA or PMA shall be Traffic Level 2 unless indicated otherwise on the plans.
2. Tack coat.

Construction Methods: Equipment for this work shall include pavement cutting, removal, material handling, and small compaction equipment to perform all patching operations. The Contractor shall provide a tack coat distributor with a minimum 150-gallon capacity tank that is trailer mounted or self-propelled and capable of applying tack coat meeting the requirements of Section 4.06. The Contractor shall also provide a 10-foot straightedge. If the work is performed at night a portable truck towed light tower and driver shall be provided for use by the Engineer for all marking, installation, and inspection of the patches.

All equipment used to place and compact the HMA or PMA shall meet the requirements of Section 4.06. Due to the nature of this work, the equipment shall be small to medium size to fit excavated areas to be patched. It is also expected that placement of HMA or PMA will require hand work or a combination of equipment and hand work methods and tools to achieve the required results.

1. The Engineer will mark out areas for patching. The minimum dimension of areas to be patched shall be 24 inches. Any area to be patched shall completely encompass the entire distressed pavement area and extend at least 6 inches beyond into the surrounding pavement wherever possible.
2. Sawcut at the marked areas through the full depth of the bituminous concrete pavement.
3. Remove existing pavement from within the sawcut minimizing disturbance of the existing granular base.
4. Regrade the existing granular base and recompact it using jumping jack or vibratory plate compactors. A minimum of 4 passes or coverages must be made by the compaction device. If existing granular base material is lost during the excavation of the deteriorated pavement, the Contractor shall add material meeting the requirements of Section 3.04. Compaction of the granular base material shall meet the density requirements of Section 3.04.

5. If it is determined that poor or inadequate granular base is contributing to the distress in the asphalt layers, the Engineer may direct that it be removed and Processed Aggregate Base be placed and compacted.
6. The cut sides/walls of the excavated area shall be wiped or swept clean. Tack coat shall be applied covering the entire area of the vertical bituminous concrete faces and allowed to cure or break.
7. HMA S0.5 or PMA S0.5 shall be placed in lifts between 2 inches and 3 inches, shall have a final lift thickness placed at 2 inches, and be placed as shown in the plans. HMA S0.375 or PMA S0.375 shall be placed in lifts between 1.5 inches and 2.5 inches, shall have a final lift thickness placed at 1.5 inches, and be placed as shown in the plans. Pavement placement shall also be in accordance with Subarticle 4.06.03-6. The Contractor shall confirm that the surface elevation of the finished patch matches the elevation of the surrounding pavement surface to within 1/4 inch using the 10-foot straightedge. The Contractor shall confirm that all patch material placed is uniform in appearance without segregation.
8. All excavated materials shall be properly disposed of at the end of the work shift.

Method of Measurement: This work will be measured by the number of square yards of patched bituminous concrete completed and accepted.

Basis of Payment: This work will be paid for at the Contract unit price per square yard for “Bituminous Concrete Patching - Partial Depth” completed and accepted. The price shall include all tools, materials, labor and equipment, including sawcutting, pavement removal and disposal, grading and compaction of existing granular base, cleaning, tack coat application, and HMA or PMA placement and compaction.

There will be no additional compensation for replacing granular base material lost during the excavation of the deteriorated pavement.

Inadequate or poor granular base foundations that cannot be recompacted as determined by the Engineer will be paid for at the Contract unit price per cubic yard of “Processed Aggregate Base.”

Pay Item	Pay Unit
Bituminous Concrete Patching - Partial Depth	s.y.

ITEM #0406196A - JOINT AND CRACK FILLING OF BITUMINOUS CONCRETE PAVEMENT

Description: This work consists of furnishing and applying a hot-applied mixture of Performance Graded (PG) asphalt binder and polyester fibers into bituminous concrete pavement joints and cracks. It shall be constructed in close conformity with the lines, grades, thicknesses, and typical cross sections shown on the plans or established by the Engineer. Joint and Crack Filling in Bituminous Concrete Pavement may be used in conjunction with other repair treatments including, joint and crack sealing or patching, in which case the sequence of treatments will be provided in the plans or directed by the Engineer.

For the purposes of this document, the word “crack” includes all longitudinal (along the direction of travel) and transverse (perpendicular to the direction of travel) cracks and joints. All work specified for “crack(s)” herein shall apply to all types of cracks and joints unless otherwise specified.

Materials: The hot-applied crack filling material shall be composed of a mixture of Performance Graded Asphalt Binder and polyester fibers blended to provide $3\% \pm 0.5\%$ fibers by weight. No field mixing of the fibers is allowed. The crack filling material (with fibers) shall be prepackaged, labeled and arrive on Site ready to be placed in the melter applicator. The component materials shall meet the following requirements:

1. Polyester Fibers: A Materials Certificate shall be provided by the manufacturer for this material. The polyester fibers must meet the following requirements:

Property	Test Method	Requirement
Length	N/A	0.25 inch \pm 2 mils (6.4mm \pm 0.05mm)
Crimps	ASTM D3937	None
Tensile Strength*	ASTM D2256	69,600 psi (480 MPa), minimum
Denier*	ASTM D1577	3.0 – 6.0
Specific Gravity	N/A	1.32 – 1.40
Melting Temperature	N/A	473°F (245°C), minimum
Ignition Temperature	N/A	1000°F (540°C), minimum

* This data must be obtained prior to cutting the fibers.

2. Performance Graded (PG) Asphalt Binder: The Performance Graded (PG) Asphalt Binder shall be PG 64E-22 (PG 76-22) and 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 asphalt binder specific gravity at 77°F, rotational viscosity at 275°F and 329°F, and a mixing and compaction viscosity-temperature chart as if the asphalt binder were to be used as binder for the construction of hot mix asphalt. The blending of PG asphalt binder from different suppliers is strictly prohibited. Contractors who blend PG asphalt

binders will be classified as a "Supplier" and will be required to certify the asphalt binder in accordance with AASHTO R 26(M).

3. Optional Barrier Material - Clean, Dry Sand: Sand shall conform to the requirements of Standard Specification Article M.01.03, Fine Aggregates, except that the gradation requirements shall be replaced with the following:

Square Mesh Sieve	Percent Passing by Weight
No. 8	100
No. 50	10 – 40
No. 100	0 – 10
No. 200	0 – 3

The Contractor must submit to the Engineer all Material Safety Data Sheet and Certified Test Report documents from the material manufacturer(s) prior to the commencement of work. During work progress, the Contractor must submit to the Engineer the manufacturer's Material Certificate for compliance to applicable specifications for each batch or lot of material used on the Contract.

Construction Methods: The crack filling operation shall proceed in accordance with the requirements of the "Maintenance and Protection of Traffic" and "Prosecution and Progress" specifications.

1. Equipment: The equipment used by the Contractor shall include, but not be limited to, the following:
- a. **Melter Applicator:** The unit shall consist of a boiler kettle equipped with pressure pump, hose, and applicator wand; the boiler kettle may be a combination melter and pressurized applicator of a double-boiler type with space between the inner and outer shells filled with heat transfer oil. Heat transfer oil shall have a flash point of not less than 600°F. The kettle shall include a temperature control indicator. The kettle shall be capable of maintaining the crack fill material at the manufacturer's specified application temperature range. The kettle shall include an insulated applicator hose and application wand. The hose shall be equipped with a shutoff control. The kettle shall include a mechanical fullsweep agitator to provide continuous blending. The unit shall be equipped with thermometers to monitor the material temperature and the heating oil temperature. The unit shall be equipped with thermostatic controls that allow the operator to regulate material temperature up to at least 425°F.
 - b. **Application Wand and Squeegee Applicator:** The material shall be applied with a wand followed by a squeegee applicator. The squeegee applicator shall be of commercial/industrial quality designed with a "U" shaped configuration. It shall be of a size adequate to strike off, flush with the surrounding pavement surface and without overflow around the sides, all crack fill material placed. This tool shall be either attached to the applicator wand or used separately as its own long handled tool.

- c. Hot Air Lance: The unit shall be designed for cleaning and drying the pavement surface cracks. Minimum compressed air capacity shall be 100 psi. The compressed air emitted from the tip of the lance shall be capable of achieving a temperature of at least 1500°F.
 - d. Vertically Mounted Power Driven Wire Brush: This tool shall be used to remove any dirt, debris, or vegetation to the depths specified that cannot be removed by the hot air lance. It shall be of adequate size and power to remove all material from cracks as specified.
2. Weather Requirements: Work shall not be performed unless the pavement is dry. No frost, snow, ice, or standing water may be present on the roadway surface or within the cracks. The ambient temperature must be 40°F and rising during field application operations for work to proceed.
 3. Material Mixing Procedure: The prepackaged material shall be added to the melter applicator in the presence of the Engineer. It shall then be mixed and heated to the recommended application temperature. The crack fill material shall never exceed 400°F.
 4. Determination of Cracks to be Filled: The width and depth requirements for cracks to be filled are as follows:

All crack width determinations shall be made by measuring the crack width flush at the surface of the pavement prior to being filled. A straightedge shall be used whenever necessary to establish the location or limits of the flush surface of the pavement.

All cracks from ¼ inch up to 1.5 inches wide shall be prepared and filled as stated below. Cracks that are between ¼ inch and 1.5 inches wide, but eventually taper in width below the minimum ¼ inch, shall also be prepared and filled as stated below. Only cracks that are less than ¼ inch wide throughout their entire length shall be excluded.

Transverse cracks, where a portion of the crack (50% or less) exceeds a width of 1.5 inches, up to 2 inches, shall also be prepared and filled as stated below.

All joints to be filled that are raveled (loss of the pavement surface material) shall be at least ½ inch in depth at the joint's deepest point. The minimum width of a raveled joint must be ½ inch. The maximum width of a raveled joint to be filled is 3 inches.

Any cracks exceeding the width and depth requirements specified above shall be repaired using separate items.

5. Crack Preparation: Cracks to be filled shall be treated with a hot air lance prior to application of the crack fill material. Two (2) passes minimum shall be made with the hot air lance. The hot air lance operation shall proceed at a rate no greater than 120 feet per minute. There shall

be no more than 10 minutes between the second hot air lance treatment and the material application. Should this time be exceeded, additional pass(es) shall be made with the hot air lance.

The use of the hot air lance is not intended to heat the crack. It is to be used to blow all debris from the crack to the depths specified below and to remove any latent moisture from the crack until the inside of the crack is completely dry as determined by the Engineer. "Moisture" does not include standing water. The hot air lance is not to be used to boil off or blow standing water from the bottom of a crack. If standing water is present in the bottom of any crack, the filling operation shall be postponed until such time that the standing water evaporates naturally. The Contractor may use compressed, oil-free air (not heated) to blow standing water from a crack to help accelerate the natural evaporation process. If standing water remains after using compressed air, the crack shall be allowed to dry naturally until remaining standing water evaporates. The hot air lance may be used after visible water has evaporated. If a crack is already completely dry as determined by the Engineer, the hot air lance shall be operated at its lowest temperature possible.

The hot air lance shall be used to blow all debris from cracks (not including raveled joints) to a depth of at least $\frac{3}{4}$ inch for cracks between $\frac{1}{4}$ inch and $\frac{3}{4}$ inch wide, and to a depth of 1.25 inches for cracks between $\frac{3}{4}$ inch and 2 inches wide. The hot air lance shall be used to blow all debris from raveled joints to a depth of 1 inch or the full depth of the joint, whichever is smaller.

In the event that cracks are packed tightly with debris, dirt, vegetation, or other material, except previously placed sealant or filler, the Contractor shall use a vertically mounted power driven wire brush to remove all material and burnish the sides of the crack to the depths specified above. Cracks treated with the power driven wire brush shall subsequently be treated with a hot air lance as described in this section. The use of both the power driven wire brush and the hot air lance shall result in the complete removal of all material in the crack (except previously placed sealant or filler) to the depths specified above such that the sides of the crack are completely free and clean of any debris and moisture.

In the event that cracks have depths greater than 2 inches below the pavement surface, the Contractor may place a barrier composed of clean, dry sand as specified herein. The barrier material shall be placed in a manner leaving 1.25 inches below the elevation of the pavement surface for crack filling material. A barrier will not be allowed for cracks wider than 1.5 inches or less than $\frac{1}{2}$ inch wide.

6. Crack Filling: As soon as cracks have been prepared, they shall be filled to refusal along their entire length. The treatment material shall be maintained at the manufacturer's specified/recommended application temperature range at all times. The filling operation shall be suspended if the temperature of the crack filling material falls outside the specified temperature range and shall remain suspended until the crack filling material is brought within the specified temperature range. Filled cracks are to be squeegeed immediately following application of the crack filling material, striking excess filler flat to the adjacent

pavement surface. There shall be no build-up of treatment material above or adjacent to the crack at any time. If the initial application of crack fill material fails to fill the crack or shrinks upon cooling such that there is a depression formed of at least ¼ inch or greater, a second application of filler shall be placed over the first application.

7. Protection of Filled Cracks: Traffic shall not be permitted on the pavement until the crack fill material is set so that the material does not track and is not deformed or pulled out by tires. If the work under this item is being performed prior to placing a hot mix overlay or other surface treatment, a detackifier or blotting agent will not be allowed. If work under this item is not followed by placement of an overlay of any kind, a detackifier or blotting agent may be used. If a detackifier or blotting agent is used, it shall be one recommended by the supplier of the crack filling material and shall be used as recommended by the supplier, except that no paper, cotton, or other organic materials shall be allowed. Information on the type and usage of a detackifier or blotting agent shall be presented to the Engineer for their written acceptance prior to use.
8. Removal and Disposal of Material: All debris generated from the operations described above shall be removed from the roadway by the Contractor.

Treatment material remaining in the Contractor’s kettle at the close of the daily work session shall be discarded. At no time shall treatment material be re-heated for use in subsequent crack filling applications unless permitted by the Engineer following a review of specific circumstances.

All debris and surplus treatment material shall be properly disposed in accordance with Article 1.10.03 and State of Connecticut law.

9. Acceptance of Work: When the work is complete, an inspection shall be scheduled with the Engineer. The Engineer will note all deficiencies including, but not limited to, areas exhibiting adhesion failure, cohesion failure, tracking of filler material, and missed cracks. Work identified by the Engineer as not acceptable shall be repaired at the Contractor’s expense. The Contractor shall notify the Engineer upon completion of any corrective work performed.

Method of Measurement: This work will be measured by the total Project area in square yards of bituminous concrete roadway surface, as indicated in the plans and as measured, verified, and accepted by the Engineer.

Basis of Payment: This work will be paid for at the Contract unit price per square yard for "Joint and Crack Filling in Bituminous Concrete Pavement" complete and accepted in place. The price shall include all submittals, materials, equipment, tools, and labor incidental thereto. No payment will be made to the Contractor prior to submittal of required documents.

Pay Item	Pay Unit
Joint and Crack Filling in Bituminous Concrete Pavement	s.y.

ITEM #0406999A - ASPHALT ADJUSTMENT COST

Description: The Asphalt Adjustment Cost will be based on the variance in price for the performance-graded binder component of hot mix asphalt (HMA), Polymer Modified Asphalt (PMA), and Ultra-Thin Bonded Hot-Mix Asphalt mixtures completed and accepted during the Contract.

The Asphalt Price is available on the Department of Transportation website at:

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

Construction Methods:

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

- I. For HMA and PMA mixtures:
 - a. The HMA or PMA mixture for which the adjustment would be applied is listed as a Contract item with a pay unit of tons.
 - b. *The total quantity for all HMA and PMA mixtures in the Contract or individual purchase order (Department of Administrative Service contract awards) exceeds 1000 tons or the Project duration is greater than 6 months.*
 - c. The difference between the posted *Asphalt Base Price* and *Asphalt Period Price* varies by more than \$5.00 per ton.
- II. For Ultra-Thin Bonded HMA mixtures:
 - a. The Ultra-Thin Bonded HMA mixture for which the adjustment would be applied is listed as a Contract item.
 - b. The total quantity for Ultra-Thin Bonded HMA mixture in the Contract exceeds:
 - i. 800 tons if the Ultra-Thin Bonded HMA item has a pay unit of tons.
 - ii. 30,000 square yards if the Ultra-Thin Bonded HMA item has a pay unit of square yards.

Note: The quantity of Ultra-Thin Bonded HMA measured in tons shall be determined from the material documentation requirements set forth in the Ultra-Thin Bonded HMA item Special Provision.
 - c. The difference between the posted *Asphalt Base Price* and *Asphalt Period Price* varies by more than \$5.00 per ton.
 - d. No Asphalt Adjustment Cost will be applied to the liquid emulsion that is specified as part of the Ultra-Thin Bonded HMA mixture system.
- III. Regardless of the binder used in all HMA or PMA mixtures, the Asphalt Adjustment Cost will be based on PG 64-22.

The Connecticut Department of Transportation (CTDOT) will post on its website, the average per ton selling price (asphalt price) of the performance-graded binder. The average is based on the high and low selling price published in the most recent available issue of the **Asphalt Weekly Monitor®** furnished by Poten & Partners, Inc. under the “East Coast Market – New England, New Haven, Connecticut area,” F.O.B. manufacturer’s terminal.

The selling price furnished from the Asphalt Weekly Monitor ® is based on United States dollars per standard ton (US\$/ST).

Method of Measurement:

Formula: $HMA \times [PG\%/100] \times [(Period\ Price - Base\ Price)] = \$$
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where

- **HMA:**
 1. For HMA, PMA, and Ultra-Thin Bonded HMA mixtures with pay units of tons:
The quantity in tons of accepted HMA, PMA, or Ultra-Thin Bonded HMA mixture measured and accepted for payment.
 2. For Ultra-Thin Bonded HMA mixtures with pay units of square yards:
The quantity of Ultra-Thin Bonded HMA mixture delivered, placed, and accepted for payment, calculated in tons as documented according to the Material Documentation provision (Construction Methods, paragraph G) of the Ultra-Thin Bonded HMA Special Provision.
- **Asphalt Base Price:** The asphalt price posted on the CTDOT website 28 days before the actual bid opening posted.
- **Asphalt Period Price:** The asphalt price posted on the CTDOT website during the period the HMA or PMA mixture was placed.
- **PG%:** Performance-Graded Binder percentage
 1. For HMA or PMA mixes:
 - PG% = 4.5 for HMA S1 and PMA S1
 - PG% = 5.0 for HMA S0.5 and PMA S0.5
 - PG% = 6.0 for HMA S0.375, PMA S0.375, HMA S0.25 and PMA S0.25
 2. For Ultra-Thin Bonded HMA mixes:
PG% = Design % PGB (Performance Graded Binder) in the approved job mix formula, expressed as a percentage to the tenth place (e.g. 5.1%)

The asphalt adjustment cost shall not be considered as a changed condition in the Contract as result of this provision since all bidders are notified before submission of bids.

Basis of Payment: The "Asphalt Adjustment Cost" will be calculated using the formula indicated above. A payment will be made for an increase in costs. A deduction from monies due the Contractor will be made for a decrease in costs.

The sum of money shown on the Estimate and in the itemized proposal as "Estimated Cost" for this item will be considered the bid price although the adjustment will be made as described above. The estimated cost figure is not to be altered in any manner by the bidder. If the bidder should alter the amount shown, the altered figure will be disregarded and the original cost figure will be used to determine the amount of the bid for the Contract.

Pay Item	Pay Unit
Asphalt Adjustment Cost	est.

ITEM #0503151A - REMOVAL OF SUPERSTRUCTURE (SITE NO. 1)**ITEM #0503152A - REMOVAL OF SUPERSTRUCTURE (SITE NO. 2)**

Work under this item shall be in accordance with the requirements of Section 5.03 of the *Standard Specifications* amended as follows:

Description:

Replace the entire article with the following:

This work shall consist of removal and satisfactory disposal of the superstructure including any abandoned utility mains within the structure limits. Items to be removed shall include the concrete deck slab, steel beams, parapets, granite curbs, railings, bearings, bracing and any other associated items on the bridge as indicated on the plans or as ordered by the Engineer.

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

Construction Methods:

Add the following:

Prior to initiating work, the Contractor shall submit for approval, plans and written documentation describing the proposed methods of removal, and for falsework and shielding required for the protection of traffic and adjoining properties. Approval of the Contractor's plan shall not be considered as relieving the Contractor of any responsibility. Working Drawings and design computations showing the Contractor's means for temporary shielding shall be submitted to the Engineer in accordance with Article 1.05.02.

All work shall proceed as directed by and to the satisfaction of the Engineer and in accordance with the construction staging and details shown on the plans, or as approved by the Engineer.

The Contractor shall provide adequate shielding below the structure to prevent debris, tools, or other materials from entering into or dropping onto the roadway below the structure. All debris shall be promptly cleaned up and removed from the Site. The removal shall not result in damage to any permanent construction (new or existing) or to adjoining properties. If damage does occur, it shall be repaired by the Contractor to the satisfaction of the Engineer at the Contractor's expense.

Where required, the existing paint shall be removed by chemical stripping, needle guns with vacuum attachments, or by any of the closed abrasive blast cleaning techniques described in SSPC Guide 6. Open abrasive blast cleaning will not be permitted.

All the debris resulting from the paint removal operations shall be contained and collected as outlined in the special provision for Item 0020903A “Lead Compliance for Miscellaneous Exterior Tasks.” Debris within containment enclosures shall be removed by vacuum collection prior to disassembly of the enclosures. The debris, rust, and paint chips shall be stored in leak-proof storage containers at the Project Site. Debris storage shall be in accordance with Connecticut Hazardous Waste Management Regulations. The storage containers and storage locations shall be reviewed by the Engineer and shall be located in areas not subject to ponding. Storage containers shall be placed on pallets and closed and covered with tarps at all times except during placement, sampling, and disposal of the debris.

Method of Measurement:

Replace the entire Article with the following:

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

Basis of Payment:

Replace the entire Article with the following:

This work will be paid for at the Contract lump sum price for “Removal of Superstructure (Site No. X),” which price shall include all materials, equipment, tools, labor, and all work incidental to the removal of the superstructure including designing, furnishing, erecting and removing the temporary shielding. It shall also include the containment and removal of paint debris as described herein.

Collection, storage and disposal of paint debris will be paid for under the item “Lead Compliance for Miscellaneous Exterior Tasks.”

Pay Item	Pay Unit
Removal of Superstructure (Site No. 1)	l.s.
Removal of Superstructure (Site No. 2)	l.s.

ITEM #0520036A - ASPHALTIC PLUG EXPANSION JOINT SYSTEM

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

Work under this item shall also consist of the removal and disposal of bituminous concrete, membrane waterproofing, existing joint components and sealing elements, cleaning and sealing median barrier joints, parapet joints, and sidewalk joints.

Work under this item excludes the removal of Portland cement concrete headers.

Materials: The APJ component materials shall conform to ASTM D6297 and the following:

Aggregate: The aggregate shall meet the following requirements:

- a) Loss on abrasion: The material shall show a loss on abrasion of not more than 25% using AASHTO Method T96.
- b) Soundness: The material shall not have a loss of more than 10% at the end of five cycles when tested with a magnesium sulfate solution for soundness using AASHTO Method T 104.
- c) Gradation: The aggregate shall meet the requirements of Table A below:
- d) Dust: aggregate shall not exceed 0.5% of dust passing the #200 sieve when tested in accordance with AASHTO T-11.

Table A

<u>Square Mesh Sieves</u>	1" (25.0 mm)	¾" (19.0 mm)	½" (12.5 mm)	⅜" (9.5 mm)	No. 4 (4.75 mm)
% passing	100	90 - 100	20 - 55	0 - 15	0 - 5

A sample of the aggregate shall be submitted to the Department with a Certified Test Report in accordance with Article 1.06.07 for each 20 tons of loose material or its equivalent number of bags delivered to the job site. The Certified Test report must include a gradation analysis resulting from a physical test performed on the actual material that accompanies the report.

Anti-Tacking Material: This material shall be a fine graded granular material with 100% passing the 3/16" sieve and no more than 5% passing the #200 when tested in accordance with AASHTO T-27.

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

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

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

Concrete Leveling Material: Shall be a cementitious-based material that conforms to ASTM C928 Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repair, for R3 performance requirements in Table 1 and achieve the following:

- a. Final set in 45 Minutes
- b. 2500 psi compressive strength in 24 hours
- c. 5000 psi compressive strength in 7 days

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

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

Table B

Properties - As Supplied	Test Method	Requirement
Extrusion Rate	ASTM C1183	200-600 grams/min
Leveling	ASTM C639	Self-Leveling
Specific Gravity	ASTM D792	1.20 to 1.40
Properties - Mixed	Test Method	Requirement
Tack Free Time	ASTM C679	60 min. max.
Joint Elongation – Adhesion to concrete	ASTM D5329 ^{1,2,3}	600% min
Joint Modulus @ 100% elongation	ASTM D5329 ^{1,2,3}	15 psi max
Cure Evaluation	ASTM D5893	Pass @ 5 hours

1. Specimens cured at $77 \pm 3^{\circ}\text{F}$ and $50 \pm 5\%$ relative humidity for 7 days
2. Specimens size: $\frac{1}{2}$ " wide by $\frac{1}{2}$ " thick by 2" long
3. Tensile Adhesion test only

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

The two-part silicone sealants shown in Table C are known to have met the specified requirements:

Table C

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

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

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

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

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

At least 30 days prior to start of the work, the Contractor shall submit to the Engineer for approval a detailed Quality Control Plan for the installation of the APJ. The submittal shall include:

- a) A list of all manufactured materials and their properties to be incorporated in the joint system, including, but not limited to the asphaltic binder, anti-tack material, backer rod, sealant, leveling material, as well as the aggregate’s source.
- b) A detailed step by step installation procedure and a list of the specific equipment to be used for the installation. The Quality Control Plan must fully comply with the specifications and address all anticipated field conditions, including periods of inclement weather.

The APJ shall not be installed when bituminous concrete overlay or joint cutout is wet. The APJ shall only be installed when the bridge superstructure surface temperature is within the limits specified in Table D and when the ambient air temperature is within the range of 45⁰F to 95⁰F. The bridge superstructure surface temperature range is determined using the thermal movement

range provided on the contract plans for the proposed APJ deck installation location and the selected APJ product.

Table D

Installation Restrictions	
Designed Deck Joint Thermal Movement Range²	Bridge Superstructure Surface Temperature¹
0" to 1"	45° F to 95° F
1-1/8"	45° F to 90° F
1-1/4"	45° F to 80° F
1-3/8"	45° F to 70° F
1-1/2"	45° F to 65° F

- The superstructure surface temperature shall be determined from the average of three or more surface temperature readings taken at different locations on the interior girder surfaces by the Contractor as directed by the Engineer. Temperature measurements of the superstructure shall be taken by the contractor with a calibrated hand held digital infrared laser-sighted thermometer on the surfaces of an interior steel girder, or interior concrete girder protected from direct sunlight. The infrared thermometer to be supplied by the Contractor for this purpose shall meet certification requirements of EN61326-1, EN61010-1, and EN60825-1 maintained by the European Committee for Electrotechnical Standardization (CENELEC). The thermometer shall have a minimum distance-to-spot ratio of 50:1 and shall have adjustable emissivity control. The thermometer shall have a minimum accuracy value of $\pm 1\%$ of reading or $\pm 2^\circ\text{F}$, whichever is greater. The thermometer shall be used in strict accordance with the manufacturer's written directions. An additional infrared thermometer satisfying the same standards to be used in this application shall also be provided to the Engineer for quality assurance purposes.*
- Linear interpolation may be used to determine an allowable surface temperature range for thermal movement ranges in between values shown in the table, as approved by the Engineer.*

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

The APJ shall be installed symmetrically about the deck joint opening to the dimensions shown on the plans or as directed by the Engineer; not to exceed 24 inches measured perpendicular to the deck joint. The proposed saw cut lines shall be marked on the bituminous concrete overlay by the Contractor and approved by the Engineer, prior to saw-cutting. The saw-cuts delineating the edges of the APJ shall extend full depth of the bituminous concrete overlay.

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

Concrete surfaces that will support the bridging plates shall be smooth and form a plane along and across the deck joint. Rough or damaged concrete surfaces shall be repaired with a leveling compound meeting the requirements of this specification. Deteriorated concrete areas within the joint limits shall be repaired as directed by the Engineer: such repairs, when deemed necessary by the Engineer, shall be compensated for under the applicable concrete deck repair items in the Contract. The existing and repaired concrete surfaces shall provide continuous uniform support for the bridging plate and prevent the plate from rocking and deflecting.

Prior to the installation of the backer rod, all horizontal and vertical surfaces of the joint cutout shall be abrasive blast cleaned using an oil-free, compressed air supply. The entire cutout shall then be cleared of all loose blast media, dust, debris and moisture using an oil-free, hot air lance capable of producing an air stream at 3,000°F with a velocity of 3,000 feet per second.

A single backer rod, with a diameter at least 25% greater than the existing joint opening at the time of installation, shall be installed at an inch below the bridging plate in the existing deck joint opening between the concrete edges.

Asphaltic binder shall be heated to a temperature within the manufacturer's recommended application temperature range which shall be provided in the Quality Control Plan. During application, the temperature of the binder shall be maintained within this range. In no case shall the temperature of the binder go below 350° F nor exceed the manufacturer's recommended maximum heating temperature.

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

Bridging plates shall be abrasive blast-cleaned on-site prior to installation and then placed over the deck joint opening in the joint cutout. The plates shall be centered over the joint opening and secured with locating pins along its centerline. The plates shall be placed end to end, without overlap, such that the gap between plates does not exceed ¼". The plates shall extend to the gutter line and be cut to match the joint's skew angle, where concrete support exists on both sides of the joint. Within APJ installation limits, where concrete support does not exist at both sides of the joint opening (such as where a bridge deck end abuts a bituminous concrete roadway shoulder), bridging plates shall not be installed. Installed bridging plates shall not rock or deflect in any way.

After installation of bridging plates, a thin layer of asphaltic binder shall be applied to all exposed surfaces of the plates.

The remainder of the joint cutout shall then be filled with a mixture of hot asphaltic binder and aggregate prepared in accordance with the submitted Quality Control Plan and the following requirements:

- The aggregate shall be heated in a vented, rotating drum mixer by the use of a hot-compressed air lance to a temperature of between 370° F. to 380° F. This drum mixer shall be dedicated solely for the heating and, if necessary, supplemental cleaning of the aggregate. Venting of the gas and loose dust particles shall be accomplished through ¼” drilled holes spaced no more than 3” on center in any direction along the entire outside surface of the drum
- Once the aggregate has been heated, it shall then be transferred to a secondary drum mixer where it shall be fully coated with asphaltic binder. A minimum of two gallons of binder per 100lbs of stone is required.
- The temperature of the aggregate and binder shall be monitored by the contractor with a calibrated digital infrared thermometer.
- The coated aggregate shall be loosely placed in the joint cutout in lifts not to exceed 2 inches.
- Each lift shall be leveled, compacted and then flooded with hot asphaltic binder to the level of the aggregate to fill all voids in the coated aggregate layer. The surface of each lift shall be flooded until only the tips of the aggregate protrude out of the surface.
- The final lift shall be placed such that no stones shall project above the level of the adjacent overlay surface following compaction of the coated aggregate.
- Following installation of the final lift, sufficient time and material shall be provided to allow all voids in the mixture to fill. This step may be repeated as needed.
- The joint shall then be top-dressed by heating the entire area with a hot-compressed air lance and applying binder. The final joint surface must be smooth with no protruding stones and be absent of voids.
- Once top-dressed, the joint shall have an anti-tack material spread evenly over the entire surface to prevent tracking.

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

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

Sidewalk, parapet, and/or curb joint openings

Before placement of any sealing materials in parapets, curbs, or sidewalks, the joints shall be thoroughly cleaned of all scale, loose concrete, dirt, dust, or other foreign matter by abrasive blast cleaning. Residual dust and moisture shall then be removed by blasting with oil free compressed

air using a hot air lance. Projections of concrete into the joint space shall also be removed. The backer rod shall be installed in the joint as shown on the plans. The joint shall be clean and dry before the joint sealant is applied. Under no circumstances is the binder material to be used as a substitute for the joint sealant.

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

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

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

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

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

Any installed joint that exhibits evidence of failure, as determined by the Engineer, such as debonding, cracking, rutting, or shoving of the APJ mixture shall be removed and replaced full-width and full-depth to a length determined by the Engineer at no additional cost to the State.

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

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

If directed by the Engineer, additional deck repairs will be addressed and paid for under the applicable concrete deck repair items in the Contract.

ITEM #0602912A - DRILLING HOLES AND BONDING DOWELS

Description: Work under this item consists of drilling holes in concrete and bonding anchors or dowels into the holes with adhesive bonding material as shown on the plans, in accordance with the manufacturer's recommendations, and as directed by the Engineer.

Adhesive bonded anchors are composed of adhesive bonding material and steel anchors, either threaded rods or deformed reinforcing bars, with an embedment no greater than 20 times the diameter of the anchor.

Adhesive bonded dowels are composed of adhesive bonding material and deformed steel reinforcing bars embedded no less than the development length of the bar and no greater than 60 times the diameter of the reinforcing bar.

Materials: For adhesive bonded anchors, the adhesive bonding material shall meet the assessment requirements of ACI 355.4 latest edition and of ICC Evaluation Service (ICC-ES) *AC308 Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements*.

Steel anchors shall meet the requirements shown on the plans.

For adhesive bonded dowels, the adhesive bonding material shall meet the assessment requirements of ACI 355.4 latest edition and of ICC-ES *AC308 Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements* for use with reinforcing bars embedded the code required development length of the bar.

Dowels shall meet the requirements shown on the plans.

Construction Methods: The Contractor shall select adhesive bonding material based on, and compatible with, the Site conditions, the requirements shown on the plans, and the conditions for use described in the material's ICC-ES Evaluation Service Report, and shall be installed in accordance with the manufacturer's printed installation instructions (MPII).

Prior to drilling holes, the Contractor shall submit the following to the Engineer for review in accordance with Article 1.05.02 Product Data requirements:

- A copy of the ICC-ES Evaluation Service Report for the adhesive bonding material. The ICC-ES Evaluation Service Report shall have been issued or reissued no more than 2 years prior to its submission
- A copy of the adhesive bonding material manufacturer's printed installation instructions (MPII)
- type of drill and diameter of bit
- method of cleaning holes

- method of placement of the adhesive bonding material
- a copy of each installer's ACI Adhesive Anchor Installer Certification card
- a copy of the independent third party agent's ACI Adhesive Anchor Inspector Certification card

The installation of the anchors and dowels shall proceed only after the Contractor's submittal has been reviewed, stamped and returned to the Contractor and copies have been delivered to the Engineer.

The installation of the anchors and dowels with adhesive bonding material shall only be performed by installers holding current ACI Adhesive Anchor Installer Certification credentials.

The installation of the anchors and dowels with adhesive bonding material shall be in accordance with the adhesive bonding material manufacturer's printed installation instructions (MPII). The methods and equipment used to drill and clean the holes, weather conditions at the time of installation, temperature of the concrete, anchor and dowel, and the condition of the hole at time of installation shall also be in accordance with the MPII.

The anchors and dowels shall be installed in clean, dry holes (no water present) drilled into hardened concrete and bonded with adhesive bonding material. If the hole is filled with water, partially filled with water, or water entered the hole during drilling, the Contractor shall blow out the water using compressed air and allow a minimum of 24 hours before cleaning the hole and installing the anchors or dowels. The Contractor shall not install anchors or dowels in saturated, surface dry holes (holes with damp surfaces, but no standing water).

Holes for the anchors and dowels shall be located and drilled to a depth no less than the anchor embedment depth shown on the plans. A pachometer shall be used to locate existing reinforcing steel. If existing reinforcing is encountered during the drilling operation, the holes shall be relocated as noted on the plans. Core drilling through the reinforcing bars may be allowed if noted on the plans. Drilled holes that are abandoned shall be completely filled with adhesive bonding material or non-shrink grout and finished flush with the adjacent surface.

After the adhesive bonding material has fully cured in accordance the MPII, the anchors and dowels shall be field tested to verify the installation procedures and installed adhesive anchor strength.

Field testing shall be performed by an independent third party testing agency. The testing agent must have current ACI Adhesive Anchor Inspector Certification credentials.

The Contractor shall provide the testing agent with a copy of the plans and these provisions and instruct the testing agent to perform the following:

- Verify the adhesive bonding material used
- Check that the anchorage size and type matches the requirements of the Contract
- Perform all field testing in accordance with the Contract
- Record all test results on the required test form (attached)
- Sign and date the test form

The Contractor shall submit the completed, and signed test report form to the Engineer prior to installation of adjacent material.

The adhesive bonded anchors and dowels to be field tested at each location shall be randomly selected by the Engineer based on the tabulated number to be tested shown on the plans. A confined static tension test shall be performed in accordance with ASTM E448 for the proof test load shown on the plans, in the presence of the Engineer. Failure criteria of a tested anchor and dowel is defined in ASTM E488. An additional anchor or dowel shall be tested for each anchor or dowel that does not pass the field test.

All anchors and dowels that do not pass the field test shall be removed without any damage to surrounding concrete. The Contractor shall reinstall new anchors and dowels in accordance with the requirements described herein. Holes can be redrilled to remove the adhesive bonding material residue prior to new anchor or dowel installation. The anchors and dowels at the failed locations shall not be reused.

The Contractor, as directed by the Engineer, shall take adequate precautions to prevent any materials from dropping to the area below, which may result in damage to any existing construction or to adjoining property. Should any damage occur to the structure as a result of the Contractor's operations, the Contractor shall make repairs at their expense. The repair work shall be approved in advance and shall be of a quality acceptable to the Engineer.

Method of Measurement: This work will be measured for payment by the actual number of drilled holes in which anchors and dowels are embedded and accepted.

Basis of Payment: This work will be paid for at the Contract unit price each for "Drilling Holes and Bonding Anchors" or "Drilling Holes and Bonding Dowels," which price shall include drilling and preparing holes, furnishing and installing adhesive bonding material, furnishing anchors and dowels, testing of the installed anchors and dowels, and all material, equipment, tools and labor incidental thereto.

Pay Item	Pay Unit
Drilling Holes and Bonding Dowels	ea.

ITEM #0603474A - METALLIZING STRUCTURAL STEEL (SITE NO. 1)

ITEM #0603473A - METALLIZING STRUCTURAL STEEL (SITE NO. 2)

Description: Work under this item shall consist of the surface preparation, shop application of a thermal spray (metallizing) coating, shop application of a sealer and topcoat, and field painting and touch-up painting operations of new structural steel, as shown on the plans, or as directed by the Engineer.

Materials: Only one metallizing supplier and one sealer and topcoat manufacturer may be used for the Project including material supplied for field painting and touch-up painting operations.

Abrasives:

Abrasives shall conform to the following:

1. SSPC AB 1 for mineral slag abrasives
2. SSPC AB 2 for recycled ferrous metal abrasives
3. SSPC AB 3 for new steel abrasives

Thermal Spray Coating (TSC) Materials: The thermal spray coating (TSC) wire feedstock material used for metallizing must be 85%/15% (Zn/Al alloy) and meet the Chemical Composition requirements stated in Table 2 of AWS C2.25, classification W-ZnAl-2. The Contractor shall provide a Certified Test Report (CTR) in accordance with 1.06.07 for the feedstock from the feedstock supplier.

Sealer and Topcoat: The Contractor shall select one of the following semi-gloss topcoats of the color shown on the plans from the list below:

- AkzoNobel: *International Interthane 870UHS*
- Carboline: *Carbothane 133 LV*
- Sherwin Williams: *Hi-Solids Polyurethane 250*
or approved equal

The Contractor shall select a sealer compatible with the topcoat chosen. The sealer shall be capable of penetrating into the body of the TSC to seal the interconnected surface porosity as defined in AWS C2.18-93R.

The sealer and topcoats shall be packaged and sealed, in the original container with labeling bearing the manufacturer's name, type of material, brand name, shelf life, batch number, and instructions for mixing and thinning. The topcoat shall meet the color and gloss retention performance criteria of SSPC Paint 36, Level 3, for accelerated weathering. The Contractor shall provide Materials Certificates in accordance with 1.06.07.

Caulking Materials: Caulking shall be as recommended by the coating manufacturer.

Construction Methods: The Contractor shall implement procedures that comply with this specification. If a state or local regulation is more restrictive than the requirements of this specification, the more restrictive requirements shall prevail. The Contractor must comply with

all local OSHA and EPA standards and regulations, even if the regulation or standard is not specifically referenced herein.

The complete coating system shall be shop-applied except for surfaces that are otherwise listed on the plans or otherwise noted in this specification. Such surfaces shall be coated only after all members are erected, bolts are fully tensioned, and temporary deck formwork is removed. The tops of bridge girder top flanges shall be primer coated only and shall not be metallized or sealed.

Metallizing Contractor Worker Qualifications: The Metallizing Contractor shall be certified by the SSPC Painting Contractor Certification Program QP-6, entitled "Thermal Spray (Metallizing) Contractor Certification Program" in the *enclosed shop* category or be certified in the American Institute of Steel Construction (AISC) Sophisticated Paint Endorsement (SPE) category – *enclosed shop* P1 or *covered shop* P2. A list of approved contractors can be found on the AISC website at www.AISC.org.

The Metallizing Contractor shall be fully certified, including endorsements, for the duration of the time they are doing the surface preparation and coating application. The certification(s) must be kept current for the duration of the Project work. If a Contractor's, subcontractor's or any craft-worker's certification expires, the firm will not be allowed to do any work on this item until the certification is reissued. Requests for extension of time for any delay to the completion of the Project due to an inactive certification will not be considered, and liquidated damages will apply.

Each person applying a metallized coating shall be qualified according to ANSI/AWS C2.18-93R.

The Metallizing Contractor shall have a certified NACE Coatings Inspector Program (CIP) Level 3 inspector, or approved equal, on staff for the duration of the project and actively engaged in the metallizing activities before during and after the coating application.

The Metallizing Contractor and subcontractors are required to have at least one (1) **Coating Application Specialist (CAS) (SSPC ACS/NACE No. 13)** – certified (Level II-Interim Status Minimal) craft-worker. CAS-certified (Level II-Interim Status-Minimal) craft-worker(s) are required for all crews/craft-workers up to four (4) crew members. For each crew larger than four (4), an additional CAS-certified (Level II-Interim Status-Minimal) craft-worker shall be present on each painting/blasting crew during blast cleaning and spray application (Atmospheric and Immersion Service) operations. A crew-member is a person who is on the job performing hand-held nozzle blast cleaning and/or spray application of protective coatings on a steel structure. The certification(s) must be kept current for the duration of the Project work. If a Contractor's, subcontractor's or any craft-worker's certification expires, the firm will not be allowed to do any work on this item until the certification is reissued.

Submittals: The Contractor shall submit the following to the Division of Materials Testing, the Designer of Record and the Project Engineer, for review a minimum of thirty (30) days prior to metallizing.

Metallizing Quality Control (QC) Plan, including:

- A. Written procedures for the preparation of surfaces and the application of the metallizing, the sealer, and topcoat in the shop; and procedures for the repair and touch up of any damage that occurs to the newly applied metallizing or coatings. Shop and field repair procedures must be clearly identified.
- B. Hold points for surface preparation, metallizing application, adhesion testing of metallizing application and top coating thickness measurements.
- C. Identification of the metallizing and coating materials to be applied, including manufacturer's name, product names, and product numbers.
- D. Product Data Sheets, VOC levels for liquid coatings, MSD sheets, and written application instructions including mixing requirements, proposed thinners, and manufacturer's recommended thinner amounts for liquid coatings.
- E. Identification of the type and brand name of the abrasive proposed for use.
- F. Metallizing Manufacturer's Slip Critical Class B Certificate of Compliance.
- G. Copies of qualification records along with continuity logs for all thermal spray operators.
- H. Copies of NACE CIP Level 3 certifications, or approved equal, for all staff required to possess same. Copies of CAS (SSPC ACS/NACE No. 13) certifications, for all staff required to possess same.
- I. Identification of the thermal spray equipment.
- J. A work schedule that includes timelines for surface preparation, metallizing, sealing and topcoating.

Notification: Contact the Division of Materials Testing at DOT.Steel@ct.gov a minimum of two (2) weeks prior to the start of work.

Surface Preparation:

- A. Weld Spatter, Sharp Edges, and Holes: All slag, flux deposits, and weld spatter and steel irregularities such as fins, tears and slivers shall be removed from the surfaces to be metallized. Any resulting burrs from such removal shall be ground smooth, including burrs around holes. All corners and edges shall be rounded to a 0.0625 inch radius or chamfered to a 0.0625 inch chamfer.
- B. Cleaning of Steel: All visible contaminants shall be removed from surfaces in accordance with SSPC-SP 1 using only solvents or detergents.
- C. Compressed Air Cleanliness: The cleanliness of the compressed air shall be confirmed in accordance with ASTM D4285 at least once per shift for each compressor system.
- D. Surface Requirements: The required surface preparation shall meet SSPC SP 5. Surface preparation shall not be performed under damp environmental conditions or when the surface temperature of the steel is less than 5°F above the dewpoint temperature as determined by a surface thermometer and an electric or sling psychrometer.
- E. Abrasives/Profile:
 - 1. The Contractor shall use abrasives that are free of oil, soluble salts and other similar substances that could contaminate the surface.
 - 2. A uniform sharp angular profile with a profile of 3.0 to 6.0 mils shall be provided in accordance with ASTM D4417, Method B or C.
- F. Acceptance Prior to Metallizing: The cleaned surface shall be accepted by the Engineer

before application of metallizing. Failure of the Contractor to prepare and clean the surfaces to be metallized in accordance with these specifications shall be cause for rejection by the Engineer. All surfaces that are rejected shall be re-cleaned to the satisfaction of the Engineer at no additional cost to the State.

G. Pre-Production Test Section and Bend Tests:

1. The Contractor shall blast clean and metallize at least 9 square feet of steel surface prior to initiating the full-scale metallizing operation using the same metallizing equipment, set up, materials, and calibration and operating procedures in the test section(s) that shall be used for the production operations.
2. Spray parameters shall be validated by passing a bend test as follows:
 - a. Five (5) steel coupons $2 \times 8 \times 0.05$ inches shall be fabricated of the same steel grade proposed as the member being coated.
 - b. The coupons shall receive the same surface preparation, and metallizing as the actual member.
 - c. The coupons may be fastened to larger pieces of stock during the blast cleaning and metallizing operations.
 - d. Bend coupons 180 degrees around a 0.5 inch diameter mandrel.
 - e. The bend test passes if there is no cracking or only minor cracking visually observed on the bend radius.
 - f. The bend test fails if the coating cracks and lifts from the substrate.
3. Additional coupons and testing may be required by the Engineer to establish the suitability of the surface preparation and the thermal spray coating. Full-scale metallizing shall not commence until the Engineer has inspected and approved the Test Section and coupons.

Metallizing Application:

- A. Quality of Surface Preparation: The Contractor shall verify that the surface meets the specified SSPC-SP 5 surface requirements immediately prior to application of the metallized coating.
- B. Surface Cleanliness: Subsequent coats shall not be applied until overspray, spent abrasive, dirt, dust, and other contaminants have been removed in accordance with SSPC-SP 1.
- C. Ambient Conditions: Metallizing shall be applied when the relative humidity is less than 80%. Metallizing shall not be applied under damp environmental conditions or when the surface temperature of the steel is less than 5°F above the dewpoint temperature as determined by a surface thermometer and an electric or sling psychrometer.
- D. Metallizing: The coating shall be applied by thermal spray employing multiple passes to achieve a uniform thickness of 0.008 to 0.012 inches (8-12 mils) unless otherwise specified. No single pass shall deposit more than 0.004 inches.
- E. Metallizing Adhesion: Adhesion strength of the metallizing shall be 700 psi minimum as measured with approved equipment per ASTM D4541, Annex A4. Measurements shall be taken on companion coupons $4 \times 6 \times 0.25$ inches of the same steel grade as the member being coated and processed concurrently. If adhesion is less than 700 psi but greater than 560 psi, four (4) additional adhesion tests shall be made. If any of the additional adhesion tests are less than 700 psi, the coating shall be removed and re-applied. Any single adhesion test result less than 560 psi, will be justification for the Engineer to have the Contractor

remove the entire coating. All corrective action will be at the Contractor's expense.

F. Quality Control of Metallizing Operation:

1. The Metallizing Contractor shall verify proper spray equipment set up, calibration, and operating procedures by performing a bend test at the beginning of each work shift that metallizing is to be applied in accordance with requirements described in the Pre-Production Test Section.
2. In addition to the bend test, a cut test shall be performed on the companion coupons, one during the production day and one at the end of each shift, to confirm that metallizing is being properly applied. The cut test consists of a single cut 1.5 inches long through the thermal spray coating to the substrate without severely cutting the substrate. A cut shall be made with a hammer and sharp chisel. The chisel cut shall be made at a shallow angle. The bond of the metallizing is considered unsatisfactory if any part of the metallizing lifts from the substrate along the cut.
3. The Engineer shall be notified immediately of any unsatisfactory tests.

G. Bolted Connections and Other Areas:

1. The Contractor shall state in writing to the Engineer a list of areas they believe are inaccessible prior to the start of work. The Engineer will have the final determination as to the accessibility of those areas.
2. Bolted connections shall be processed in a manner that achieves the required Slip Critical Classification detailed on the approved steel Shop Drawings.
3. Thickness in bolted, Class B, connection areas shall not exceed those listed on the Metallizing Manufacturer's Class B Slip Critical Certificate of Compliance. Under no circumstance shall any thickness reading exceed 16 mils.
4. All connection points shall be appropriately masked off either before or after metalizing and prior to the application of seal coat.
5. After members have been erected in the field, all previously masked areas that remain exposed shall be thoroughly cleaned and lightly sanded by hand to receive a brush-applied coat of the same sealer and topcoat used in the shop.
6. Areas such as bolt holes, backs of snipes and other similar areas where the standard application of a metallized coating cannot be performed shall be cleaned and free of dirt and any loose overspray, and shall receive a brush applied coating of the approved coating system.
7. The top of the top flange shall be metallized. No sealer or topcoat shall be applied on this area.
8. Metallized coating applied to surfaces not required to be coated may remain if found to be tightly adhered, as determined by the Engineer.

Sealer and Topcoat Application:

A. The sealer shall be applied in a single mist coat followed by a full topcoat.

1. The Metallizing Contractor shall apply the sealer in accordance with the manufacturer's recommendations, unless otherwise specified.
2. The sealer shall be applied no more than 8 hours after application of the metallizing, and in no case shall the sealer be applied over dust, rust that may have bled through (if there was not enough thickness), loose oxides or other visible contaminants that would interfere with the sealer.

3. When conventional spray equipment is used, the Contractor shall verify that the compressed air supply is clean and dry as determined by the blotter test (ASTM D4285).
 4. The topcoat shall be applied to achieve a 4 to 6 mils dry film thickness and shall be applied after the seal coat has been allowed to dry as required by the recoat time in the manufacturer's written instructions, but in no case shall a coat remain exposed for longer than ten (10) calendar days prior to overcoating.
- B. Coverage and Continuity: All surfaces shall be completely coated and free of voids, runs, sags or other defects. Special attention shall be given to hard-to-reach or inaccessible areas and irregular surfaces. Some configurations may require spraying from multiple directions to assure complete coverage.
- C. Sealer and Topcoat Adhesion to Metallized Surfaces:
1. The Metallizing Contractor shall apply the sealer and topcoat in such a manner to assure adherence to the underlying surface. Any lifting of an underlying coat, or poor adhesion between coats or to the substrate, will require removal of the coating in the affected area to adjacent intact, adherent, coating, and reapplication of the material.
 2. Topcoat adhesion shall be verified using adhesion tests in accordance with ASTM D4541 as directed by the Engineer.
- D. Coating Thickness
1. Wet Film Thickness: The Contractor shall verify and document the thickness of each liquid coat at the time of application using wet film thickness gages in accordance with ASTM D4414.
 2. Dry Film Thickness: The dry film thicknesses of the completed coating shall be:

Metallizing	8 to 12 mils
Topcoat	<u>4 to 6 mils</u>
TOTAL SYSTEM	12 to 18 mils
- The Contractor shall measure the thickness of each coat using nondestructive magnetic dry film thickness gages. The procedure shall comply with SSPC-PA2 for the calibration and use of the gages, and the frequency of thickness measurements. Spot readings both 20% above and 20% below the thicknesses shown above are permitted, provided the average thicknesses are within the specified tolerances.

Field Required Coating Operations: Any areas requiring sealer or topcoat after erection shall be done in accordance with the previously submitted and approved field coating procedures and shall be in accordance with the manufacturer’s recommendations.

Repair of Film Discontinuities and Damage to Coating System after Erection: A repair procedure shall be submitted for concurrence by the Engineer prior to the start of repair work.

Shipping and Storage: All materials shall be shipped and stored in a manner to prevent damage from all physical and environmental factors.

Date of Completion: The words “METALLIZED AND TOPCOATED” followed by the month and year the coating of the structure is completed along with the CTDOT Project Number and the manufacturer's abbreviations, shall be stenciled on the inside of a fascia girder at mid-depth of the girder in three (3) inch high block letters located near the abutment, so as to be clearly visible from the ground below. Paint for stenciling information shall be of a contrasting color and be compatible

with the topcoat and shall be approved by the Engineer prior to application of the stenciled information.

Method of Measurement: The work under this item, being paid on a lump sum basis, will not be measured for payment.

Basis of Payment: The coating of structural steel, incorporated in the completed and accepted structure, will be paid for at the Contract lump sum price for “Metallizing Structural Steel (Site No. X).” The lump sum price shall include all materials, equipment, tools, transportation, repairs, corrective actions, inspection access, and labor incidental thereto

A schedule of values shall be submitted to the Engineer for review and comment prior to application of the metallizing coating.

Pay Item	Pay Unit
Metallizing Structural Steel (Site No. 1)	l.s.
Metallizing Structural Steel (Site No. 2)	l.s.

ITEM #0603726A - EMBEDDED GALVANIC ANODES

Description: This item includes furnishing all labor, tools, materials, equipment and services necessary to install embedded galvanic anodes within areas of concrete repair or in other locations as shown on the plans.

Materials: The galvanic anodes shall have a cast zinc core meeting the requirements of ASTM B418 Type II (Z13000) and shall be one of the following:

1. Vector Corrosion Technologies, Inc.
Galvashield XP4
8413 Laurel Fair Circle, Suite 200A
Tampa, FL 33610
Tel: (813) 830-7566
Website: www.vector-corrosion.com

2. Sika Corporation
Sika FerroGard - 675
201 Polito Avenue
Lyndurst, NJ 07071
Tel: (800)-933-7452
Website: www.sikaconstruction.com

3. BASF Corporation
Master Builders Solutions – MASTERPROTECT 8160CP
889 Valley Park Drive
Shakopee, MN 55379
Tel: (800)-243-6739
Website: www.basf.com

4. Euclid Chemical Company
Sentinel Gold
19215 Redwood Road
Cleveland, OH 44110
Tel: (800)-321-7628
Website: www.euclidchemical.com

A Materials Certificate shall be submitted to the Engineer in accordance with 1.06.07 that certifies the anode as one of the listed products above.

Construction Methods:**Submittals:**

The following information shall be submitted to the Engineer:

- The Manufacturer and product name, written instructions, including Manufacturer limitations on time during which anodes may be submersed in water as the substrate of the repair area is saturated.
- NACE CP2 Cathodic Protection Technician Certification of the Qualified Technical Representative (QTR). The Qualified Technical Representative supplied by the anode manufacturer shall hold and maintain such certification throughout the project.

Installation:

A minimum of two (2) weeks in advance of the scheduled installation of the anodes, the Contractor shall arrange for a Qualified Technical Representative (QTR) to train the employees of the Contractor and Department. The QTR shall review the plans and tailor the training to address specific details of the project. Training shall also include inspection procedures to detect different reinforcing bar configurations, installation procedures, quality control procedures, and documentation. The QTR shall be present to provide direction until the Contractor becomes proficient in the work to the satisfaction of the Engineer. The QTR shall also be available for consultation at such additional times during the work as requested by the Engineer.

In addition to the Contract documents, the work for this item shall be performed as directed by the Engineer, in accordance with the Manufacturer's recommendations and written instructions, and recommendations of the QTR.

Should the Engineer determine that the reinforcing steel size and spacing differs from the expected reinforcing layout, the Engineer will direct the Contractor regarding placement of anodes. The actual reinforcing bar density may be obtained by entering the bar size and spacing in the "Table of Reinforcing Steel Density Ratios" in the Appendix. Anode spacing shall not exceed that shown in the Appendix. Any spacing deviations shall allow for sufficient clearance around the anodes to allow concrete to encase the anode and be properly consolidated.

Reinforcing steel shall be clean and securely fastened together with tie wires to provide electrical connectivity. The Contractor shall secure the galvanic anodes to the reinforcing bars along the edge of the repair as shown on the plans, using the anode tie wires. The tie wires shall be wrapped around the cleaned reinforcing steel and twisted tightly to allow little or no free movement and to allow concrete to encase the anode. The Contractor shall place the anodes along a single bar or at the intersection between two bars. In addition, the Contractor shall place the anodes to provide two (2) inches of cover between the proposed form and the anodes. *[Note: this is to prevent the finished patch from sounding hollow when hammer-tapped.]* If less cover will result due to shallow bar location, additional localized removal of concrete may be required to place the anode behind the bar.

The Contractor shall test the connections between anodes and reinforcing steel for electrical continuity, as instructed by the QTR. The Contractor shall place additional tie wires or re-tie connections as directed to provide the specified continuity. The Contractor's testing shall:

- Confirm electrical connection between anode tie wire and reinforcing steel by measuring DC resistance in ohms (Ω) or potential (mV). Electrical connection is acceptable if the DC resistance measured is less than 1 Ω or the DC potential is less than 1 mV.
- Confirm electrical continuity of the exposed reinforcing steel within the repair area. Electrical continuity between test areas is acceptable if the DC resistance is less than 1 Ω or the potential is less than 1 mV.

The Contractor shall install anodes and concrete following preparation and cleaning of the steel reinforcement to ensure proper connectivity of the anodes. If significant surface rust forms before the concrete is placed, the bar must be re-cleaned and the anode-to-steel and bar-to-bar connectivity shall be re-verified and corrected as necessary.

Once anodes are installed, precautions shall be taken to prevent water from soaking the anodes prior to concrete placement. The substrate shall be saturated immediately prior to concrete placement, however, the anodes shall not be immersed longer than recommended by the Manufacturer.

Method of Measurement: This work will be measured for payment by the number of anodes installed and accepted.

Basis of Payment: This work will be paid for at the Contract unit price each for “Embedded Galvanic Anodes,” complete and accepted in place, which price shall include all applicable materials, equipment, tools, and labor incidental thereto. All services of a QTR, and testing of installed anodes are included in the Contract unit price.

The concrete and concrete removal will be paid under a separate item(s).

Pay Item	Pay Unit
Embedded Galvanic Anodes	ea.

APPENDIX TO ITEM #0603726A – EMBEDDED GALVANIC ANODES

MAXIMUM ANODE SPACING Based on 160g Zinc Mass	
Steel Density Ratio	Maximum Anode Spacing (Inches)
< 0.31	24
0.31 - 0.60	20
0.61 - 0.90	16
0.91 - 1.20	14
1.21 - 1.50	10
1.51 - 1.80	8
1.81 - 2.10	6

Enter the left column in the table above with the Steel Density Ratio from TABLE OF REINFORCING STEEL DENSITY RATIOS below. Select the maximum anode spacing in the right column in the table above.

TABLE OF REINFORCING STEEL DENSITY RATIOS

Bar Size (#)	Spacing (inches)	5				6				7				8				9			
		6	9	12	18	6	9	12	18	6	9	12	18	6	9	12	18	6	9	12	18
5	6	0.65	0.55	0.49	0.44	0.72	0.59	0.52	0.46	0.79	0.63	0.56	0.48	0.85	0.68	0.59	0.50	0.92	0.72	0.62	0.52
	9	0.55	0.44	0.38	0.33	0.61	0.48	0.41	0.35	0.68	0.52	0.45	0.37	0.74	0.57	0.48	0.39	0.81	0.61	0.51	0.41
	12	0.49	0.38	0.33	0.27	0.56	0.43	0.36	0.29	0.62	0.47	0.39	0.32	0.69	0.51	0.43	0.34	0.75	0.56	0.46	0.36
	18	0.44	0.33	0.27	0.22	0.50	0.37	0.31	0.24	0.57	0.41	0.34	0.26	0.63	0.46	0.37	0.28	0.70	0.50	0.40	0.31
6	6	0.72	0.61	0.56	0.50	0.79	0.65	0.59	0.52	0.85	0.70	0.62	0.55	0.92	0.74	0.65	0.57	0.98	0.79	0.69	0.59
	9	0.59	0.48	0.43	0.37	0.65	0.52	0.46	0.39	0.72	0.57	0.49	0.41	0.79	0.61	0.52	0.44	0.85	0.65	0.56	0.46
	12	0.52	0.41	0.36	0.31	0.59	0.46	0.39	0.33	0.65	0.50	0.43	0.35	0.72	0.55	0.46	0.37	0.79	0.59	0.49	0.39
	18	0.46	0.35	0.29	0.24	0.52	0.39	0.33	0.26	0.59	0.44	0.36	0.28	0.65	0.48	0.39	0.31	0.72	0.52	0.43	0.33
7	6	0.79	0.68	0.62	0.57	0.85	0.72	0.65	0.59	0.92	0.76	0.69	0.61	0.98	0.81	0.72	0.63	1.05	0.85	0.75	0.65
	9	0.63	0.52	0.47	0.41	0.70	0.57	0.50	0.44	0.76	0.61	0.53	0.46	0.83	0.65	0.57	0.48	0.89	0.70	0.60	0.50
	12	0.56	0.45	0.39	0.34	0.62	0.49	0.43	0.36	0.69	0.53	0.46	0.38	0.75	0.58	0.49	0.40	0.82	0.62	0.52	0.43
	18	0.48	0.37	0.32	0.26	0.55	0.41	0.35	0.28	0.61	0.46	0.38	0.31	0.68	0.50	0.41	0.33	0.74	0.55	0.45	0.35
8	6	0.85	0.74	0.69	0.63	0.92	0.79	0.72	0.65	0.98	0.83	0.75	0.68	1.05	0.87	0.79	0.70	1.11	0.92	0.82	0.72
	9	0.68	0.57	0.51	0.46	0.74	0.61	0.55	0.48	0.81	0.65	0.58	0.50	0.87	0.70	0.61	0.52	0.94	0.74	0.64	0.55
	12	0.59	0.48	0.43	0.37	0.65	0.52	0.46	0.39	0.72	0.57	0.49	0.41	0.79	0.61	0.52	0.44	0.85	0.65	0.56	0.46
	18	0.50	0.39	0.34	0.28	0.57	0.44	0.37	0.31	0.63	0.48	0.40	0.33	0.70	0.52	0.44	0.35	0.76	0.57	0.47	0.37
9	6	0.92	0.81	0.75	0.70	0.98	0.85	0.79	0.72	1.05	0.89	0.82	0.74	1.11	0.94	0.85	0.76	1.18	0.98	0.88	0.79
	9	0.72	0.61	0.56	0.50	0.79	0.65	0.59	0.52	0.85	0.70	0.62	0.55	0.92	0.74	0.65	0.57	0.98	0.79	0.69	0.59
	12	0.62	0.51	0.46	0.40	0.69	0.56	0.49	0.43	0.75	0.60	0.52	0.45	0.82	0.64	0.56	0.47	0.88	0.69	0.59	0.49
	18	0.52	0.41	0.36	0.31	0.59	0.46	0.39	0.33	0.65	0.50	0.43	0.35	0.72	0.55	0.46	0.37	0.79	0.59	0.49	0.39

How to use the Table of Reinforcing Steel Density Ratios:

1. Enter the table with the first bar size and spacing in the top two rows. Identify that column.
2. Enter the bar size and spacing in the transverse direction in the first two columns. Identify that row.
3. Follow the identified column and row to their intersection and read the reinforcing steel density in that cell.
4. Enter the Maximum Anode Spacing Table with the Reinforcing Steel Density to select the maximum anode spacing.

ITEM #0707009A - MEMBRANE WATERPROOFING (COLD LIQUID ELASTOMERIC)

Description: Work under this item consists of furnishing and installing a seamless elastomeric waterproofing membrane system applied to a concrete or steel surface as shown on the plans, in accordance with this specification and as directed by the Engineer. Work shall also include conditioning of the surface to be coated and all quality-control testing noted herein.

The completed membrane system shall be comprised of a primer coat, two layers of the membrane coating (minimum total thickness of 80 mil and maximum total thickness not to exceed 120 mil), an additional 40 mil membrane layer with aggregate broadcast into the material while still wet, reinforcing material at deck panel joints and two applications of asphalt emulsion (tack coat) at a rate of 0.05-0.07 gal/s.y. each, allowing the first application to break prior to applying the second.

Materials: The Contractor shall select a waterproofing membrane system from the Department's current Qualified Product List (QPL) for Spray-Applied Membrane Waterproofing System. All materials incorporated in the works shall meet the Manufacturer's specification for the chosen system. The Engineer will reject any system that is not on the QPL.

Reinforcing material shall be as recommended by the manufacturer.

Materials Certificate: The Contractor shall submit to the Engineer a Materials Certificate for the primer, membrane and aggregate in accordance with the requirements of Article 1.06.07.

Construction Methods: At least 30 days prior to installation of the membrane system, the Contractor shall submit to the Engineer a Site-specific Installation Plan that includes the manufacturer's recommended procedure for preparing the deck surface, pre-treatment or preparing at cracks and gaps, treatment at curbs, vertical surfaces or discontinuities, applying the primer and membrane, placing of aggregated coat and all Quality Control (QC Plan) testing operations to be performed during the membrane system's installation. Procedures shall also include recommended repairs of system non-compliant issues identified during application. The system shall be applied to the prepared area(s) as defined or shown in the plans, strictly in accordance with the Installation Plan.

A technical representative, in the direct employ of the manufacturer, shall be present on-Site immediately prior to and during application of the membrane. The representative shall inspect and approve the surface prior to priming, and provide guidance on the handling, mixing and addition of components and observe application of the primer and membrane. The technical representative shall perform all required QC testing and remain on the Project site until the membrane has fully cured.

All QC testing, including verbal direction or observations at the time of installation, shall be recorded and submitted to the Engineer for inclusion in the Project records. The QC testing data

shall be received by the Department's project personnel prior to any paving over the finished membrane, or within 24 hours following completion of any staged portion of the work.

1. **Applicator Approval:** The Contractor's membrane Applicator shall be fully trained and licensed by the membrane manufacturer and shall have successfully completed at least three spray membrane projects in the past five years. The Contractor shall furnish references from those projects, including names of contact persons and the names, addresses and phone numbers of persons who supervised the projects. This information shall be submitted to the Engineer prior to the submittal of the Installation Plan. The Engineer shall have sole authority to determine the adequacy and compliance of the submitted information. Inadequate proof of ability to perform the work will be grounds to reject proposed applicators.

2. **Job Conditions:**

- (a) **Environmental Requirements:** Air and substrate temperatures shall be between 32°F and 104°F and the substrate shall be above the dew point. Outside of this range, the Manufacturer shall be consulted.

The Applicator shall be provided with adequate disposal facilities for nonhazardous waste generated during installation of the membrane system. The applicator shall follow safety instructions regarding respirators and safety equipment.

- (b) **Safety Requirements:** All open flames and spark producing equipment shall be removed from the work area prior to commencement of application.

"No Smoking" signs shall be visibly posted at the Site during application of the membrane waterproofing.

Personnel not involved in membrane application shall be kept out of the work area.

3. **Delivery, Storage and Handling:**

- (a) **Packaging and Shipping:** All components of the membrane system shall be delivered to the Site in the Manufacturer's packaging, clearly identified with the product type and batch number.
 - (b) **Storage and Protection:** The Applicator shall be provided with a storage area for all components. The area shall be cool, dry and out of direct sunlight and shall be in accordance with the Manufacturer's recommendations and relevant health and safety regulations.

Copies of Material Safety Data Sheets (MSDS) for all components shall be kept on Site for review by the Engineer or other personnel.

- (c) Shelf Life - Membrane Components: Packaging of all membrane components shall include a shelf life date sealed by the Manufacturer. No membrane components whose shelf life has expired shall be used.

4. Surface Preparation:

- (a) Protection: The Applicator shall be responsible for the protection of equipment and adjacent areas from over spray or other contamination. Parapets and bridge joints shall be masked prior to application of the materials.
- (b) Surface Preparation: Sharp peaks and discontinuities shall be ground smooth. Any peak greater than ¼ inch above the surface profile of the prepared substrate shall be ground to the surrounding elevation. Any valley or minor surface deterioration of ½ inch or greater shall also be repaired. The extent and location of surface patches require the approval of the Engineer before the membrane system is applied.

Surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae, growth, laitance, friable matter, dirt, bituminous products, and previous waterproofing materials. If required, degreasing shall be done by detergent washing in accordance with ASTM D4258.

The surface shall be abrasively cleaned, in accordance with ASTM D4259, to provide a sound substrate free from laitance.

Voids, honeycombed areas, and blow holes on vertical surfaces shall be repaired as indicated in the Installation Plan.

All steel components to receive membrane waterproofing shall be blast cleaned in accordance with SSPC SP6 and shall be coated with the membrane waterproofing system within the same work shift.

5. Inspection and Testing: Prior to priming of the surface, the Engineer, Applicator and Manufacturer's technical representative shall inspect and approve the prepared substrate.

- (a) Random tests for deck moisture content shall be conducted on the substrate by the Contractor at the Site using a "Sovereign Portable Electronic Moisture Master Meter," a "Tramex CMEXpertII Concrete Moisture Meter" or approved equal. The minimum frequency shall be one test per 1000 s.f. but not less than three tests per shift for each contiguous section worked on during that shift. Additional tests may be required if atmospheric conditions change and retesting of the substrate moisture content is warranted.

The membrane system shall not be installed on substrate with a moisture content greater than 6%, or at a moisture content above the amount recommended by the system's Manufacturer, whichever is less.

- (b) Random tests for adequate tensile bond strength shall be conducted by the Contractor on the substrate using an adhesion tester in accordance with the requirements of ASTM D4541. The minimum frequency shall be one test per 5,000 s.f. but not less than three adhesion tests per shift for each contiguous section worked on during that shift. The locations of the pull tests shall be at least a distance from each other equal to or greater than 1/3 of the width or length (whichever is greater) of the area being worked in that section. The location of the pull tests shall be located in accordance with ASTM D3665 or a statistically-based procedure of stratified random sampling approved by the Engineer.

Adequate surface preparation will be indicated by tensile bond strengths of primer to the substrate greater than or equal to 150 psi or failure in a concrete surface and greater than or equal to 300 psi for steel surfaces.

If the tensile bond strength is lower than the minimum specified, the Engineer may request additional substrate preparation. Any primer not adequately applied shall be removed and new primer applied at the Contractor's expense, as directed by Engineer.

- (c) Grouted joints, materials that the membrane cannot bond to, and cracks or discontinuities that cannot be bridged over by the membrane material shall be covered by a reinforcing material recommended by the membrane system's Manufacturer prior to application of membrane layers as approved or directed by the Engineer.

6. Application:

- (a) The System shall be applied in the following distinct steps as follows:
- 1) Substrate preparation
 - 2) Priming
 - 3) Reinforcing material application over grouted joints, cracks, etc.
 - 4) Membrane application (minimum 2 layers)
 - 5) Membrane with aggregate
- (b) Immediately prior to the application of any components of the System, the surface shall be adequately dry (see Section 5(a) of this specification) and any remaining dust or loose particles shall be removed using clean, dry, oil-free compressed air or industrial vacuum.
- (c) Where the area to be treated is bound by a vertical surface (e.g. curb or wall), the membrane system shall be continued up the vertical, if shown on the plans or directed by the Engineer.
- (d) The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results, in accordance with the Manufacturer's recommendations or as approved or directed by the Engineer.

- (e) A neat finish with well defined boundaries and straight edges shall be provided by the Applicator.
- (f) Primer: The primer shall consist of one coat with an overall coverage rate of 125 to 175 s.f./gal unless otherwise recommended in the Manufacturer's written instructions.

All components shall be measured and mixed in accordance with the Manufacturer's recommendations.

The primer shall be spray applied using a single component spray system approved for use by the Manufacturer. If required by Site conditions and allowed by the manufacturer brush, squeegee or roller application will be allowed.

The primer shall be allowed to cure tack-free for a minimum of 30 minutes or as required by the Manufacturer's instructions, whichever time is greater, prior to application of the first lift of waterproofing membrane.

Porous concrete (brick) may require a second coat of primer should the first coat be absorbed.

- (g) Membrane and Reinforcing Material: Application of the membrane on the primed surface shall not commence until the primer is cured as described in Section 6(f) of this specification and the adhesion pull tests are completed in accordance with Section 5(b) of this specification.

The waterproofing membrane shall consist of two coats for a total dry film thickness of a minimum 80 mils but not to exceed 120 mils. Adjacent coats shall be of a contrasting color to aid in Quality Assurance and inspection. Any reinforcing material shall be applied immediately before the first coat of membrane in accordance with the Manufacturer's recommendations.

The membrane shall be comprised of Components A and B and a hardener powder which is to be added to Component B in accordance with the Manufacturer's recommendations.

The substrate shall be coated in a methodical manner.

Thickness checks: For each layer, checks for wet film thickness using a gauge pin or standard comb-type thickness gauge shall be carried out once every 100 s.f. Where rapid set time of the membrane does not allow for wet film thickness checks, ultrasonic testing (steel surfaces only), calibrated point-penetrating (destructive) testing, in-situ sampling (cutout of small sections for measuring thicknesses), or other methods approved by the Engineer shall be employed for determination of dry film

thickness. The measured thickness of each and every individual test of the membrane shall be greater than or equal to the required thickness.

Bond Strength: Random tests for adequate tensile bond strength shall be conducted on the membrane in accordance with the requirements of ASTM D4541. The minimum test frequency shall be one test per 5,000 s.f. but no less than three adhesion tests per bridge. Adequate adhesion will be indicated by tensile bond strengths of the membrane to the substrate of greater than or equal to 150 psi or failure in a concrete surface, and greater than or equal to 300 psi for steel surfaces.

Repair the membrane system following destructive testing and correct any deficiencies in the membrane system or substrate noted during QC testing in accordance with the Manufacturer's recommendations to the satisfaction of the Engineer at no additional cost to the State.

- (h) Repairs: If an area is left untreated or the membrane becomes damaged, a patch repair shall be carried out to restore the integrity of the system. The damaged areas shall be cut back to sound materials and wiped with solvent (e.g. acetone) up to a width of at least four inches on the periphery, removing any contaminants unless otherwise recommended by the Manufacturer. The substrate shall be primed as necessary, followed by the membrane layers. A continuous layer shall be obtained over the substrate with a four-inch overlap onto existing membrane.

Where the membrane is to be joined to existing cured material, the new application shall overlap the existing by at least four inches. Cleaning and surface preparation on areas to be lapped shall be as recommended in the Manufacturer's written instructions.

- (i) Aggregated Finish:
 - 1) Apply an additional 40 mil thick layer of the membrane material immediately followed by an aggregate coating, before the membrane cures, at a rate to fully cover the coated area to a point where no membrane material is visible. The membrane and aggregate shall be fully integrated after the aggregate has been applied and the membrane cured.
 - 2) Localized areas not fully coated shall be touched-up with additional membrane and aggregate as needed.
 - 3) Using motorized mechanical sweepers or a vacuum sweeper apparatus, remove all loose and excess aggregate from the surface to the satisfaction of the Engineer and dispose of properly after application prior to allowing traffic onto finished surface or application of tack coat. Any areas not fully coated after sweeping shall be touched up with additional membrane and aggregate as needed.

7. Final Review: The Engineer and the Applicator shall jointly review the area(s) over which the completed system has been installed. Any irregularities or other criteria that do not meet the requirements of the Engineer shall be addressed at this time.

Method of Measurement: This item shall be measured by the number of square yards of waterproofed surface completed and accepted.

Basis of Payment: This item will be paid for at the Contract unit price per square yard of “Membrane Waterproofing (Cold Liquid Elastomeric),” complete and accepted in place, which price shall include all surface preparation, furnishing, storing and applying the system, technical representative and Quality Control testing, and any necessary repairs and remediation work as well as all materials, equipment, tools, labor incidental to this work.

Pay Item	Pay Unit
Membrane Waterproofing (Cold Liquid Elastomeric)	s.y.

ITEM #0819002A - PENETRATING SEALER PROTECTIVE COMPOUND

Specific to Project No. 0080-0131

Description: Work under this item shall consist of cleaning concrete surfaces of dirt, dust and debris, and furnishing and applying a clear, penetrating sealer where shown on the plans, to provide a hydrophobic barrier against the intrusion of moisture. This work also includes furnishing, installing and removing platforms, scaffolding, ladders and other means of access as well as shields, as required, to protect adjacent areas from overspray. Penetrating sealer shall not be applied to concrete surfaces that have been previously treated with coatings or curing compounds that would hinder penetration of the sealer into the concrete.

Materials: The penetrating sealer shall be a single component, 100% silane or silane siloxane from the list of materials below. The material shall be selected in anticipation of the expected ambient and surface temperature at the time of installation.

The following products may be used when ambient and surface temperatures are 40°F and above:

SIL-ACT ATS-100 (Silane)
Advanced Chemical Technologies, Inc.
9608 North Robinson Ave.
Oklahoma City, OK 73114
405-843-2585
www.advchemtech.com

Armor SX 5000 EXT-100 or SX 5000 WB (Silane Siloxane)
Foundation Armor, LLC.
472 Amherst St. STE 14
Nashua, NH 03063
866-306-0246
www.foundationarmor.com

Aquinil Plus 100 (Silane)
ChemMasters
300 Edwards Street
Madison, OH 44057
440-428-2105, 800-486-7866
www.chemmasters.net/Aquanil100.php

The following product may be used when ambient and surface temperatures are 20°F and above:

Certi-Vex Penseal 244 100% (Silane)
Vexcon Chemicals
7240 State Road
Philadelphia, PA 19135
888-839-2661
www.Vexcon.com

Construction Methods:

Submittals: The Contractor shall submit to the Engineer Safety Data Sheets (SDS) and product literature for the selected product. The literature shall include written instructions how to apply the product to vertical and horizontal surfaces, and where required, overhead surfaces.

The Contractor shall submit to the Engineer, in accordance with Article 1.05.02, written procedures for cleaning the concrete surfaces. The submittal shall include proposed equipment and materials and shall address how adjacent traffic and other areas shall be protected from dust, debris and overspray during the cleaning and application processes. Where the sealer is to be applied to parapets before pavement is placed, the submittal shall address protecting the deck and curb to which membrane waterproofing will be applied. Should the membrane already be present, the submittal shall address protecting the membrane. It shall also indicate how vegetation shall be protected from overspray. The submittal shall address the conditions under which work may proceed, including wind speed, temperature and precipitation. It shall also include procedures to be followed to protect the work should unfavorable weather conditions occur before the product has been absorbed.

The Contractor shall inspect the surfaces to be sealed to identify surface cleaning needs before submitting the procedures. The Contractor shall identify conditions that need repair or surfaces that may require special attention or cleaning procedures. Such observations shall be addressed in the written procedures.

Surface Preparation: Concrete surfaces to which penetrating sealer will be applied shall be dry, clean and free of grease, oil and other surface contaminants. New concrete and newly placed repair concrete shall be allowed to cure for at least 28 days before applying sealer. After rain or water cleaning, allow existing concrete surfaces to dry for at least 8 hours before applying sealer. Dry surfaces may be cleaned by sweeping with brushes or brooms, and blowing clean with oil-free, compressed air. The Contractor shall take care not to damage the concrete surface finish during cleaning operations. Care shall be taken so that cleaning methods do not damage joint sealant or other components of the structure.

Application: Application of the sealer can only begin after the Engineer evaluates the concrete surfaces for cleanliness and moisture, and determines that conditions are appropriate for application.

The sealer shall saturate the concrete surface with a rate of application of 200 square feet per gallon of sealer. The dispersion shall run six to eight inches down a vertical surface from the spray pattern. The maximum run-down is 12 inches. The Contractor shall monitor and record the number of square feet per gallon of sealer used to verify that the required application rate is being met. Additional sealer may be needed if surfaces are porous, rough or textured.

The Engineer will inspect the concrete surface during application and after the sealer has had adequate time to penetrate. As a test, water sprayed from a bottle on the sealed surface shall bead up and not be absorbed. Should water be absorbed into the concrete at a test area, additional areas shall be tested to determine which areas should receive additional application of sealer. The

Contractor shall apply additional sealer to the identified areas until absorption of water is prevented.

Method of Measurement: This work will be measured for payment by the actual number of square yards of concrete, coated completely and accepted, within the designated limits. The area will be measured once, regardless of the number of applications required.

Basis of Payment: This work will be paid for at the Contract unit price per square yard for “Penetrating Sealer Protective Compound,” complete, which price shall include all equipment tools, labor and materials, incidental thereto, including the preparation of the concrete surfaces and proper disposal of debris.

Pay Item	Pay Unit
Penetrating Sealer Protective Compound	s.y.

ITEM #0822072A - TEMPORARY PRECAST CONCRETE BARRIER CURB (PINNED)

Description: Work under this item shall consist of furnishing, installing, relocating, and removing pinned temporary concrete barrier, for use on roadways to separate traffic from opposing traffic, work areas or elevation changes. Pinned barriers shall be used at roadway locations where construction phase conditions warrant a barrier system with greater resistance to lateral dynamic deflection than provided by a non-pinned barrier system, with the locations identified on the plans.

Materials:

1. The barrier shall be constructed of precast concrete meeting the requirements of 8.21.02.
2. Each section of barrier shall be permanently marked with the manufacturer identification and cast date by means of a non-corrosive metal or plastic tag. When barrier is transferred from another Department project, the Contractor shall provide documentation in accordance with 1.06.02.
3. Anchor pins and plate washers shall be ASTM A36 and shall be hot dip galvanized after fabrication, in accordance with AASHTO M 111 (ASTM A123) or AASHTO M 232 (ASTM A153), whichever applies.
4. Connection loop bars shall be bent from smooth bars that meet the requirements of ASTM A36. Loop bar ends not encased in concrete shall be hot-dip galvanized in accordance with the requirements of AASHTO M 111 (ASTM A123).
5. Threaded connection rods shall be steel conforming to AASHTO M314 (ASTM F1554) Grade 55 except that threads and nominal diameters shall conform to ANSI B1.13M for Class 6g threads. The rod shall be threaded for a minimum of 4" at each end. Plain steel washers shall be manufactured in accordance with ANSI B18.22M. Heavy hex nuts shall conform to ASTM A563 for Class 10S and shall conform to the geometry defined in ANSI B18.2.4.6M. The threaded connection rods, washers, and nuts shall be hot-dip galvanized after fabrication in accordance with the requirements of Class C of AASHTO M232 (ASTM A153).
6. Delineators shall meet the requirements of 8.22.02.
7. Non-shrink grout shall meet the requirements of M.03.05.

Construction Methods:

1. Fabrication: The barrier shall be precast concrete in conformance with the pertinent requirements of 8.21.03 and the plans, except that penetrating sealer protective compound is not required. Welding for the anchor pins shall conform to the requirements of 6.03.03.
2. Installation: The barrier shall be placed as shown on the plans or as directed by the Engineer.

The barrier shall be pinned through the flexible pavement and subbase in accordance with the plans.

The Contractor shall core drill through the bituminous pavement with a hole diameter equal to the diameter of the anchor pin. The pin shall be driven through the drilled hole and into the underlying subbase material until the plate washer is tight to the concrete barrier. No portion of the pin or washer shall protrude beyond the limits of the anchor pocket.

The Contractor shall identify any underground utilities in areas of pinned barrier and shall not install any pins that may damage utilities, including drainage systems. If pinned barrier is required at a location with such underground utility present, the Contractor shall notify the Engineer of the potential conflict for a determination on the work limits appropriate for installation of the pinned barrier.

3. Connection of Barrier Units: The barrier shall be joined together with threaded connection rods, washers, and heavy hex nuts in accordance with the plans.
4. Removal of Anchor Pins: All anchor pins shall be removed prior to the removal or relocation of barrier sections. Pins shall be pulled with the applied force in a direction aligned with the axis of the pin to minimize damage to the surrounding pavement. Pins damaged during the removal operation shall not be reused by the Contractor unless any damage is repaired in a manner acceptable to the Engineer.
5. Patching Anchor Holes: After removal of the barrier, holes in flexible pavement shall be filled flush with the roadway surface with non-shrink grout or other suitable material approved by the Engineer prior to the placement of the top course of pavement. Non-shrink grout shall be mixed and placed in accordance with the manufacturer's recommendations.
6. Delineators: Delineators shall be installed on top of the barrier in accordance with 8.22.03-3 and the plans.
7. General: The barrier shall be kept in good condition at all times by the Contractor during all stages of construction.
When the barrier is no longer required, it shall be removed from the Site.
8. Relocation of Barrier: If called for on the plans, the Contractor shall relocate the barrier and its appurtenances to locations within the project limits as shown on the plans or as ordered by the Engineer.

Method of Measurement: Temporary pinned barrier shall be measured for payment along the centerline at the top of the barrier and will be the actual number of linear feet of temporary pinned barrier furnished, installed, and accepted. Relocation necessary for storage of the barrier will not be measured for payment.

Basis of Payment: This work will be paid for at the Contract unit price per linear foot for "Temporary Precast Concrete Barrier Curb (Pinned)," complete in place, which price shall include all furnishing, transportation, storage, materials, reinforcing steel, connection rods, anchor pins, initial installation and final removal; and all equipment, tools, and labor incidental thereto. The cost of patching anchor holes shall also be included for payment under this item. Each temporary pinned barrier will be paid for once regardless of the number of times it is used on the project. Any temporary barrier units that become lost, damaged or defaced shall be replaced by the Contractor at no cost to the State.

Delineators will be paid for in accordance with 12.05.05.

Any damaged hardware or other material, including damaged pavement during the removal of pins, shall be replaced by the Contractor at no cost to the State.

Pay Item	Pay Unit
Temporary Precast Concrete Barrier Curb (Pinned)	l.f.

ITEM #0913023A - 6' POLYVINYL CHLORIDE CHAIN LINK FENCE

Description: Work under this item consists of furnishing and installing chain link fencing in accordance with the details shown on the plans.

Materials: Materials for this work shall be as follows:

1. **Chain Link Fabric:** The fabric shall be a black, Polyvinyl Chloride (PVC) - coated steel chain link type, conforming to the specifications of ASTM F668, Class 2b, thermally fused and bonded. The #9 gage core wire shall be galvanized, PVC-coated, then woven to create a continuous fabric having a two inch mesh, knuckled at both top and bottom. The PVC coating shall be the color black as described in ASTM F934.

2. **Base Plates, Posts, Rails and Tension Wire:** Cold formed electric resistance welded steel pipe complying with ASTM F1043 Group IC having minimum steel yield strength of 50,000 psi. Burrs and sharp edges shall be removed and smoothed before galvanizing.

Base plate assembly, where shown on the plans, shall conform to AASHTO M270 (ASTM A709), Grade 50. Weldable deformed steel bars used as dowels to anchor the base plate assembly shall meet the requirements of ASTM A706. Round steel bars shall conform to ASTM A36. All welding procedures shall be submitted in accordance with 6.03.03-3(c). Welding shall be in accordance with Article 1.05.17. Burrs and sharp edges shall be removed and smoothed before galvanizing. The base plate assembly shall be hot-dip galvanized after fabrication in accordance with ASTM A123.

Tension wire shall be 7 gauge (core), wire complying with ASTM F1664, with a Class 2b thermally fused and bonded, black coating to match the fabric.

3. **Coating Requirements:** External protective coating meeting ASTM F1043 Type B, 0.9 oz/ft² minimum hot-dip zinc coating plus a chromate conversion and a clear polymer coating, plus a minimum 10 mil thermally fused PVC color coating in accordance with F1043. Internal coating F1043 Type D, 81% nominal zinc pigmented coating minimum 3 mils thick or Type B, minimum 0.9 oz/ft² zinc. The color of the coating shall be black and conform to ASTM F934. The coating shall not fade, crack, blister or split under normal use. It shall have demonstrated the ability to endure a salt spray resistance test conducted in accordance with ASTM B117 without loss of adhesion for a minimum exposure time of 3,500 hours. Additionally, the coated framework shall have demonstrated the ability to withstand exposure in a weatherometer apparatus for 1000 hours without failure when tested in accordance with ASTM D1499. Adhesion of the coating shall be tested in accordance with the parallel line test or the cross hatch test as referenced in ASTM F1043.

4. **Fence Fittings and Tension Bars:** All materials and coating requirements shall conform to the specifications of ASTM F626. All fittings shall receive the same coating system as the posts and rails. The ties used to fasten the fabric to the post and rails shall not be less than #6 and #9 gage respectively.

5. **Neoprene or Closed Cell Elastomer Pad:** Pads beneath base plates shall conform to ASTM D1056, Grade 2A2 or 2A3 and shall be suitable for outdoor applications. Weather and ozone resistance shall be classified as "Excellent." Pads shall have a Shore A Durometer hardness within the range of 70 to 90.
6. **Galvanizing Compound:** Galvanizing compound shall conform to the requirements of Military Specification MIL-P-21035.
7. **Non-shrink Grout:** Grout used to anchor fence posts in preformed holes shall be non-shrink and non-staining and shall conform to the requirements of Subarticle M.03.05.
8. **Silicone Joint Seal:** Joint seal placed around the base of the posts to seal the interface between the post and the non-shrink grout shall conform to the requirements of "Section 6.01 - Concrete for Structures."
9. **Chemical Anchoring Material:** Chemical anchoring material for securing anchor bolts and dowels shall conform to the requirements of Subarticle M.03.07.
10. **Aluminum:** The angle used to close openings shall be extruded aluminum and conform to the requirements of ASTM B221, Alloy 6063-T6.
11. **Expansion Anchors:** Anchors shall be as shown on the plans and shall be manufactured from Type 316 stainless steel.
12. **Preset Anchorage:** The preset anchorage when specified on the plans shall conform to the requirements listed below.

The preset anchorage shall be fabricated as detailed on the contract plans. Preset anchorages configured differently from those detailed on the plans may be used provided they utilize the same materials described below and are approved by the Engineer prior to fabrication. The wire struts shall be cold-drawn and conform to ASTM A510, Grade 1030 with minimum tensile strength of 100,000 psi. These wire struts shall be securely welded to the ferrules with the welds capable of developing the tensile strength of the struts and the ferrules.

The ferrules, either open end or closed end, shall conform to ASTM A108, Grade 12L14. A plastic cap shall be provided for sealing the bottom of each open end ferrule before placing concrete. Closed end ferrules shall provide a minimum full thread length of 2". Removable plastic washers of the same diameter as the ferrules and approximately 3/32" in thickness shall be provided for the top of each ferrule and shall be left in place until the temporary supporting bolts are removed. Removable plastic caps shall be provided for sealing the top of each ferrule until the erection of fence posts.

After fabrication, the preset anchorage shall be hot-dip galvanized in accordance with ASTM A123.

Bolts for the preset anchorage shall conform to the requirements of ASTM A307. The washers shall be standard circular washers conforming to ASTM F844. The bolts and washers shall be hot-dip galvanized in accordance with ASTM A153.

13. Threaded Rod, Bolts, Nuts and Washers: Threaded rod and bolts shall conform to the requirements of ASTM A307, Grade A. Nuts shall be hex style, Grade A, conforming to the requirements of ASTM A563 and washers shall be standard, circular plain washers conforming to the requirements of ASTM F844. Threaded rods, bolts, nuts and washers shall be hot-dip galvanized after fabrication in accordance with the requirements of ASTM A153, Class C.

All components of the chain link fence shall be the color black as described in ASTM F934. Coating which exhibits fading, peeling or chipping will be cause for rejection of the shipment.

Materials Certification and Testing: The Contractor shall furnish a Materials Certificate in accordance with Article 1.06.07 for the fabric, posts, rails, and all fittings. A sample of PVC-coated fabric shall be submitted to the Department for testing the bond of the coating in accordance with the requirements of ASTM F668, Class 2b.

Construction Methods:

1. Shop Drawings: Before fabricating any materials, the Contractor shall submit Shop Drawings to the Engineer for approval in accordance with Article 1.05.02. An individual, independently packaged set of Shop Drawings, with all details and documents necessary for fabrication and installation of the fence shall be prepared and submitted. The Shop Drawings shall be prepared in Customary U.S. units.

The packaged set of Shop Drawings for fencing at each site shall be submitted in an individual file in electronic portable document format (.pdf) with appropriate bookmarks and commenting enabled.

The Shop Drawings shall include complete details of all fence components. The drawings shall include, but not be limited to the following:

1. The project number, town.
2. A layout plan showing all posts and rail spacings, parapet grades and joint spacings. The Contractor shall submit measurements verifying joint spacings and parapet grades at a sufficient number of points to ensure posts are plumb to within 0.25% after installation.
3. All fence and anchorage details, including expansion devices.
4. Pre-qualified welding procedures.
5. Material specifications for all components. Including touch-up repair material.
6. Written Repair procedures
7. The packaged set shall include the contact information for fabricator and detailer. Contact information shall include name and address of each company and the name of a contact person with phone number and email address for each.

The reviewed and stamped Shop Drawings and calculations will be returned to the Contractor directly with an appropriate stamp indicating the status of the Department's review. For submissions that do not require resubmission, the Contractor shall print and deliver to the Assistant District Engineer, the number of paper copies requested by the Engineer.

2. Fabrication: The chain link fence shall be accurately fabricated and installed in accordance with the plans, the approved Shop Drawings and as directed by the Engineer.

3. Installation: Posts that are embedded in circular concrete foundations shall be centered in pre-augured holes and held plumb. Unless otherwise directed by the Engineer, the holes shall be at least 3' deep with a diameter of 10". The post shall extend to a depth no closer than 4" from the bottom of the hole while maintaining the fence height shown on the plans. Posts shall be placed into the concrete such that concrete fills inside the post up to the top of the foundation to prevent moisture from condensing inside the post and filling the post below grade with water. The portion of foundation above grade and a portion at least 1' below grade shall be formed with a 10" inside diameter round tube. The tops of foundations shall be crowned to shed water. After the concrete has attained 3,000 psi, strip the forms to expose the concrete foundation. Posts shall have drain holes as shown on the plans to allow moisture to escape.

Where holes must be drilled in concrete walls or parapets to anchor or set posts, the Contractor shall submit to the Engineer his proposed method of drilling holes. Hole drilling methods shall not cause spalling, cracking, or other damage to the existing concrete. Those areas damaged by the Contractor shall be repaired by him in a manner suitable to the Engineer and at no expense to the State. The Contractor shall also indicate how he will prevent drillings and debris from falling to areas below or into adjacent traffic. The submittal shall also address dust control.

The Contractor shall layout and drill holes in accordance with the approved Shop Drawings. The holes shall be cleaned of all dirt, moisture, concrete dust and other foreign material. Prior to placing posts or anchors in the holes, the hole depths shall be checked for conformance with the approved Shop Drawings. The Contractor shall not proceed until authorized by the Engineer. When authorized by the Engineer, the dowels or fence posts may be installed in the holes.

Where posts are detailed on the plans to be mounted in drilled or preformed holes in the top of parapet or wall, they shall be held plumb until the non-shrink, non-staining grout has gained at least 2,000 psi compressive strength. Fence fabric shall not be installed until the grout has gained at least 3,000 psi compressive strength. Posts shall be placed into the grout such that grout fills inside the post up to the top of the wall or parapet to prevent moisture from condensing inside the post and filling the post below top of concrete with water.

Where posts are shown to be attached to base plates on the plans, the base plates shall be shop welded to the fence posts. Posts, to be installed on a sloping surface shall be cut to grade as required to ensure that the posts are plumb after installation. Posts shall be welded to the base plates and all burrs and sharp edges shall be removed before powder coating. All welding procedures shall be submitted in accordance with 6.03.03-3(c). Welding shall be in accordance

with Article 1.05.17. Posts that are to be anchored to concrete with a base plate shall be secured with stainless steel anchors as shown on the plans. The base plate shall be set on a 1/8” neoprene pad of the same dimensions as the base plate.

All rails shall be erected to produce a smooth, continuous appearance, with posts placed plumb and with all rails parallel to the grade along the top of parapets, curbs, walls or finished grade as shown on the plans. The fabric shall be stretched tightly between end posts and securely fastened with stretcher bar bands. The fabric shall be attached to the rails and line posts as shown on the plans. Dome caps shall be installed on top of all posts.

Coated fabric, fence posts, rails and fittings shall be handled with care so the coating is not damaged. Damage to the galvanized coating below the finish coating shall be repaired in accordance with ASTM A780 with two coats of galvanizing compound before repairing the finish coat. The final dry film thickness of the galvanizing compound shall be a minimum of 2 to 3 mils. Damage to coating shall be repaired as directed by the Engineer and in accordance with the approved repair procedures. The finish coat shall be brush applied.

The preset anchorage where specified on the plans shall be installed perpendicular to the grade of the parapet. The preset anchorage shall be accurately positioned and restrained against movement during the placement of the concrete.

Method of Measurement: This work will be measured for payment by the number of linear feet of completed and accepted fence, measured horizontally from centerline to centerline of posts.

The following components will not be measured for payment but will be included in the general cost of the work: base plate assemblies, chemical anchoring material, non-shrink grout, molded pads, concrete foundations, aluminum angles, silicone joint sealer, expansion anchors and preset anchorage.

Basis of Payment: This work will be paid for at the contract unit price per linear foot for “4’ Polyvinyl Chloride Chain Link Fence”, complete and accepted in place, which price includes all materials, equipment, tools and work incidental thereto.

Pay Item	Pay Unit
6’ Polyvinyl Chloride Chain Link Fence	l.f.

ITEM #0917010A - REPAIR GUIDERAIL

Description: Work under this item shall consist of the repair of newly installed guiderail. It shall be repaired in the locations originally installed and fabricated in conformity with the lines, designations, dimensions, and details shown on the plans or as ordered by the Engineer.

Materials: The material for guiderail shall meet the requirements as specified within the original applicable contract items.

When repairing guiderail, the Contractor shall reuse any undamaged existing guiderail elements, timber rail, wire rope, appropriate posts, delineators, lap bolts, and other hardware within the project limits as approved by the Engineer to repair the guiderail. The Contractor shall use new materials when any components of the existing railing are damaged or missing and cannot be obtained from other guiderail systems being removed or converted within the Project limits.

Construction Methods: The repair of guiderail shall be in accordance with contraction methods as specified within the original applicable contract items.

Guiderail, including end anchors, which has been installed in final condition and accepted by the Engineer, shall be eligible for reimbursement for repairs subject to the conditions described below. If multiple runs are to be installed in a single stage as indicated in the contract documents, determination for reimbursement shall be made when all runs within the stage are complete and accepted as previously described. On projects without designated stages, guiderail installations must be complete and serving the intended function as determined by the Engineer.

When newly installed guiderail is damaged by public traffic, the following conditions must be satisfied prior to reimbursement for payment;

1. The damage must have been caused solely by the traveling public.
2. The contractor shall provide satisfactory evidence that such damage was caused by public traffic. Such as accident reports obtained from the Connecticut Department of Public Safety, police agencies or insurance companies; statements by reliable, unbiased eyewitnesses; or identification of the vehicle involved in the accident.
3. The contractor shall attempt to collect the costs from the person or persons responsible for the damage and provide documentation of those efforts to the satisfaction of the Engineer.
4. If such evidence cannot be obtained, the Engineer may determine that the damage was not caused by the Contractor and reimbursement for payment is warranted.

This repair provision does not relieve the Contractor of the requirements of Section 1.07, any other contractual requirements for maintenance and protection of traffic and final acceptance and relief of responsibility for the project.

The contractor shall remain responsible for the safety and integrity of the guiderail system for the duration of the project. In the event the guiderail is damaged, the Contractor shall provide sufficient cones, drums and other traffic control devices to provide safe passage by the public. When ordered by the Engineer, the Contractor shall furnish replacement parts and immediately repair the guiderail, but in no case more than 24 hours after notification from the Engineer. In non-emergency situations, the guiderail shall be repaired within 72 hours. The repaired guiderail or anchorages, when completed, shall conform to these specifications for a new system. The Contractor shall be responsible for the removal and the proper disposal of all damaged material and debris.

Method of Measurement: Guiderail damaged solely by the traveling public will be measured for payment. Damage caused by the Contractor's equipment or operations will not be measured for payment.

The sum of money shown on the estimate and in the itemized proposal as "Estimated Cost" for repair of guiderail will be considered the price bid even though payment will be made only for actual work performed. The estimated cost figure is not to be altered in any manner by the bidder. Should the bidder alter the amount shown, the altered figures will be disregarded and the original price will be used to determine the total amount bid for the contract.

Basis of Payment: Repair of guiderail will be paid for in accordance with Article 1.09.04 as required to restore the rail to its full working condition in conformance with these specifications for a new system. There will be no payment for maintenance and protection of traffic for work associated with this item unless, in the opinion of the Engineer, the sole purpose of the maintenance and protection of traffic is for repair of the guiderail.

<u>Pay Item</u>	<u>Pay Unit</u>
Repair Guiderail	est. (est.)

ITEM #0950019A - TURF ESTABLISHMENT - LAWN

Description: The work included in this item shall consist of providing an accepted stand of grass by furnishing and placing seed as shown on the plans or as directed by the Engineer.

Materials: The materials for this work shall conform to the requirements of Section 9.50 of Standard Specification Form 818. The following mix shall be used for this item:

Turf Seed Mix:

In order to preserve and enhance the diversity, the source for seed mixtures shall be locally obtained within the Northeast USA including New England, New York, Pennsylvania, New Jersey, Delaware, or Maryland. One approved seed mixture is detailed below. Other proposed mixtures must be approved by the ConnDOT Landscape Design office.

<u>Proportion (Percent)</u>	<u>Species Common name</u>	<u>Scientific name</u>
20	Kentucky Bluegrass Improved varieties	Poa pratensis
45	Red Fescue Improved varieties	Festuca rubra
35	Perennial Ryegrass Improved varieties	Lolium perenne

Construction Methods: Construction Methods shall be those established as agronomically acceptable and feasible and that are approved by the Engineer. Rate of application shall be field determined in Pure Live Seed (PLS) based on the minimum purity and minimum germination of the seed obtained. Calculate the PLS for each seed species in the mix. Adjust the seeding rate for the above composite mix, based on 250 lbs. per acre. The seed shall be mulched in accordance with Article 9.50.03.

Method of Measurement: This work will be measured for payment by the number of square yards of surface area of accepted established grasses as specified or by the number of square yards of surface area of seeding actually covered and as specified.

Basis of Payment: This work will be paid for at the contract unit price per square yard for “Turf Establishment - Lawn” which price shall include all materials maintenance, equipment, tools, labor, and work incidental thereto. Partial payment of up to 60% may be made for work completed, but not accepted.

Pay Item

Turf Establishment - Lawn

Pay Unit

S.Y.

ITEM #0969054A - CONTRACTOR QUALITY CONTROL PROGRAM

LEVEL 1

Description: The Contractor shall establish, maintain, and implement a written Project-specific Quality Control (QC) Program tailored to the complexity and scope of the work. This Program shall detail the programmatic documentation of the Contractor's processes for delivering the level of construction quality required by the Contract.

The written QC Program shall provide a comprehensive description of the planning, monitoring and reporting program the Contractor shall implement to ensure and document the quality of the work as it progresses.

The QC Program shall address, as a minimum, the following elements: Organization; Design Control; Procurement Control; Control of Subcontractors, Fabricators and Suppliers; Inspection; Special Process Control; Non-Conformance Resolution; Records; and Reporting.

The QC Program shall identify and list critical and routine work categories, which shall be used to differentiate the level of reporting, inspection and attention throughout the process.

The QC Program shall include a method to identify and resolve any deviations from the Contract while maintaining the Project schedule. The QC Program shall include a method to prevent recurring deviations once identified and resolved.

The Contractor shall modify the QC Program as needed to meet the requirements of this specification. The QC Program shall be recognized as a dynamic document, subject to revisions and amendments, as required, in response to actual Site conditions, work methods, and to address deviations encountered and corrected throughout the Project.

The Contractor shall furnish the services of a dedicated (sole responsibility), full-time, on-Site Quality Control Manager (QCM) for the Project. The QCM shall report directly to upper management and shall have the authority to issue stop work orders.

When the Contractor's schedule dictates simultaneous work operations, the Contractor is responsible for supplementing the QCM with additional QC personnel (independent of trade staff) to meet the requirements of this specification.

The additional Contractor Quality Control requirements described herein shall be used in conjunction with the Department's Standard Specifications Form 817. The QC Program is neither intended to relieve the Contractor from its responsibility under the Contract, nor to replace the external inspections of the work carried out by the Engineer.

The minimum lump sum bid for this item shall be **\$200,000**. Failure of the Contractor to bid at least the minimum amount will result in the Department adjusting the Contractor's bid to the minimum bid amount for this item.

Construction Methods:

Submittals

(1) **QCM:** Within thirty (30) days of Contract award, the Contractor shall submit, in writing, the name of their proposed QCM with a resume of their qualifications, submitted in accordance with the requirements listed below, for concurrence by the Department. The QCM shall not be changed without prior written notification to the Department.

The submittal shall outline the credentials of the proposed QCM, who shall be an individual with demonstrated construction experience. This shall include at least 7 years of experience in any combination of the following areas:

- Field inspection experience
- Construction experience relevant to the type of work and the scope of the Project
- Previous experience as a Quality Control professional

The submittal shall also list any certifications or training in quality control principles (NETTCP Quality Assurance Technologist or approved equal) of the proposed QCM and two (2) letters of recommendation from previous clients.

- (2) QC Program: Within forty-five (45) days of Contract award, the Contractor, with direct input from the QCM, shall prepare and submit to the Department, for review and approval, a written QC Program, including the Elements listed below, and in accordance with all requirements of this specification.

Sample forms and reports intended to be used to assure compliance with this specification shall be included in the initial submittal of the QC Program. Sample forms and reports shall include, but are not limited to:

- Sample document control tracking form
- Sample design control tracking form (for Contractor design-build items)
- Sample shop drawing/working drawing review
- Sample material receiving inspection report
- Sample inspection forms for critical work categories
- Sample special process control forms
- Sample non-conformance report
- Sample daily and monthly reports

The Contractor's QCM, Project Manager and a representative of their upper management shall sign the final QC Program submission and any revisions or amendments thereto. Any revisions or amendments made to the QC Program shall be submitted in writing to the Engineer for acceptance.

Subcontractors, fabricators and suppliers involved in critical work categories, as defined in the QC Program, shall have their own work-item specific QC Plan which shall be included as an addendum to the Contractor's QC Program, and shall comply with all conditions of this item.

- (3) Additional QC Personnel: When additional QC personnel are required due to simultaneous work operations, the Contractor shall provide resume(s) of qualifications of the proposed personnel at least thirty (30) days in advance of the work. All additional QC personnel utilized for inspecting, sampling, and testing of materials shall be certified by NETTCP (or another entity acceptable to the Department) in the appropriate designation for the work or materials being inspected, sampled, or tested. These individual(s) shall also have demonstrated construction experience of at least 5 years in any combination of the following areas:

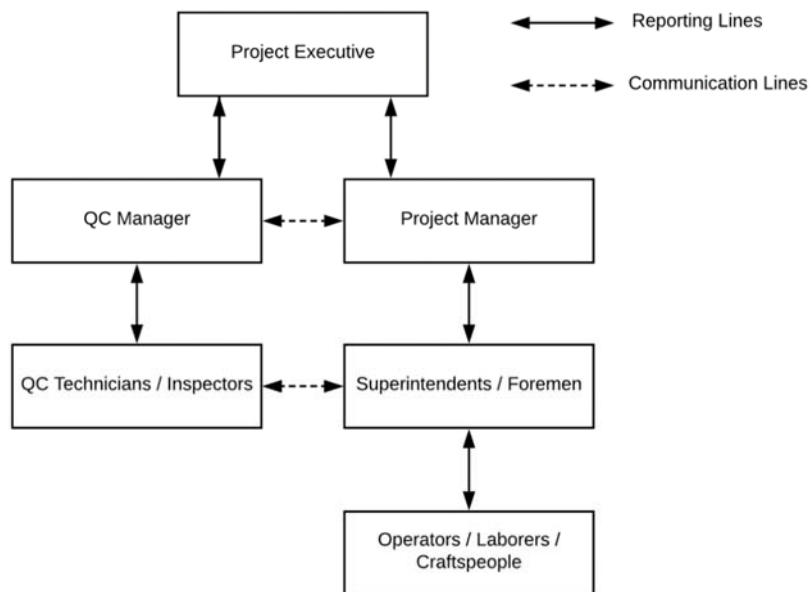
- Field inspection experience
- Construction experience relevant to the type of work and the scope of the Project
- Previous experience as a Quality Control professional

- (4) Laboratories: All laboratories performing QC testing of Project Produced Materials shall be qualified through either the AASHTO Accreditation Program (AAP) or the NETTCP Laboratory Qualification Program. The Contractor shall provide laboratory proof of qualification at least thirty (30) days in advance of the work.

(5) Reports: The Contractor shall be required to produce and submit to the Engineer daily and monthly inspection reports as described in the Reporting Element of this specification.

Elements of the Contractor Quality Control Program:

1. Organization: This Element shall describe the Contractor’s organization, including reporting relationships within and external to the Contractor’s organization. The name of the QCM shall be clearly stated and this individual shall be responsible to upper management and have the authority to stop work. An organizational chart shall be included to graphically depict the Contractor’s organizational structure and major reporting lines and relationships. The organizational chart shall clearly show the hierarchy between the QCM, upper management and additional QC personnel; and a narrative shall follow which shall define the roles, duties and responsibilities of each person in the implementation of the QC Program and in the resolution of QC issues. This Element shall also include the resumes of all QC personnel.



2. Design Control: This Element shall describe how the Contractor and the QCM control any design process (i.e. working and shop drawings) for which it is responsible. This shall include the selection of design input data, checking for correctness, completeness, compatibility and format, and reviewing and approving design output documents prior to submission to the Department. This Element shall provide guidance as to how the QCM or other personnel shall indicate that documents have been reviewed by the Contractor prior to submission, and that Department comments have been adequately addressed prior to any required resubmissions.

3. Procurement Control: This Element shall describe the methods used by the Contractor and the QCM to assure that all materials and specialized equipment provided for the work are as specified. Included shall be guidelines for documenting that purchase documents have been reviewed to assure that correct details have been ordered, including specification, grade, type, color, Buy America or other aspects as required by the Contract.

This Element shall describe receiving inspection activities to be performed, and documentation required to confirm that the correct material or equipment has been delivered. A list of items requiring Materials Certificates and/or Certified Test Reports shall be developed by the Contractor and included in this Element. The Contractor shall prepare a “Material Receiving

Inspection Report” which shall include records of inspections performed and reviews of material test reports or other documentation required by the Contract. It shall also include copies of Materials Certificates and/or Certified Test Reports for all these items.

As a minimum, receiving inspections shall be performed on the following materials:

- Materials requiring a Materials Certificate or Certified Test Report
- Source-Controlled Materials (not inspected at the manufacturing plant)
- Job-Controlled Materials (other than concrete, bituminous and soils)

Following a receiving inspection, a copy of the “Material Receiving Inspection Report,” along with associated documents, shall be submitted to the Engineer.

4. Control of Subcontractors, Fabricators and Suppliers: Subcontractors, fabricators and suppliers involved in critical work categories, as defined in 5(a) herein, shall develop their own QC Plan to be added as an addendum to the Contractor’s QC Program, which shall comply with all conditions of this item. The Contractor shall be responsible for reporting on QC activities performed by or for subcontractors, fabricators and suppliers.

It is the Contractor’s responsibility to notify all subcontractors, fabricators, and suppliers of the requirements of the Contract. This Element shall describe the methods used by the Contractor and the QCM to assure that all the applicable requirements of the Contract are passed on to the subcontractors, fabricators and suppliers. This Element shall include the methods used by the Contractor and the QCM to monitor and control the quality of the work performed by subcontractors, fabricators and suppliers, and to obtain the required quality records.

This Element shall also describe how the Contractor will ensure that:

- The Engineer receives advance notice of:
 - The source of supply
 - The location of fabrication, including component parts
 - The schedule of fabrication, including the date of beginning of fabrication and the date the material is to be delivered to the Project
- Material fabricated specifically for the Project will be inspected and approved prior to being shipped or incorporated into the work
- Properly documented mill test reports are furnished by suppliers
- Subcontractors are approved prior to performing any work for or on the Project

5. Inspection: This Element shall describe how the Contractor and the QCM will assure that the specified quality of materials and workmanship will be achieved. The Contractor’s QC Program is not related to any inspection carried out by the Engineer. Inspection will include the identification and tracking of the quality characteristics (metrics) used to verify that the level of quality of materials and workmanship conforms to the requirements of the Contract.

The QC Program shall identify the reporting requirements for each item based on its work category, and these reporting requirements will be approved by the Engineer. The work categories will be identified as **critical** or **routine**.

(a) Critical Work Categories: For this Project, critical work categories shall include, but are not limited to the following:

- Construction Surveying
- Temporary Relocation of utilities
- Installation of Temporary Utility Support
- Maintenance & Protection of Traffic

- Earthwork
- Hot Mix Asphalt
- Superstructure Demolition
- Substructure Reconstruction and Patching
- Reinforcing Steel
- Structural Steel
- Metallizing
- Structural Concrete
- Roadside Safety (guiderail, barrier, impact attenuators, etc.)
- Removal of Temporary Utility Support

The QCM shall be familiar with all aspects of work related to critical work categories and no work shall be performed on these categories without the prior knowledge of the QCM. The QC Program shall define specific means and methods that shall be employed to minimize, identify, resolve and prevent recurrence of deviations from the Contract in regards to materials or workmanship for each of the critical work categories listed.

The QC Program shall identify hold points in the critical work categories beyond which work operations cannot proceed until the QCM and the Engineer have inspected the work in place and releases the hold.

When simultaneous critical work categories are required by the Contractor's schedule, additional QC personnel shall be required.

This Element shall describe the system(s) used to assure that all materials and workmanship for critical work categories are in conformance with the Contract, including but not limited to:

- visual inspection of the work, including frequency and hold points
- materials to be tested
- tests to be conducted
- frequency of testing
- locations of sampling
- checks
- intermittent or continuous inspections
- inspections of completed work
- or a combination of above methods

Quality control reporting forms shall be developed to document the work performed by the QCM and QC personnel, on each of these critical work categories. The forms shall be signed by Contractor supervisory field personnel, the QCM and QC personnel (if applicable), to document conformance of the work being performed. All work performed by the QCM and QC personnel on these critical work categories shall be documented and included in the QCM's daily and monthly reports.

(b) Routine Work Categories: All other work categories not covered by 6(a) will be defined as routine work categories and the general provisions of this specification shall apply.

6. Special Process Control: This Element shall describe the measures to be used to assure that any special processes (such as, but not limited to, welding, high-strength bolting,

nondestructive examination, critical coatings, surveys, and control of critical tolerances) shall be controlled by procedures that are described in and comply with the Contractor's approved QC Program. The recording of results shall properly document that processes are in conformance with the Contract. In addition, this Element shall describe the methods used to verify, document and track any pre-qualification of the processes, personnel and equipment where required by the Contract.

7. Non-Conformance Resolution: This Element shall describe the protocol(s) for correcting any material or workmanship found not to be in compliance with the Contract, the reporting requirements for documenting any non-compliance, subsequent corrective measures and issue resolution.

(a) Contractor-Issued Non-Conformance Reports: This Element shall outline the Contractor's use of self-issued non-conformance reports to document actions taken to identify, resolve and prevent recurring deviations. The non-conformance reports shall include signatures of the responsible persons for each process of the corrective action taken. Upon resolution of a non-conformance issue, the QC Program shall be revised to identify preventive measures that shall be taken to prevent similar deviations. Contractor supervisory field personnel involved in the work shall be informed of any changes implemented to avoid recurrence of deviations.

(b) Engineer-Issued Non-Compliance Notices (NCN): Non-compliance notices (NCNs) issued by the Engineer shall also be an indication of non-conformance and shall be addressed according to 1.05.11 and resolved to the satisfaction of the Engineer. Upon resolution, the QC Program shall be revised to identify preventive measures that shall be taken to prevent similar deviations. Contractor supervisory field personnel involved in the work shall be informed of any changes implemented to avoid recurrence of deviations.

8. Records: This Element shall describe how various records generated by the Contractor are originated, maintained, received, filed, protected and authenticated. Quality Control records required for submittal to the Engineer shall be described. This Element shall outline the Contractor's procedure for retaining records for a period of 3 years after acceptance of the Contract.

9. Reporting: QC Inspection Reports: The Contractor shall be required to produce and submit to the Engineer daily and monthly inspection reports in accordance with all requirements of this specification. The QC Program shall clearly define the information that shall be provided as part of the daily and monthly reports.

(a) Daily Reports: Daily reports shall include documentation of all activities, including inspection, material testing, and any work associated with the Elements of this specification, performed by the QCM and other QC personnel. The location of any forms relative to this specification shall be referenced in the daily reports.

For any week that a non-conformance report is issued, either by the Contractor or the Engineer, actions taken to resolve the non-conformance report shall be summarized and included with the submission of the daily reports. Updates on the status of the non-conformance shall continue in each submission of daily reports until the non-conformance issue is resolved. Once resolved, the next submission of daily reports shall document that supervisory field personnel involved in the work have been informed of any changes to be implemented to avoid recurrence of deviations. Any revisions or amendments made to the

QC Program, once submitted and accepted by the Engineer, shall be documented in the next submission of daily reports.

Daily reports shall be submitted (as a package) to the Engineer by 12 PM on the Tuesday following the week of the inspection reports, or as agreed to by the Engineer. Except as otherwise authorized by the Engineer, submissions after that time will be considered late.

(b) Monthly Reports: Monthly reports shall include a summary of the work performed, including QC activities, in the previous month and also a one (1) month “look ahead” schedule with expected QC efforts and procedures for critical and routine work categories. Monthly reports shall also include a submittal status update spreadsheet.

Monthly reports shall be submitted to the Engineer by the fifth (5th) business day each month. Except as otherwise authorized by the Engineer, monthly submissions after that time will be considered late.

(c) Quality Assurance/Quality Control (QA/QC) Meetings: Meetings shall be held specific to the QC Program. The Contractor shall, at minimum, be represented by the QCM and shall meet with the Engineer every other week, or more frequently at the Engineer’s request, to review reporting and all work related to this specification.

Method of Measurement: Within forty-five (45) calendar days of the award of the Contract, the Contractor shall submit to the Engineer for approval a schedule of values of its lump sum bid price for this item detailing the following:

1. The development costs to prepare the written QC Program. Development costs shall be ten percent (10%) of the total cost of the item.
2. The cost per-month to provide the services of the QC Program, including the QCM, QC activities, necessary QC personnel, preparing and submitting daily and monthly reports, and all other requirements of this specification. A per-month cost will be derived by taking the lump sum bid price, subtracting the development cost to prepare the written QC Program, and dividing the remainder by the number of Contract months remaining from the date of submission of the written QC Program.

Basis of Payment: This item will be paid for at the Contract lump sum price for “Contractor Quality Control Program Level 1” complete, which price shall include all submittals, QC Program revisions and amendments, inspections, monitoring, daily logs, reports, meetings, records, and all materials, equipment, labor and work incidental thereto.

Upon approval of the schedule of values by the Engineer, payments for work performed will be made as follows:

1. Upon acceptance of the written QC Program, the lump sum development cost from the payment schedule will be approved for payment.
2. Upon acceptable completion of the services of the QC Program for the month, the per-month cost will be approved for payment.

The Engineer reserves the right to apply the following reductions to the monthly payment portion, which cannot be recovered and will result in a reduction in the lump sum amount, should the Contractor fail to meet the requirements of this specification:

1. QC staff: A five percent (5%) reduction to the monthly payment will be applied for each day that acceptable QC services are not provided. The total reduction for any calendar month will not exceed the monthly payment for the item.

2. Reports: A five percent (5%) reduction to the monthly payment will be applied for each day that the required reports have been submitted late, up to a maximum of fifty percent (50%) of the monthly payment per report. This five percent (5%) reduction will apply to each independent report (each package of daily reports, described in 9(a) above, submitted on a weekly basis is considered one independent report). The total reduction for any calendar month will not exceed the monthly payment for the item.
3. QA/QC Meetings: A twenty-five percent (25%) reduction to the monthly payment will be applied for each bi-weekly QA/QC meeting not attended by the QCM. The total reduction for any calendar month will not exceed the monthly payment for the item.

Should the Contractor fail to continuously provide an acceptable QC Program, as required by this specification, the Engineer may withhold the entire monthly estimate until such time as all requirements are met.

Should the Contractor fail to comply with the QCM requirements of this specification, the QCM shall be replaced at the Engineer's request.

Only one monthly payment will be made for each calendar month regardless of the number of personnel required to complete the specified work.

Pay Item	Pay Unit
Contractor Quality Control Program Level 1	l.s.

ITEM #0969062A - CONSTRUCTION FIELD OFFICE, MEDIUM

Description: Under the item included in the bid document, adequate weatherproof office quarters with related furnishings, materials, equipment and other services, shall be provided by the Contractor for the duration of the work, and if necessary, for a close-out period determined by the Engineer. The office, furnishings, materials, equipment, and services are for the exclusive use of CTDOT forces and others who may be engaged to augment CTDOT forces with relation to the Contract. The office quarters shall be located convenient to the work site and installed in accordance with Article 1.08.02. This office shall be separated from any office occupied by the Contractor. Ownership and liability of the office quarters shall remain with the Contractor.

Furnishings/Materials/Supplies/Equipment: All furnishings, materials, equipment and supplies shall be in like new condition for the purpose intended and require approval of the Engineer.

Office Requirements: The Contractor shall furnish the office quarters and equipment as described below:

Description \ Office Size	Med.
Minimum Sq. Ft. of floor space with a minimum ceiling height of 7 ft.	400
Minimum number of exterior entrances.	2
Minimum number of parking spaces.	7

Office Layout: The office shall have a minimum square footage as indicated in the table above, and shall be partitioned as shown on the building floor plan as provided by the Engineer.

Tie-downs and Skirting: Modular offices shall be tied-down and fully skirted to ground level.

Lavatory Facilities: For field offices sizes Small and Medium the Contractor shall furnish a toilet facility at a location convenient to the field office for use by CTDOT personnel and such assistants as they may engage; and for field offices sizes Large and Extra Large the Contractor shall furnish two (2) separate lavatories with toilet (men and women), in separately enclosed rooms that are properly ventilated and comply with applicable sanitary codes. Each lavatory shall have hot and cold running water and flush-type toilets. For all facilities the Contractor shall supply lavatory and sanitary supplies as required.

Windows and Entrances: The windows shall be of a type that will open and close conveniently, shall be sufficient in number and size to provide adequate light and ventilation, and shall be fitted with locking devices, blinds and screens. The entrances shall be secure, screened, and fitted with a lock for which four keys shall be furnished. All keys to the construction field office shall be furnished to the CTDOT and will be kept in their possession while State personnel are using the office. Any access to the entrance ways shall meet applicable building codes, with appropriate handrails. Stairways shall be ADA/ABA compliant and have non-skid tread surfaces. An ADA/ABA compliant ramp with non-skid surface shall be provided with the Extra-Large field office.

Lighting: The Contractor shall equip the office interior with electric lighting that provides a minimum illumination level of 100 foot-candles at desk level height, and electric outlets for each desk and drafting table. The Contractor shall also provide exterior lighting that provides a minimum illumination level of 2 foot-candles throughout the parking area and for a minimum distance of 10 ft. on each side of the field office.

Parking Facility: The Contractor shall provide a parking area, adjacent to the field office, of sufficient size to accommodate the number of vehicles indicated in the table above. If a paved parking area is not readily available, the Contractor shall construct a parking area and driveway consisting of a minimum of 6 inches of processed aggregate base graded to drain. The base material will be extended to the office entrance.

Field Office Security: Physical Barrier Devices - This shall consist of physical means to prevent entry, such as: 1) All windows shall be barred or security screens installed; 2) All field office doors shall be equipped with dead bolt locks and regular day operated door locks; and 3) Other devices as directed by the Engineer to suit existing conditions.

Electric Service: The field office shall be equipped with an electric service panel, wiring, outlets, etc., to serve the electrical requirements of the field office, including: lighting, general outlets, computer outlets, calculators etc., and meet the following minimum specifications:

- A. 120/240 volt, 1 phase, 3 wire
- B. Ampacity necessary to serve all equipment. Service shall be a minimum 100 amp dedicated to the construction field office.
- C. The electrical panel shall include a main circuit breaker and branch circuit breakers of the size and quantity required.
- D. Additional 120 volt, single phase, 20 amp, isolated ground dedicated power circuit with dual NEMA 5-20 receptacles will be installed at each desk and personal computer table (workstation) location.
- E. Additional 120 volt, single phase, 20 amp, isolated ground dedicated power circuit with dual NEMA 5-20 receptacles will be installed, for use by the Telephone Company.
- F. Additional 120-volt circuits and duplex outlets as required meeting National Electric Code requirements.
- G. One exterior (outside) wall mounted GFI receptacle, duplex, isolated ground, 120 volt, straight blade.
- H. After work is complete and prior to energizing, the State's CTDOT electrical inspector, must be contacted at 860-594-2240. (Do Not Call Local Town Officials)
- I. Prior to field office removal, the CTDOT Office of Information Systems (CTDOT OIS) must be notified to deactivate the communications equipment.

Heating, Ventilation and Air Conditioning (HVAC): The field office shall be equipped with sufficient heating, air conditioning and ventilation equipment to maintain a temperature range of 68°-80° Fahrenheit within the field office.

Telephone Service: The Contractor shall provide telephone service with unlimited nation-wide calling plan. For a Small, Medium and Large field office this shall consist of the installation of two (2) telephone lines: one (1) line for phone/voice service and one (1) line dedicated for the facsimile machine. For an Extra-Large field office this shall consist of four (4) telephone lines: three (3) lines for phone/voice service and one (1) line dedicated for facsimile machine. The Contractor shall pay all charges.

Data Communications Facility Wiring: Contractor shall install a Category 6 568B patch panel in a central wiring location and Cat 6 cable from the patch panel to each PC station, Smart Board location, Multifunction Laser Printer/Copier/Scanner/Fax, terminating in a (Category 6 568B) wall or surface mount data jack. The central wiring location shall also house either the data circuit with appropriate power requirements or a category 5 cable run to the location of the installed data circuit. The central wiring location will be determined by the CTDOT OIS staff in coordination with the designated field office personnel as soon as the facility is in place.

For Small, Medium and Large field offices the Contractor shall run a CAT 6 LAN cable a minimum length of 25 feet for each CTDOT networked device (including but not limited to: smartboards and Multi-Function Laser Printer/Copier/Scanner/Fax) to LAN switch area leaving an additional 10 feet of cable length on each side with terminated RJ45 connectors. For an Extra-Large field office the Contractor shall run CAT 6 LAN cables from workstations, install patch panel in data circuit demark area and terminate runs with RJ45 jacks at each device location. Terminate runs to patch panel in LAN switch area. Each run / jack shall be clearly labeled with an identifying Jack Number.

The Contractor shall supply cables to connect the Wi-Fi printer to the Contractor supplied internet router and to workstations/devices as needed. These cables shall be separate from the LAN cables and data Jacks detailed above for the CTDOT network.

The number of networked devices anticipated shall be at least equal to the number of personal computer tables, Multi-Function Laser Printer/Copier/Scanner/Fax, and smartboards listed below.

The installation of a data communication circuit between the field office and the CTDOT OIS in Newington will be coordinated between the CTDOT District staff, CTDOT OIS staff and the local utility company once the Contractor supplies the field office phone numbers and anticipated installation date. The Contractor shall provide the field office telephone number(s) to the CTDOT Project Engineer within 10 calendar days after the signing of the Contract as required by Article 1.08.02. This is required to facilitate data line and computer installations.

Additional Equipment, Facilities and Services: The Contractor shall provide at the field Office at least the following to the satisfaction of the Engineer:

Furnishing Description	Office Size
	Med.
	Quantity
Office desk (2.5 ft. x 5 ft.) with drawers, locks, and matching desk chair that have pneumatic seat height adjustment and dual wheel casters on the base.	3
Standard secretarial type desk and matching desk chair that has pneumatic seat height adjustment and dual wheel casters on the base.	-
Personal computer tables (4 ft. x 2.5 ft.).	3
Drafting type tables (3 ft. x 6 ft.) and supported by wall brackets and legs; and matching drafters stool that have pneumatic seat height adjustment, seat back and dual wheel casters on the base.	1
Conference table, 3 ft. x 12 ft.	-
Table – 3 ft. x 6 ft.	-
Office Chairs.	4
Mail slot bin – legal size.	-
Non-fire resistant cabinet.	-
Fire resistant cabinet (legal size/4 drawer), locking.	1
Storage racks to hold 3 ft. x 5 ft. display charts.	-
Vertical plan racks for 2 sets of 2 ft. x 3 ft. plans for each rack.	1
Double door supply cabinet with 4 shelves and a lock – 6 ft. x 4 ft.	-
Case of cardboard banker boxes (Min 10 boxes/case)	1
Open bookcase – 3 shelves – 3 ft. long.	-
White Dry-Erase Board, 36" x 48" min. with markers and eraser.	1
Interior partitions – 6 ft. x 6 ft., soundproof type, portable and freestanding.	-
Coat rack with 20 coat capacity.	-
Wastebaskets - 30 gal., including plastic waste bags.	1
Wastebaskets - 5 gal., including plastic waste bags.	3
Electric wall clock.	-
Telephone.	1
Full size stapler 20 (sheet capacity, with staples)	2
Desktop tape dispensers (with Tape)	2
8 Outlet Power Strip with Surge Protection	4
Rain Gauge	1
Business telephone system for three lines with ten handsets, intercom capability, and one speaker phone for conference table.	-

Mini refrigerator - 3.2 c.f. min.	1
Hot and cold water dispensing unit. Disposable cups and bottled water shall be supplied by the Contractor for the duration of the project.	1
Microwave, 1.2 c.f. , 1000W min.	1
Fire extinguishers - provide and install type and *number to meet applicable State and local codes for size of office indicated, including a fire extinguisher suitable for use on a computer terminal fire.	*
Electric pencil sharpeners.	2
Electronic office type printing calculators capable of addition, subtraction, multiplication and division with memory and a supply of printing paper.	1
Small Multi-Function Laser Printer/Copier/Scanner/Fax combination unit, network capable, as specified below under <u>Computer Related Hardware and Software</u> .	1
Large Multi-Function Laser Printer/Copier/Scanner/Fax combination unit, network capable, as specified below under <u>Computer Related Hardware and Software</u> .	
Field Office Wi-Fi Connection as specified below under <u>Computer Related Hardware and Software</u>	1
Wi-Fi Printer as specified below under <u>Computer Related Hardware and Software</u> .	1
Digital Camera as specified below under <u>Computer Related Hardware and Software</u> .	1
Video Projector as specified below under <u>Computer Related Hardware and Software</u> .	-
Smart Board as specified below under <u>Computer Related Hardware and Software</u> .	-
Infrared Thermometer, including annual third party certified calibration, case, and cleaning wipes.	1
Concrete Curing Box as specified below under Concrete Testing Equipment.	1
Concrete Air Meter and accessories as specified below under Concrete Testing Equipment as specified below. Contractor shall provide third party calibration on a quarterly basis.	1
Concrete Slump Cone and accessories as specified below under Concrete Testing Equipment.	1
First Aid Kit	1
Flip Phones as specified under <u>Computer Related Hardware and Software</u> .	-

Smart Phones as specified under <u>Computer Related Hardware and Software</u> .	-
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The furnishings and equipment required herein shall remain the property of the Contractor. Any supplies required to maintain or operate the above listed equipment or furnishings shall be provided by the Contractor for the duration of the project.

Computer Related Hardware and Software: The CTDOT will supply by its own means the actual Personal Computers for the CTDOT representatives. The Contractor shall supply the Field Office Wi-Fi Connection, Wi-Fi Printer, Digital Camera(s), Flip Phones, Smart Phones, Multifunction Laser Printer/Copier/Scanner/Fax, Video Projectors, and Smart Board(s) as well as associated hardware and software, must meet the requirements of this specification as well as the latest minimum specifications posted, as of the project advertising date, at CTDOTs web site <http://www.ct.gov/dot/cwp/view.asp?a=1410&q=563904>

Within 10 calendar days after the signing of the Contract but before ordering/purchasing the Wi-Fi Printer (separate from the Multifunction Laser Printer/Copier/Scanner/Fax), Field Office Wi-Fi, Digital Camera(s), Flip Phones, Smart Phones, Multifunction Laser Printer/Copier/Scanner/Fax, Video Projector(s) and Smart Board(s) as well as associated hardware, the Contractor must submit a copy of their proposed order(s) with catalog cuts and specifications to the Administering CTDOT District for review and approval. The Wi-Fi Printer, Wi-Fi Router, Flip Phones, Smart Phones, digital cameras, Projector(s) and Smart Board(s) will be reviewed by CTDOT District personnel. The Multifunction Laser Printer/Copier/Scanner/Fax will be reviewed by the CTDOT OIS. The Contractor shall not purchase the hardware, software, or services until the Administering CTDOT District informs them that the proposed equipment, software, and services are approved. The Contractor will be solely responsible for the costs of any hardware, software, or services purchased without approval.

The Contractor and/or their internet service provider shall be responsible for the installation and setup of the field office Wi-Fi, Wi-Fi printer, and the configuration of the wireless router as directed by the CTDOT. Installation will be coordinated with CTDOT District and Project personnel.

After the approval of the hardware and software, the Contractor shall contact the designated representatives of the CTDOT administering District, a minimum of 2 working days in advance of the proposed delivery or installation of the Field Office Wi-Fi Connection, Wi-Fi Printer, Digital Camera(s), Flip Phones, Smart Phones, Multifunction Laser Printer/Copier/Scanner/Fax, Video Projectors and Smart Board(s), as well as associated hardware, software, supplies, and support documentation.

The Contractor shall provide all supplies, paper, maintenance, service and repairs (including labor and parts) for the Wi-Fi printers, copiers, field office Wi-Fi, fax machines and other equipment and facilities required by this specification for the duration of the Contract. All repairs must be performed with-in 48 hours. If the repairs require more than 48 hours then an equal or better replacement must be provided.

Once the Contract has been completed, the hardware and software will remain the property of the Contractor.

First Aid Kit: The Contractor shall supply a first aid kit adequate for the number of personnel expected based on the size of the field office specified and shall keep the first aid kit stocked for the duration that the field office is in service.

Rain Gauge: The Contractor shall supply install and maintain a rain gauge for the duration of the project, meeting these minimum requirements. The rain gauge shall be installed on the top of a post such that the opening of the rain gauge is above the top of the post an adequate distance to avoid splashing of rain water from the top of the post into the rain gauge. The Location of the rain gauge and post shall be approved by the Engineer. The rain gauge shall be made of a durable material and have graduations of 0.1 inches or less with a minimum total column height of 5 inches. If the rain gauge is damaged the Contractor shall replace it prior to the next forecasted storm event at no additional cost.

Concrete Testing Equipment: If the Contract includes items that require compressive strength cylinders for concrete, in accordance with the Schedule of Minimum Testing Requirements for Sampling Materials for Test, the Contractor shall provide the following equipment.

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

All testing equipment will remain the property of the Contractor at the completion of the project.

Insurance Policy: The Contractor shall provide a separate insurance policy, with no deductible, in the minimum amount of five thousand dollars (\$5,000) in order to insure all State-owned data equipment and supplies used in the office against all losses. The Contractor shall be named insured on that policy, and the CTDOT shall be an additional named insured on the policy. These losses shall include, but not be limited to: theft, fire, and physical damage. The CTDOT will be responsible for all maintenance costs of CTDOT owned computer hardware. In the event of loss, the Contractor shall provide replacement equipment in accordance with current CTDOT equipment specifications, within seven days of notice of the loss. If the Contractor is unable to provide the required replacement equipment within seven days, the CTDOT may provide replacement equipment and deduct the cost of the equipment from monies due or which may become due the Contractor under the Contract or under any other contract. The Contractor's financial liability under this paragraph shall be limited to the amount of the insurance coverage required by this paragraph. If the cost of equipment replacement

required by this paragraph should exceed the required amount of the insurance coverage, the CTDOT will reimburse the Contractor for replacement costs exceeding the amount of the required coverage.

Maintenance: During the occupancy by the CTDOT, the Contractor shall maintain all facilities and furnishings provided under the above requirements, and shall maintain and keep the office quarters clean through the use of weekly professional cleaning to include, but not limited to, washing & waxing floors, cleaning restrooms, removal of trash, etc. Exterior areas shall be mowed and clean of debris. A trash receptacle (dumpster) with weekly pickup (trash removal) shall be provided. Snow removal, sanding and salting of all parking, walkway, and entrance ways areas shall be accomplished during a storm if on a workday during work hours, immediately after a storm and prior to the start of a workday. If snow removal, salting and sanding are not completed by the specified time, the State will provide the service and all costs incurred will be deducted from the next payment estimate.

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

There will not be any price adjustment due to any change in the minimum computer related hardware and software requirements.

Basis of Payment: The furnishing and maintenance of the Construction Field Office will be paid for at the Contract unit price per month for “Construction Field Office, (Medium),” which price shall include all material, equipment, labor, service contracts, licenses, software, repair or replacement of hardware and software, related supplies, utility services, parking area, external illumination, trash removal, snow and ice removal, and work incidental thereto, as well as any other costs to provide requirements of this specified this specification.

<u>Pay Item</u>	<u>Pay Unit</u>
Construction Field Office, (Medium)	Month

ITEM #0971001A - MAINTENANCE AND PROTECTION OF TRAFFIC

Article 9.71.01 – Description *is supplemented by the following:*

The Contractor shall maintain and protect traffic as described by the following and as limited in the special provision for Section 1.08 - Prosecution and Progress:

Route I-84

The Contractor shall maintain and protect the minimum number of through lanes and shoulders on a paved travel path not less than 12 feet in width per lane during the hours dictated in the special provision for Article 1.08.04 – Limitation of Operations.

The Contractor will be permitted to halt traffic during the allowable periods. If more than one 20 minute period is required, then the Contractor shall allow all stored vehicles to proceed through the work area prior to the next stoppage.

Benson Road

The Contractor shall maintain and protect a minimum of 1 lane of traffic in each direction with each lane on a paved travel path not less than 11 feet in width, with the following exceptions:

1. 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 and no more than 300 feet in length, unless specified elsewhere in the Contract. There shall be no more than one alternating one-way traffic operation within the Project limits without prior approval of the Engineer.
2. During the allowable period, the Contractor will be permitted to close Benson Road to through traffic and detour traffic as shown on the Detour Plans. The Contractor shall notify the Engineer at least two weeks prior to implementing the detour. The Contractor shall not be allowed to implement both detours simultaneously

Bucks Hill Road

The Contractor shall maintain and protect a minimum of 1 lane of traffic in each direction with each lane on a paved travel path not less than 11 feet in width, with the following exceptions:

1. 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 and no more than 300 feet in length, unless specified elsewhere in the Contract. There shall be no more than one alternating one-way traffic operation within the Project limits without prior approval of the Engineer.
2. During the allowable period, the Contractor will be permitted to close Bucks Hill Roads to through traffic and detour traffic as shown on the Detour Plans. The Contractor shall notify the Engineer at least two weeks prior to implementing the detour. The Contractor shall not be allowed to implement both detours simultaneously”

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 permitted to temporarily close

affected driveways while actively working with coordination and permission from the owner or proprietor.

Article 9.71.03 - Construction Methods *is supplemented as follows:*

General

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

The Contractor shall schedule operations so that pavement removal and roadway resurfacing shall be completed full width across a roadway or bridge section by the end of a work shift, or as directed by the Engineer.

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

The Contractor, during the course of any active overhead construction work, 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.

When an existing sign is to be relocated or replaced, the work shall be completed during the same work shift.

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

On limited-access highways, construction vehicles entering travel lanes 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 the posted speed limit, in order to merge with existing traffic.

Existing Signing

The Contractor shall maintain all existing overhead and side-mounted signs within the Project limits throughout the duration of the Project. The Contractor shall temporarily relocate signs and sign supports as many times as deemed necessary, and shall install temporary sign supports if necessary and as directed by the Engineer.

Requirements for Winter

The Contractor shall schedule a meeting with representatives of the Department, including the offices of Maintenance and Traffic, and the Town/City to determine any interim traffic control measures the Contractor shall accomplish prior to winter to provide safety to 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.

Temporary pavement markings shall be installed on each intermediate course of bituminous concrete pavement and on any milled surface by the end of the work shift.

Permanent Epoxy Resin Pavement Markings shall be installed on the final course of bituminous concrete pavement within 10 calendar days of the final pavement installation if no Pavement Marking Grooves are proposed.

Temporary Pavement Markings

Temporary pavement markings shall consist of temporary painted pavement markings and shall be installed in accordance with Section 12.09. The markings shall include 4 inch wide white lane lines (solid and broken), 4 inch wide edge lines, lane-use arrows at the stop bar. Temporary 12 inch wide white stop bars shall consist of temporary pavement marking tape, as described below.

Refer to Pavement Marking Groove special provisions for pavement marking requirements.

Temporary 12 inch wide white stop bars consisting of temporary plastic pavement marking tape shall be installed on exit ramps if permanent Epoxy Resin Pavement Markings are not installed by the end of the work shift on the final course of bituminous concrete pavement. Temporary 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 is included under the applicable temporary pavement marking items.

All temporary pavement markings exposed throughout the winter shall be Epoxy Resin Pavement Markings, unless directed otherwise by the Engineer.

Temporary pavement markings, as described above, shall be maintained until the permanent pavement markings are installed.

Final Pavement Markings

Refer to Pavement Marking Groove special provisions for pavement marking requirements. Permanent epoxy resin pavement markings shall be installed in accordance with Section 12.10 and the applicable Traffic Engineering Standard Drawings.

If Temporary Plastic Pavement Marking Tape is installed, then the Contractor shall remove and dispose of these markings during the same work shift that the permanent epoxy resin pavement

markings are to be installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be paid for under the appropriate pay items.

Pavement Markings - Non-Limited Access Roadways

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

Temporary pavement markings shall be installed on each intermediate course of bituminous concrete pavement and on any milled surface by the end of the work shift.

Permanent Epoxy Resin Pavement Markings shall be installed on the final course of bituminous concrete pavement within 10 calendar days of the final pavement installation if no Pavement Marking Grooves are proposed.

Temporary Pavement Markings

Temporary pavement markings that will be in place for less than 72 continuous hours may consist of temporary plastic pavement marking tape at the Contractor's expense. Additionally;

1. These temporary pavement markings shall include centerlines, lane lines (solid and broken), and stop bars.
2. Centerlines shall consist of two 4 inch wide yellow markings, 2 feet in length, side by side, 4 inches apart, at 40 foot intervals.
3. Lane lines shall consist of 4 inch wide white markings, 2 feet in length, at 40 foot intervals.
4. No passing zones shall be posted with signs in those areas where the final centerlines have not been established on two-way roadways.
5. Stop bars may consist of two 6 inch wide white markings or three 4 inch wide white markings placed side by side.
6. The temporary plastic pavement marking tape shall be installed in accordance with Section 12.12.
7. The Contractor shall remove and dispose of the temporary plastic pavement marking tape prior to another course of bituminous concrete pavement being installed.

Temporary pavement markings that will be in place for 72 continuous hours or more should consist of temporary painted pavement markings and shall be installed in accordance with Section 12.09. The markings shall include centerlines, edge lines, lane lines (solid and broken), 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 shift. Edge lines and lane-use arrows are not required if the next course of bituminous concrete pavement will be placed within 10 calendar days.

All temporary pavement markings exposed throughout the winter shall be Epoxy Resin Pavement Markings, unless directed otherwise by the Engineer.

Temporary pavement markings, as described above, shall be maintained until the permanent pavement markings are installed.

Final Pavement Markings

Refer to Pavement Marking Groove special provisions for pavement marking requirements. Permanent epoxy resin pavement markings shall be installed in accordance with Section 12.10 and the applicable Traffic Engineering Standard Drawings.

If Temporary Plastic Pavement Marking Tape is installed, then the Contractor shall remove and dispose of these markings during the same work shift that the permanent epoxy resin pavement markings are to be installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

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 a safer and more 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 or is within the clear zone. 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 in order to command respect from the motorist.

Lane reduction tapers should be placed so that the entire length of the taper is installed on a tangent section of roadway and the entire taper area can be seen by the motorist.

All existing conflicting signs shall be removed, covered with an opaque material, or turned so that they are not legible to oncoming traffic prior to implementing a traffic control pattern. The existing signs shall be uncovered or reinstalled once the pattern is removed.

A buffer area should be provided during installation of a traffic control pattern and maintained for the duration of the work. The buffer area shall be free of any equipment, workers, materials, and parked vehicles.

Construction Traffic Control Plans 19 through 25 should be used for moving operations such as line striping, rumble strips, pothole patching, mowing, or sweeping when it is necessary for equipment to occupy a travel lane.

Traffic control patterns are not required for vehicles on an emergency patrol type activity or for a short duration stop of up to one hour, as long as the equipment is contained within the shoulder. Flashing lights, arrow boards, truck-mounted or trailer-mounted impact attenuators, and appropriate Trafficperson(s) shall be used when required.

In a situation not adequately covered by the Construction Traffic Control Plans, the Contractor shall contact the Engineer for assistance prior to setting up a traffic control pattern.

Placement of Signs

Signs shall be placed in a position that allows 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 Construction Traffic Control Plans

The Construction 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.

The proper application of the Construction Traffic Control Plans and installation of traffic control devices is dependent upon actual field conditions.

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.

Adjustments to the Construction Traffic Control Plans shall only be made at the direction of the Engineer.

Table 1 indicates the minimum taper lengths required for a lane closure based on the posted speed limit and lane width of the roadway. These taper lengths shall only be used when the recommended taper lengths shown on the Construction Traffic Control Plans cannot be achieved.

Table 1 – Minimum Taper Length

POSTED SPEED LIMIT (MPH)	MINIMUM TAPER LENGTH FOR A SINGLE LANE CLOSURE (FEET)	
	FREEWAYS	SECONDARY ROADS
30 OR LESS	180	165
35	245	225
40	320	295
45	540	495
50	600	550
55	660	605
65	780	715

1. Work Zone Safety Meetings

- 1.a) Prior to the commencement of work, a Work Zone Safety Meeting shall be conducted with representatives from 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. DOT Traffic Engineering shall be invited to the Work Zone Safety Meeting. 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 shall include:
 - i. Review Project scope of work and time;
 - ii. Review Section 1.08, Prosecution and Progress;
 - iii. Review Section 9.70, Trafficpersons;
 - iv. Review Section 9.71, Maintenance and Protection of Traffic;
 - v. Review Contractor's schedule and method of operations;
 - vi. Review special concern areas: ramps, turning roadways, medians, lane drops, etc.;
 - vii. Open discussion of work zone questions and issues;
 - viii. Discussion of review and approval process for changes in Contract requirements as they relate to work zone areas.

2. General

- 2.a) Traffic control patterns shall only be installed if the required minimum number of signs, traffic cones, traffic drums, and other equipment (i.e. one Arrow Board for each lane closed, two Truck-Mounted or Trailer-Mounted Attenuators (TMAs), Changeable Message Sign, etc.) are on Site.
- 2.b) The Contractor shall have spare maintenance and protection of traffic equipment (TMAs, Arrow Board, Changeable Message Sign(s), construction signs, traffic cones, traffic drums, etc.) available at all times in case of mechanical failures, etc. Spare maintenance and protection of traffic equipment installed as a result of a sudden equipment breakdown shall be replaced by the Contractor 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 lost time.
- 2.d) In cases of differences of opinion between the Contractor and the Inspection staff, the Contractor shall follow the directions of the Engineer. 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.

3. Installing and Removing Traffic Control Patterns

- 3.a) Lane closures shall be installed beginning with the advance warning signs and proceeding forward toward the work area.
- 3.b) Lane closures shall be removed in the reverse order, beginning at the end of the work area, or traffic control pattern, and proceeding back toward the advance warning signs.
- 3.c) Stopping traffic may be allowed within the allowable hours stated in Section 1.08.04:
 - i. For those activities stated within the Contract.
 - ii. During paving, milling operations, or similar activities 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 so traffic does not travel across the longitudinal joint or difference in roadway elevation.
 - iii. To move slow moving equipment across live traffic lanes into the work area.
- 3.d) The Contractor shall adhere to using the proper signs, placing the signs correctly, and ensuring the proper spacing of signs.
- 3.e) 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 with or exiting from the mainline traffic. This shall be completed before installing the mainline pattern past the ramp or intersecting roadway.
- 3.f) Workers are prohibited from crossing the travel lanes on limited access roadways 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.

4. Implementation of Rolling Road Block (RRB)

- 4.a) Temporary road closures using a RRB may be allowed on limited access highways for operations associated with the installation and removal of temporary lane closures. RRB may be allowed for the installation and removal of lead signs and lane tapers only and shall meet the following requirements:
 - i. Refer to the Limitation of Operations Chart provided in Section 1.08.04 for the hours allowed for implementing a RRB operation. The Contractor shall only implement a RRB operation within the hours shown in the Chart.
 - ii. In areas with good sight lines and full shoulders, signs on the side of the road opposite the traffic pattern should be installed in a separate operation.
 - iii. TMAs equipped with Arrow Boards shall be used to slow traffic to implement the RRB. State Police Officers in marked vehicles may be used to support the implementation of the RRB. The RRB shall start by having all vehicles, including TMAs and police vehicles, leave the shoulder or on-ramp and accelerate

- to normal roadway speeds in each lane. The vehicles will then position themselves side by side and decelerate to the RRB speed on the highway.
- iv. A Pre-Warning Vehicle, as specified elsewhere in the Contract, shall be used to advise the motorists that sign pattern installation or removal is underway.
 - v. The RRB duration shall not exceed 15 minutes from the start of the traffic block until all lanes are opened as designated in the Limitation of Operations chart. If the RRB duration exceeds 15 minutes on 2 successive shifts, no further RRB will be allowed until the Contractor obtains approval for a revised installation procedure from the District.
 - vi. RRB shall not be used to expand a lane closure pattern to an additional lane during the shift. The workers and equipment required to implement the additional lane closure should be staged from within the closed lane. TMAs (and State Police if available) shall be used to protect the workers installing the taper in the additional lane.
 - vii. Exceptions to these work procedures may be submitted to the District Office for consideration. A minimum of 2 business days shall be allowed for review and comment by the District.
 - viii. The Engineer and the Contractor will review and discuss the RRB procedures (including any revisions) in advance of the work. The implementation of the agreed upon plan will be reviewed with the State Police during the Work Zone Safety Meeting held before each shift involving temporary lane closures. If the State Police determine that alternative procedures should be implemented for traffic control during the work shift, the Department and Contractor will attempt to resolve any discrepancies with the duty sergeant at the Troop. If the discrepancies are unable to be resolved prior to the start of the shift, then the work will proceed as recommended by the Department. Any unresolved issues shall be addressed the following day.

5. Use of Arrow Boards

- 5.a) On limited access roadways, one Arrow Board shall be used for each lane that is closed. The Arrow Board shall be installed concurrently with the installation of the traffic control pattern and its placement shall be as shown on the Construction Traffic Control Plans. Additional Arrow Boards shall be deployed if sight distances are limited.
- 5.b) On non-limited access roadways, the use of an Arrow Board for lane closures is optional. The roadway geometry, sight distance, and traffic volume shall be considered in the decision to use the Arrow Board.
- 5.c) A vehicle displaying an arrow board shall be equipped with high-intensity rotating, flashing, oscillating, or strobe lights.
- 5.d) The flashing arrow mode shall be used for lane closure (merge) tapers.

- 5.e) The flashing arrow mode shall not be used for temporary alternating one-way traffic operations or to laterally shift lanes of traffic.
- 5.f) The flashing double arrow mode shall only be used for closing a center lane on a multilane roadway where adjacent left and right lanes remain open.
- 5.g) For shoulder work or roadside work near the shoulder, the Arrow Board shall be positioned in the shoulder and the flashing alternating diamond mode should be used.
- 5.h) The flashing alternating diamond caution mode should also be used when supplemental Arrow Boards are positioned in an already closed lane.

6. Use of Truck-Mounted or Trailer-Mounted Impact Attenuators (TMAs)

- 6.a) On limited access roadways, lane closures shall use a minimum of two TMAs to install and remove traffic control patterns. If two TMAs are not available, then the pattern shall not be installed.
- 6.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 shall be considered in the decision to utilize the TMAs.
- 6.c) On limited access roadways, one TMA shall be placed on the shoulder and the second TMA shall be approximately 1,000 feet ahead blocking the lane to establish the advance and transition signing. The Arrow Board mounted on the TMA shall be in the arrow mode when taking the lane. The sign truck and workers shall be at sufficient distance 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 Portable Changeable Message Signs, signs, Arrow Boards, and cones/drums are installed. The Arrow Board mounted on the TMA should be in the flashing alternating diamond caution mode when traveling in the closed lane.
- 6.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 Arrow Board mounted on the TMA should be in the flashing alternating diamond caution mode when in the closed lane.
- 6.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 Section 18.06. 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) shall be placed at the beginning of the work area and shall be advanced as the paving or concrete operations proceed.

- 6.f) TMAs will be paid for in accordance with how the unit is used. If it is used as a TMA and is in the proper location as specified, then it will be paid for at the specified hourly rate for Truck-Mounted or Trailer-Mounted Impact Attenuator. When the TMA is used as an Arrow Board, it will be paid for at the daily rate for Arrow Board. If a TMA is used to install and remove a pattern and is also used as an Arrow Board in the same day, then the unit will be paid for as a Truck-Mounted or Trailer-Mounted Impact Attenuator for the hours used to install and remove the pattern, typically 2 hours (1 hour to install and 1 hour to remove). If the TMA is also used as an Arrow Board during the same day, then the unit will only be paid for at the daily rate as an Arrow Board.

7. Use of Traffic Drums and Traffic Cones

- 7.a) On limited-access highways, ramps, and turning roadways:
 - i. Traffic drums shall be used for taper channelization.
 - ii. Traffic drums shall be used to delineate raised catch basins and other hazards.
 - iii. Traffic cones with a minimum height of 42 inches may be used in place of drums in the tangent section of a closed lane or shoulder.
 - iv. Traffic cones less than 42 inches in height shall not be used.
- 7.b) On all roadways:
 - i. 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.
 - ii. Traffic cones shall not be left unattended.
 - iii. Traffic cones with a minimum height of 42 inches shall be used when the posted speed limit is 45 MPH or above.
- 7.c) Typical spacing of traffic drums and/or cones shown on the Construction Traffic Control Plans in the Contract are maximum spacings and may be reduced to meet actual field conditions as required.

8. Use of Barricade Warning Lights

- 8.a) Barricade Warning Lights may be installed on channelizing devices when used in a merge taper. The Barricade Warning Lights shall flash in a sequential pattern when used in a merge taper. The successive flashing shall occur from the upstream end (beginning) of the merge taper to the downstream end (end) of the merge taper.
- 8.b) Type C Barricade Warning Lights may be used at night to delineate the edge of the travel way.
- 8.c) Type B Barricade Warning Lights shall be used on post-mounted advanced warning signs.

9. Use of Portable Changeable Message Signs (PCMS)

- 9.a) On limited access roadways, one PCMS shall be used in advance of the traffic control pattern for all lane closures. Prior to installing the pattern, the PCMS shall be installed and in operation, displaying the appropriate lane closure information. The PCMS shall be positioned $\frac{1}{2}$ to 1 mile ahead of the start of the lane closure taper. If the distance to the nearest exit ramp is greater than the specified $\frac{1}{2}$ to 1 mile distance, then an additional PCMS shall be positioned a sufficient distance ahead of the exit ramp (and before the previous on-ramp where practical) to alert motorists to the work and therefore offer them an opportunity to take the exit.
- 9.b) On non-limited access roadways, the use of PCMS for lane closures is optional. The roadway geometry, sight line distance, and traffic volume shall be considered in the decision to use the PCMS.
- 9.c) PCMS should be placed off the shoulder of the roadway and behind a traffic barrier, if practical. Where a traffic barrier is not available to shield the PCMS, it should be placed off the shoulder and outside of the clear zone. If a PCMS has to be placed on the shoulder of the roadway or within the clear zone, it should be placed on the paved shoulder with a minimum of five traffic drums placed in a taper in front of it to delineate its position. The taper shall meet minimum distance requirements for a shoulder closure. The PCMS shall be protected if it is used for a continuous duration of 36 hours or more.
- 9.d) The PCMS shall be removed from the clear zone and have the display screen cleared and turned 90 degrees away from the roadway when the PCMS is no longer required.
- 9.e) The PCMS should not be used within 1,000 feet of an existing PCMS or Variable Message Sign (VMS).
- 9.f) A PCMS message shall:
- i. consist of no more than two phases;
 - ii. contain no more than three lines of text per phase;
 - iii. have no more than eight characters per line, including spaces.
- 9.g) The PCMS should be used for specific situations that need to command the motorist's attention which cannot be conveyed with standard construction signs. The PCMS should not be used for generic messages (ex.: Road Work Ahead, Bump Ahead, Gravel Road, etc.) or for messages that need to be displayed for long periods of time, such as during stage construction. These types of messages should be displayed with construction signs. Special signs shall be coordinated with the Office of Construction and the Division of Traffic Engineering for the proper layout/dimensions required.
- 9.h) Typical messages that are allowed on the PCMS are shown below. Approval must be received from the Office of Construction for any message(s) different than the typical messages shown in Figure 1.
- 9.i) All messages shall comply with the information provided in Tables 2 and 3.

	<u>Phase 1</u>	<u>Phase 2</u>	<u>Message No.</u>	<u>Phase 1</u>	<u>Phase 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	EXIT XX CLOSED	USE EXIT YY
4	2 LEFT LANES CLOSED	REDUCE SPEED	12	EXIT XX CLOSED USE YY	FOLLOW DETOUR
5	RIGHT LANE CLOSED	MERGE LEFT	13	2 LANES SHIFT AHEAD	USE CAUTION
6	2 RIGHT LANES CLOSED	MERGE LEFT	14	3 LANES SHIFT AHEAD	USE CAUTION
7	RIGHT LANE CLOSED	REDUCE SPEED			
8	2 RIGHT LANES CLOSED	REDUCE SPEED			

Figure 1: Typical PCMS Messages

Table 2: Acceptable Abbreviations

Word Message	Standard Abbreviation	Word Message	Standard Abbreviation
Access	ACCS	Minimum	MIN
Afternoon / Evening	PM	Minor	MNR
Ahead	AHD	Minute(s)	MIN
Alternate	ALT	Monday	MON
Avenue	AVE, AV	Morning / Late Night	AM
Bicycle	BIKE	Mount	MT
Blocked	BLKD	Mountain	MTN
Boulevard	BLVD	National	NATL
Bridge	BR	Normal	NORM
CB Radio	CB	North	N
Center	CTR	Northbound	NBND
Center	CNTR	Oversized	OVRSZ
Chemical	CHEM	Parking	PKING
Circle	CIR	Parkway	PKWY
Compressed Natural Gas	CNG	Pavement	PVMT
Condition	COND	Pedestrian	PED
Congested	CONG	Place	PL
Construction	CONST	Pounds	LBS
Court	CT	Prepare	PREP
Crossing	XING	Quality	QLTY
Crossing (other than highway-rail)	XING	Right	RT
Downtown	DWNTN	Road	RD
Drive	DR	Roadwork	RDWK
East	E	Route	RT, RTE
Eastbound	EBND	Saint	ST
Electric Vehicle	EV	Saturday	SAT
Emergency	EMER	Service	SERV
Entrance, Enter	ENT	Shoulder	SHLDR
Exit	EX	Slippery	SLIP
Express	EXP	South	S
Expressway	EXPWY	Southbound	SBND
Feet	FT	Speed	SPD
Freeway	FRWY, FWY	State, county, or other non-US or non-Interstate numbered route	[Route Abbreviation determined by highway agency]**
Friday	FRI	Street	ST
Frontage	FRNTG	Sunday	SUN
Hazardous	HAZ	Telephone	PHONE
Hazardous Material	HAZMAT	Temporary	TEMP
High Occupancy Vehicle	HOV	Terrace	TER
Highway	HWY	Thruway	THWY
Highway-Rail Grade Crossing	RR XING	Thursday	THURS

Hospital	HOSP	Tons of Weight	T
Hour(s)	HR, HRS	Traffic	TRAF
Information	INFO	Trail	TR
International	INTL	Travelers	TRVLRS
Interstate	I-	Tuesday	TUES
Junction / Intersection	JCT	Turnpike	TPK
Lane	LN	Two-Way Intersection	2-WAY
Left	LFT	Two-Wheeled Vehicles	CYCLES
Liquid Propane Gas	LP-GAS	Upper	UPR
Local	LOC	US Numbered Route	US
Lower	LWR	Vehicle(s)	VEH, VEHS
Maintenance	MAINT	Warning	WARN
Major	MAJ	Wednesday	WED
Maximum	MAX	West	W
Mile(s)	MI	Westbound	WBND
Miles Per Hour	MPH		

** A space and no dash shall be placed between the abbreviation and the number of the route.

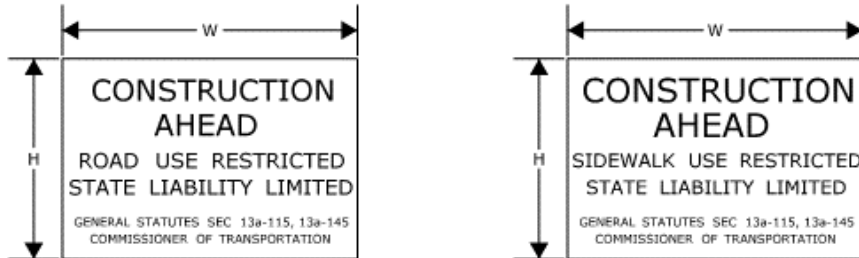
Table 3: Unacceptable Abbreviations

Unacceptable Abbreviation	Intended Word	Common Misinterpretation
ACC	Accident	Access (Road)
CLRS	Clears	Colors
DLY	Delay	Daily
FDR	Feeder	Federal
L	Left	Lane (Merge)
LT	Light (Traffic)	Left
PARK	Parking	Park
POLL	Pollution (Index)	Poll
RED	Reduce	Red
STAD	Stadium	Standard
WRNG	Warning	Wrong

10. Use of State Police Officers

- 10.a) State Police may be used only on limited access highways and secondary roadways that are under their primary jurisdiction. A minimum of one Officer may be used per critical sign pattern; however, a State Police presence is not required. Shoulder closures and right lane closures can generally be implemented without the presence of a State Police Officer. Left lane closures may also be implemented without State Police presence in areas with only moderate traffic and wide, unobstructed medians. It may be desirable to have a State Police presence, when available, under specific situations, such as nighttime lane closures; left lane closures with minimal width for setting up advance signs and staging; lane and shoulder closures on turning roadways/ramps or mainline where sight distance is minimal; and closures where extensive turning movements or traffic congestion regularly occur; however, they are not required.
- 10.b) If a State Police presence is provided, once the pattern is in place, the State Police Officer should be positioned in a non- hazardous location in advance of the pattern to provide advance warning to the motorist. If traffic backs up beyond the beginning of the pattern, then the State Police Officer shall reposition so that they are located prior to the backup. The State Police Officer should not be located immediately behind or within the roll ahead area of any TMA or within the work zone buffer area. The State Police Officer shall not be positioned in such a way that the State Police Officer obstructs any construction warning signs or PCMS from view of the motorist.
- 10.c) Other functions of the State Police Officer(s) may include:
 - i. Assisting construction vehicles entering and exiting the work area.
 - ii. Enforcement of motor vehicle laws within the work area, if specifically requested by the Engineer.
- 10.d) State Police Officers assigned to a work site shall take direction from the Engineer.

SERIES 16 SIGNS



		W	H
16-E	80-1605	84"	60"
16-H	80-1608	60"	42"
16-M	80-1613	30"	24"

		W	H
16-S	80-1619	48"	30"

SIGN 16-S 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. SERIES 16 SIGNS SHOULD BE LOCATED TO ALLOW MOTORISTS THE OPPORTUNITY TO AVOID A WORK ZONE. SERIES 16 SIGNS SHOULD BE INSTALLED ON MAJOR INTERSECTING ROADWAYS THAT APPROACH THE WORK ZONE. ON LIMITED-ACCESS HIGHWAYS, THESE SIGNS SHOULD BE LOCATED IN ADVANCE OF THE NEAREST UPSTREAM EXIT RAMP AND ON ANY ENTRANCE RAMP PRIOR TO OR WITHIN THE WORK ZONE LIMITS.

SIGNS 16-E AND 16-H SHALL BE POST-MOUNTED.

SIGN 16-E SHALL BE USED ON ALL FREEWAYS AND EXPRESSWAYS.

SIGN 16-H SHALL BE USED ON ALL RAMPS, OTHER STATE ROADWAYS AND MAJOR TOWN/CITY ROADWAYS.

SIGN 16-M SHALL BE USED ON OTHER TOWN ROADWAYS.

CONSTRUCTION TRAFFIC CONTROL PLAN
SERIES 16 SIGNS

SCALE: NONE

CONNECTICUT DEPARTMENT OF TRANSPORTATION
 BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED

Tracy L. Fogarty
 PRINCIPAL ENGINEER

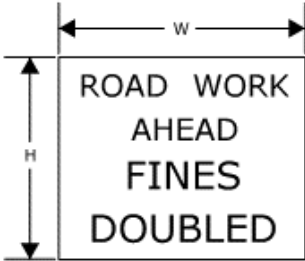
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REGULATORY SIGN "ROAD WORK AHEAD, FINES DOUBLED"

THE REGULATORY SIGN "ROAD WORK AHEAD FINES DOUBLED" SHALL BE INSTALLED FOR ALL WORK ZONES THAT OCCUR ON ANY STATE HIGHWAY AND MUNICIPAL ROAD IN CONNECTICUT WHERE THERE ARE WORKERS PRESENT ON THE HIGHWAY.

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.

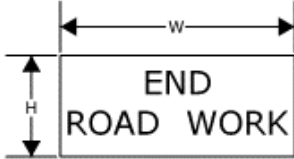
	W	H
31-1906	48"	42"
31-1907	60"	54"



"END ROAD WORK" SIGN

THE LAST SIGN IN THE PATTERN SHALL BE THE "END ROAD WORK" SIGN.

	W	H
80-9606	36"	18"
80-9612	48"	24"



CONSTRUCTION TRAFFIC CONTROL PLAN
**ROAD WORK AHEAD
 SIGNS**

SCALE: NONE

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 IN ADVANCE 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. TRAFFIC CONES AND PORTABLE CONSTRUCTION SIGNS SHALL NOT BE LEFT UNATTENDED.
5. ALL CONFLICTING 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 48 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 \leq 40 MPH).
8. IF THIS PLAN IS TO REMAIN IN OPERATION FROM SUNSET TO SUNRISE, INSTALL BARRICADE WARNING LIGHTS - HIGH INTENSITY ON ALL POST-MOUNTED DIAMOND SIGNS IN THE ADVANCE WARNING AREA.
9. A PORTABLE CHANGEABLE MESSAGE SIGN SHALL BE INSTALLED ONE HALF MILE 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'
35	245'
40	320'
45	540'
50	600'
55	660'
65	780'

CONSTRUCTION TRAFFIC CONTROL PLAN

NOTES

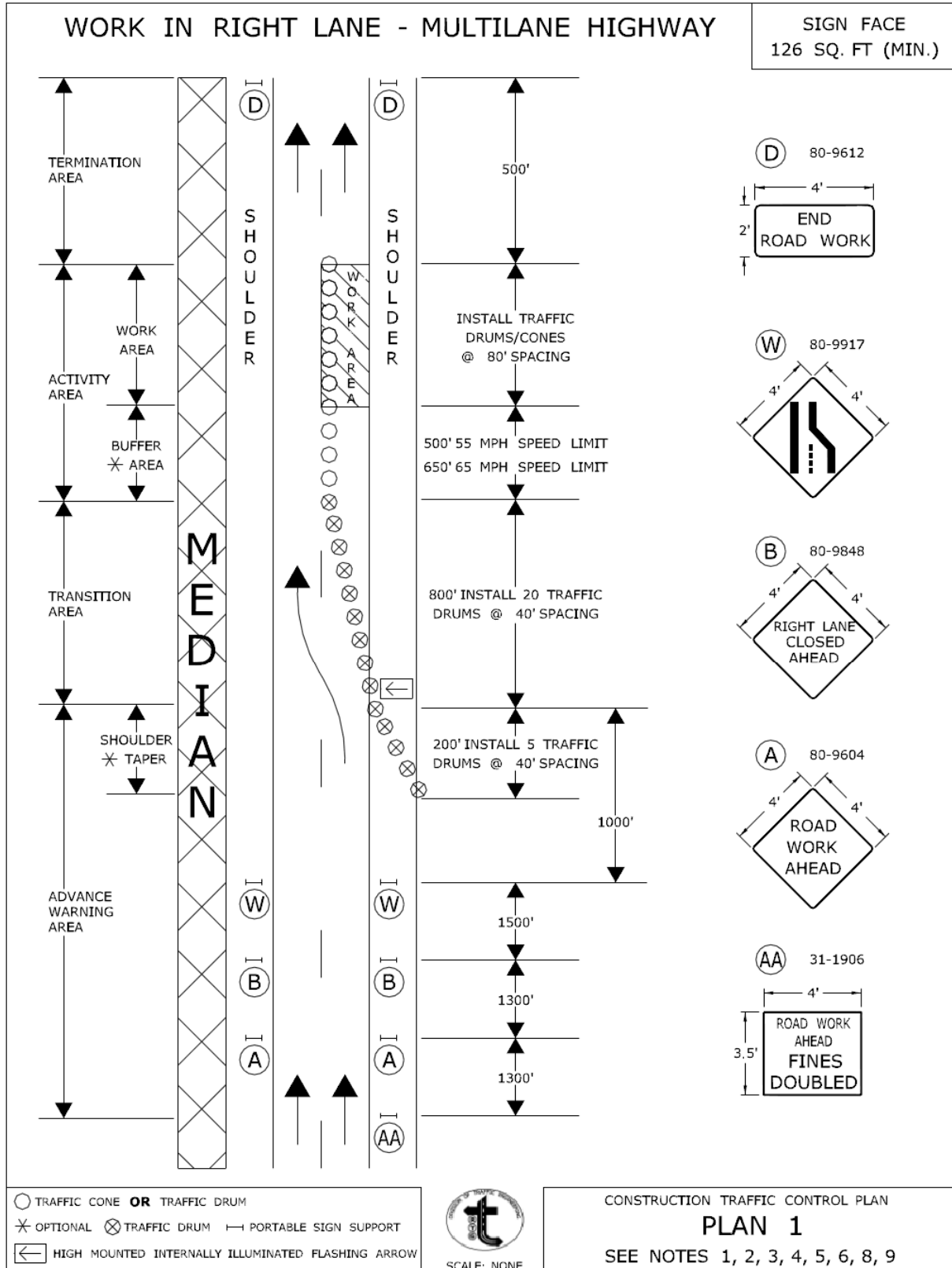
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CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED

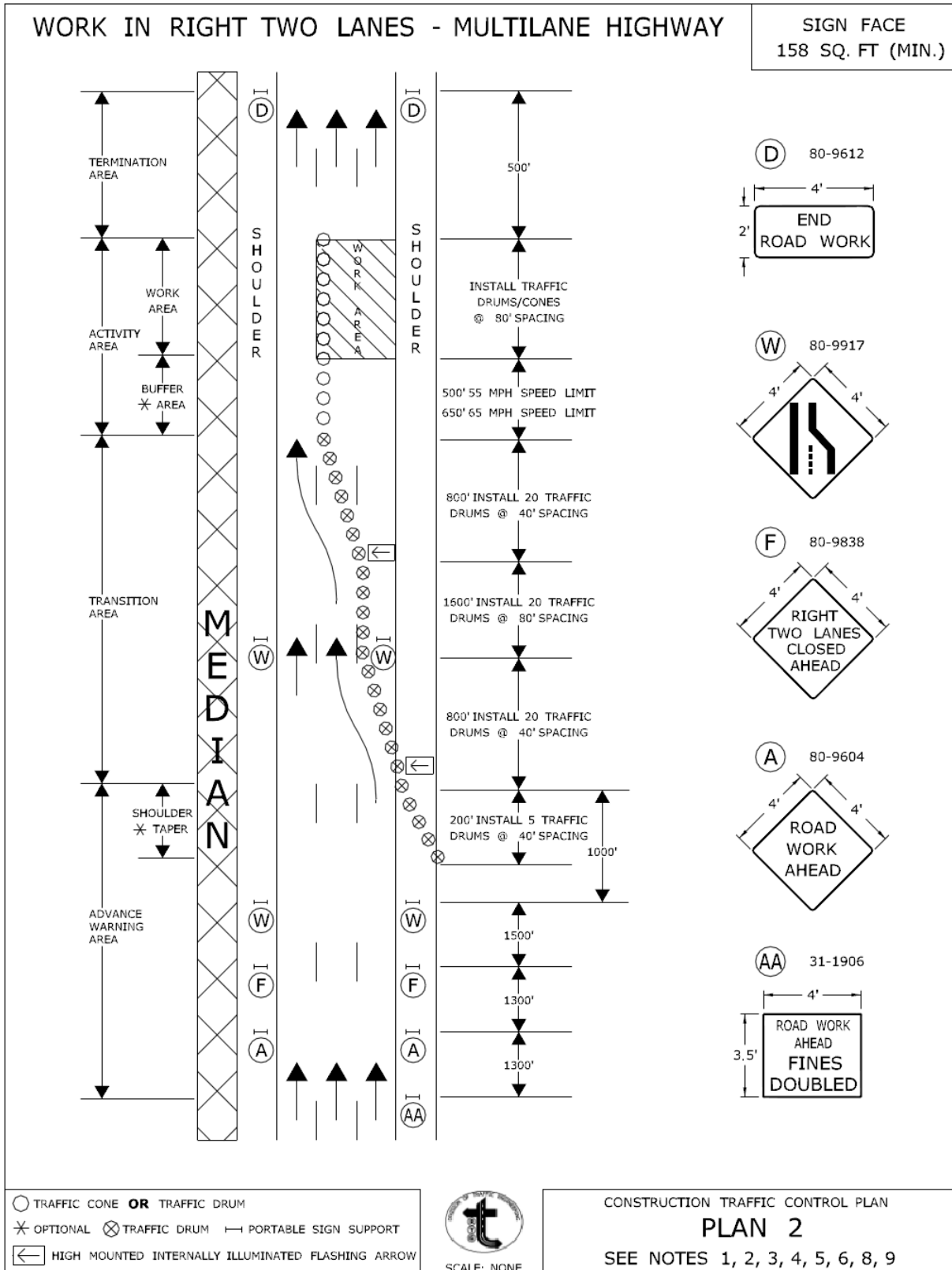
Tracy L. Fogarty
PRINCIPAL ENGINEER

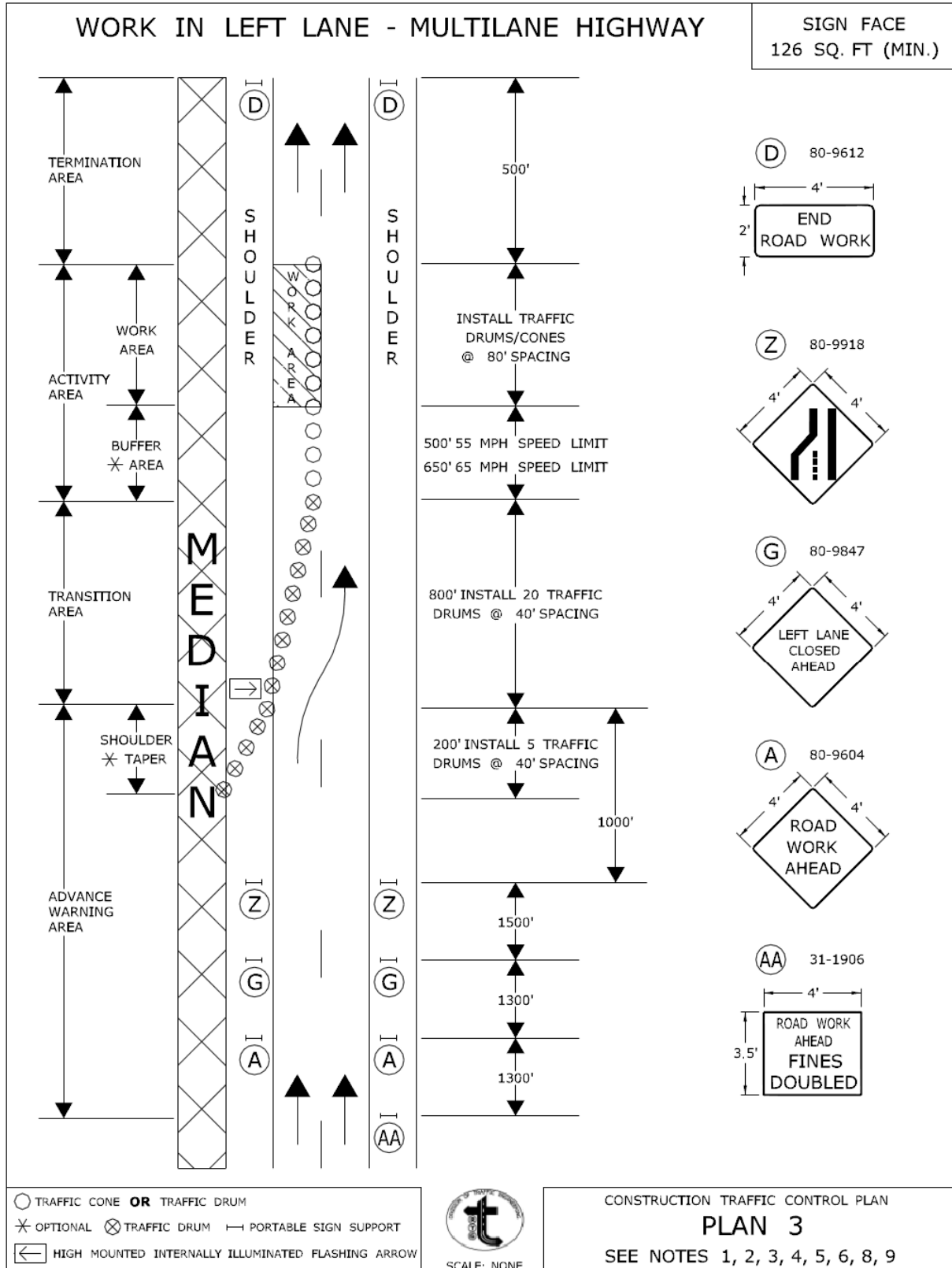
Tracy L. Fogarty, P.E.
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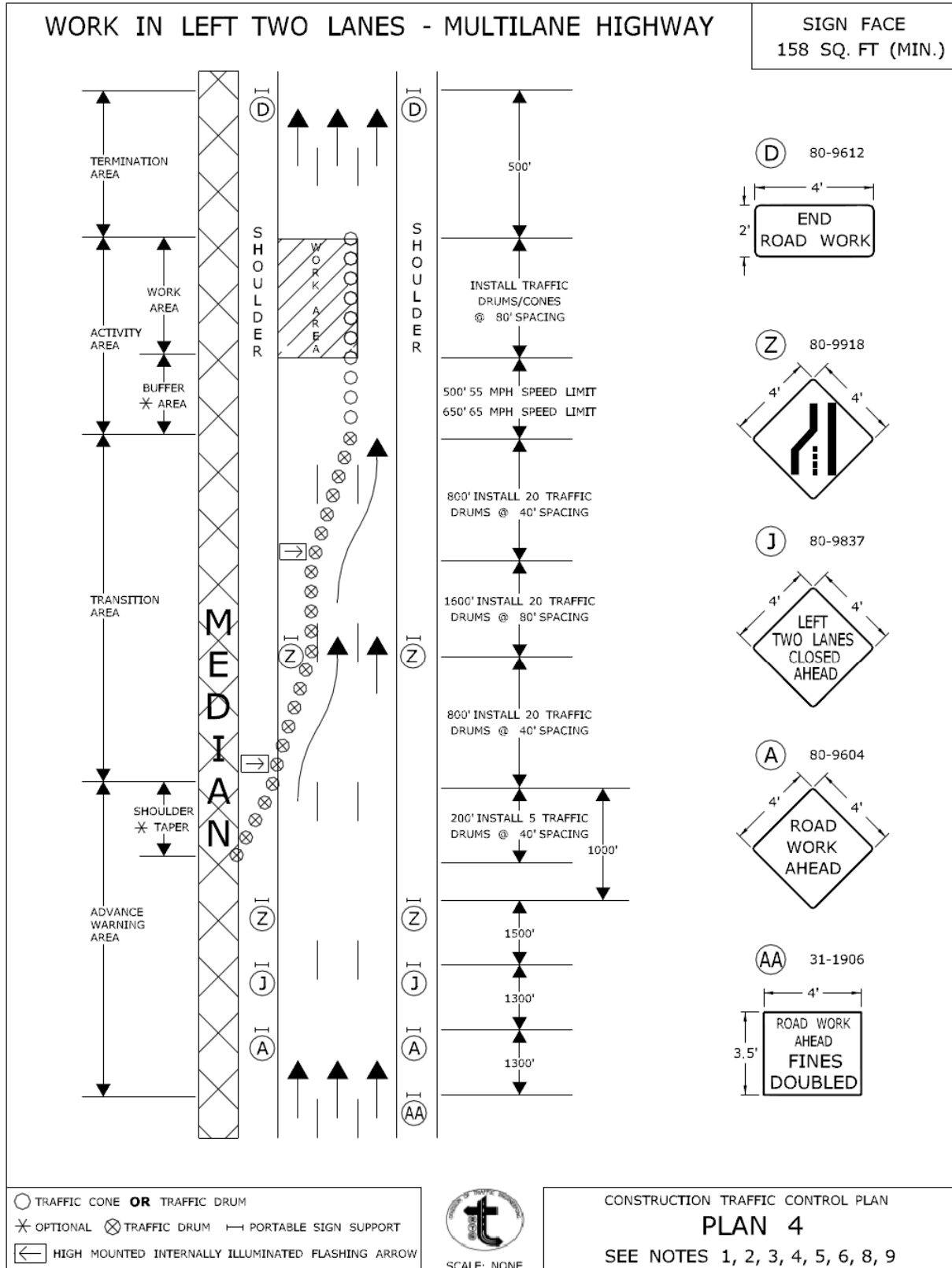


CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow*
PRINCIPAL ENGINEER
Charles S. Harlow
2012.06.05 15:51:00-0400'





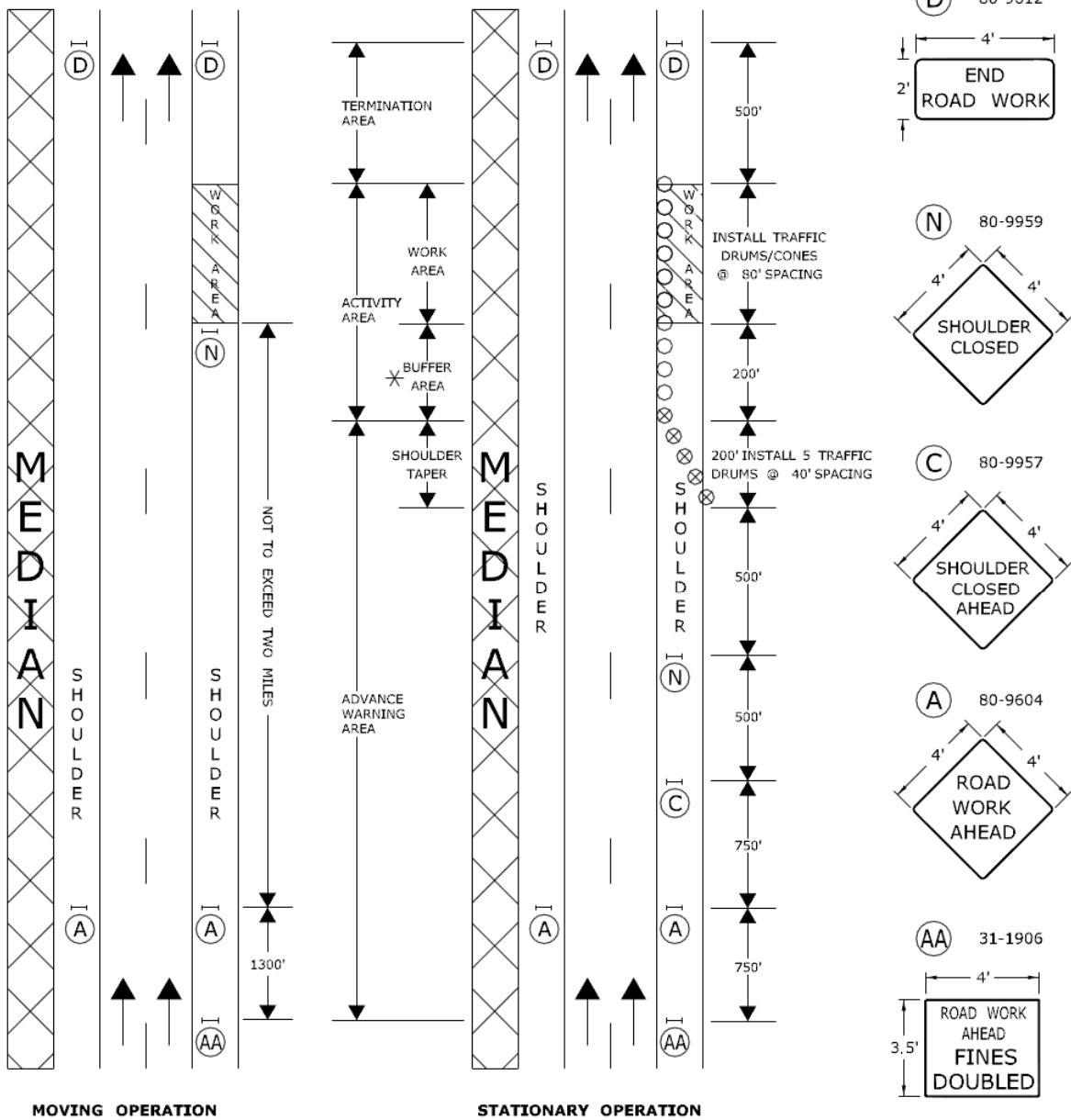


CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow*
PRINCIPAL ENGINEER
Charles S. Harlow
2012.06.05 15:52:10-0400

WORK IN SHOULDER AREA - MULTILANE HIGHWAY

SIGN FACE
94 SQ. FT (MIN.)



- TRAFFIC CONE OR TRAFFIC DRUM
- ✱ OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

PLAN 6

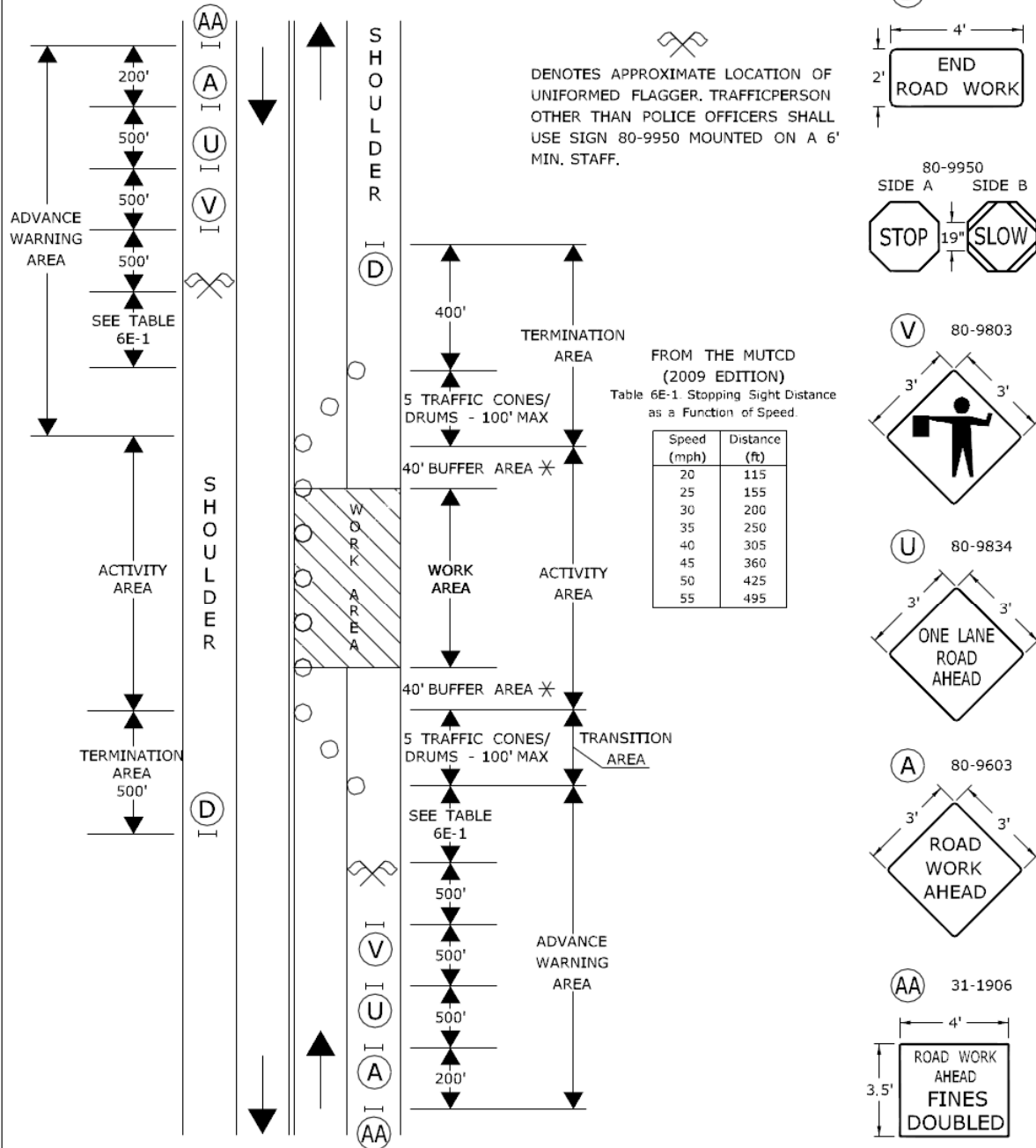
SEE NOTES 1, 2, 4, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow*
PRINCIPAL ENGINEER
2012.06.05 15:52:38-04'00"

WORK IN TRAVEL LANE AND SHOULDER TWO LANE HIGHWAY ALTERNATING ONE-WAY TRAFFIC OPERATIONS

SIGN FACE
108 SQ. FT (MIN.)



- TRAFFIC CONE **OR** TRAFFIC DRUM
- ✱ OPTIONAL ✕ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 13 - SHEET 1 OF 2
SEE NOTES 1, 2, 4, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow*
PRINCIPAL ENGINEER
Charles S. Harlow
2012.06.05 15:55:23-04'00"

WORK IN TRAVEL LANE AND SHOULDER TWO LANE HIGHWAY ALTERNATING ONE-WAY TRAFFIC OPERATIONS

SIGN FACE
108 SQ. FT (MIN.)

HAND SIGNAL METHODS TO BE USED BY UNIFORMED FLAGGERS

THE FOLLOWING METHODS FROM SECTION 6E.07, FLAGGER PROCEDURES, IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES," SHALL BE USED BY UNIFORMED FLAGGERS WHEN DIRECTING TRAFFIC THROUGH A WORK AREA. THE STOP/SLOW SIGN PADDLE (SIGN NO. 80-9950) SHOWN ON THE TRAFFIC STANDARD SHEET TR-1220 01 ENTITLED, "SIGNS FOR CONSTRUCTION AND PERMIT OPERATIONS" SHALL BE USED.

A. TO STOP TRAFFIC

TO STOP ROAD USERS, THE FLAGGER SHALL FACE ROAD USERS AND AIM THE STOP PADDLE FACE TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FREE ARM SHALL BE HELD WITH THE PALM OF THE HAND ABOVE SHOULDER LEVEL TOWARD APPROACHING TRAFFIC.



B. TO DIRECT TRAFFIC TO PROCEED

TO DIRECT STOPPED ROAD USERS TO PROCEED, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FLAGGER SHALL MOTION WITH THE FREE HAND FOR ROAD USERS TO PROCEED.



C. TO ALERT OR SLOW TRAFFIC

TO ALERT OR SLOW TRAFFIC, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. TO FURTHER ALERT OR SLOW TRAFFIC, THE FLAGGER HOLDING THE SLOW PADDLE FACE TOWARD ROAD USERS MAY MOTION UP AND DOWN WITH THE FREE HAND, PALM DOWN.



- TRAFFIC CONE **OR** TRAFFIC DRUM
- * OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

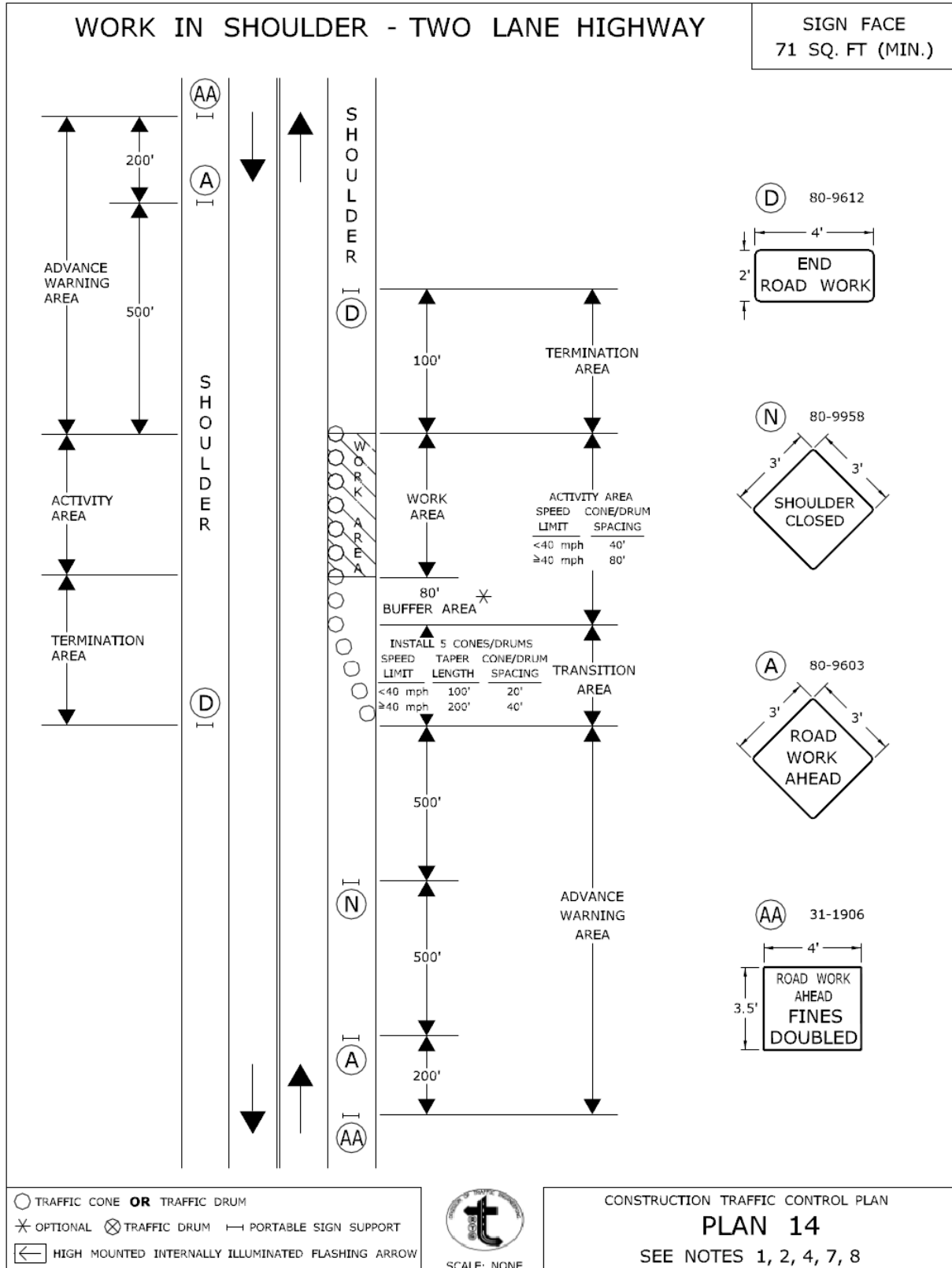


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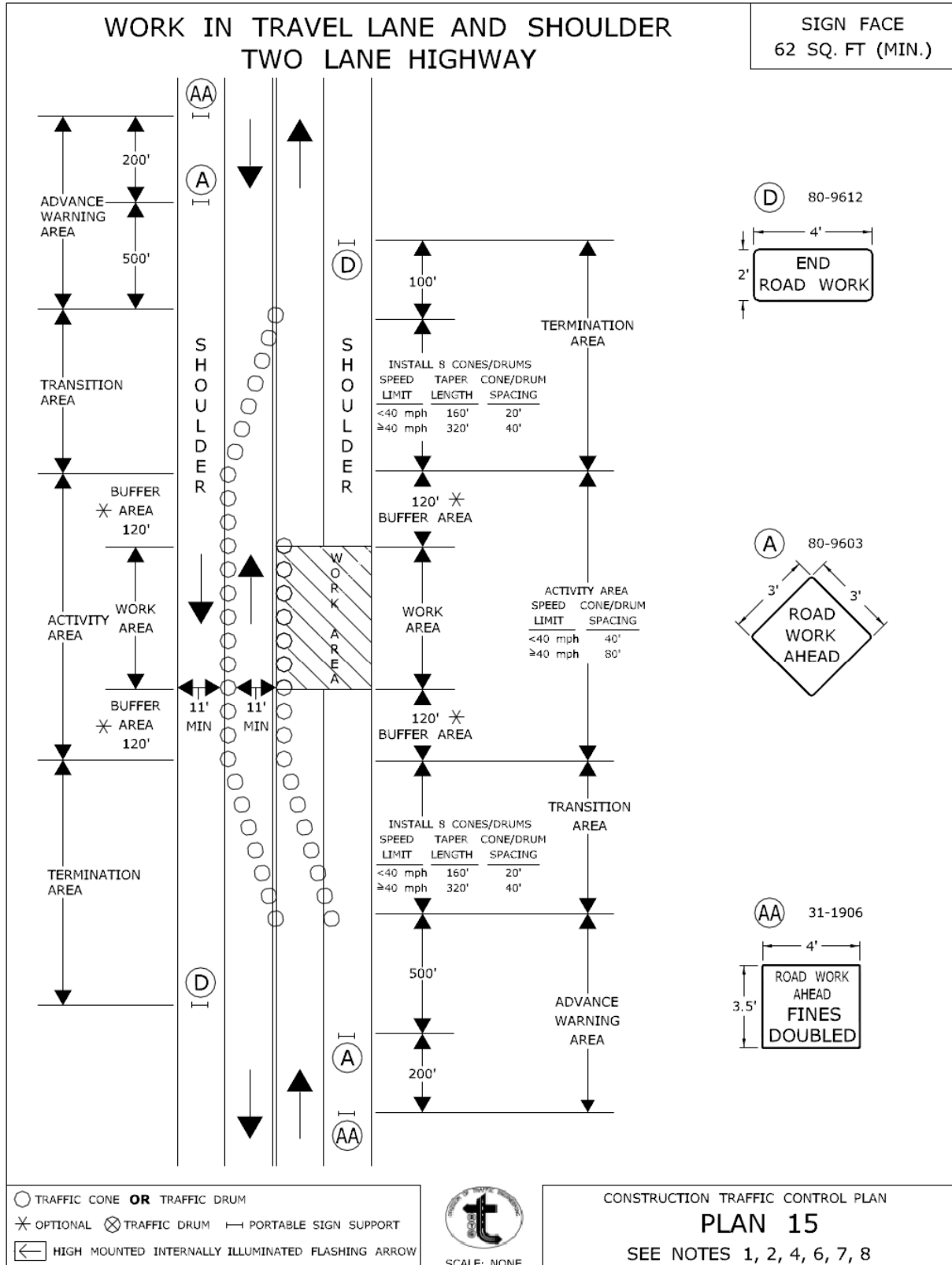
CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 13 - SHEET 2 OF 2
SEE NOTES 1, 2, 4, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED Charles S. Harlow
2012.06.05 15:55:45-04'00'
PRINCIPAL ENGINEER



APPROVED *Charles S. Harlow*
 Charles S. Harlow
 2012.06.05 15:56:09-04'00"
 PRINCIPAL ENGINEER



- TRAFFIC CONE **OR** TRAFFIC DRUM
- ✱ OPTIONAL ✕ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

PLAN 15

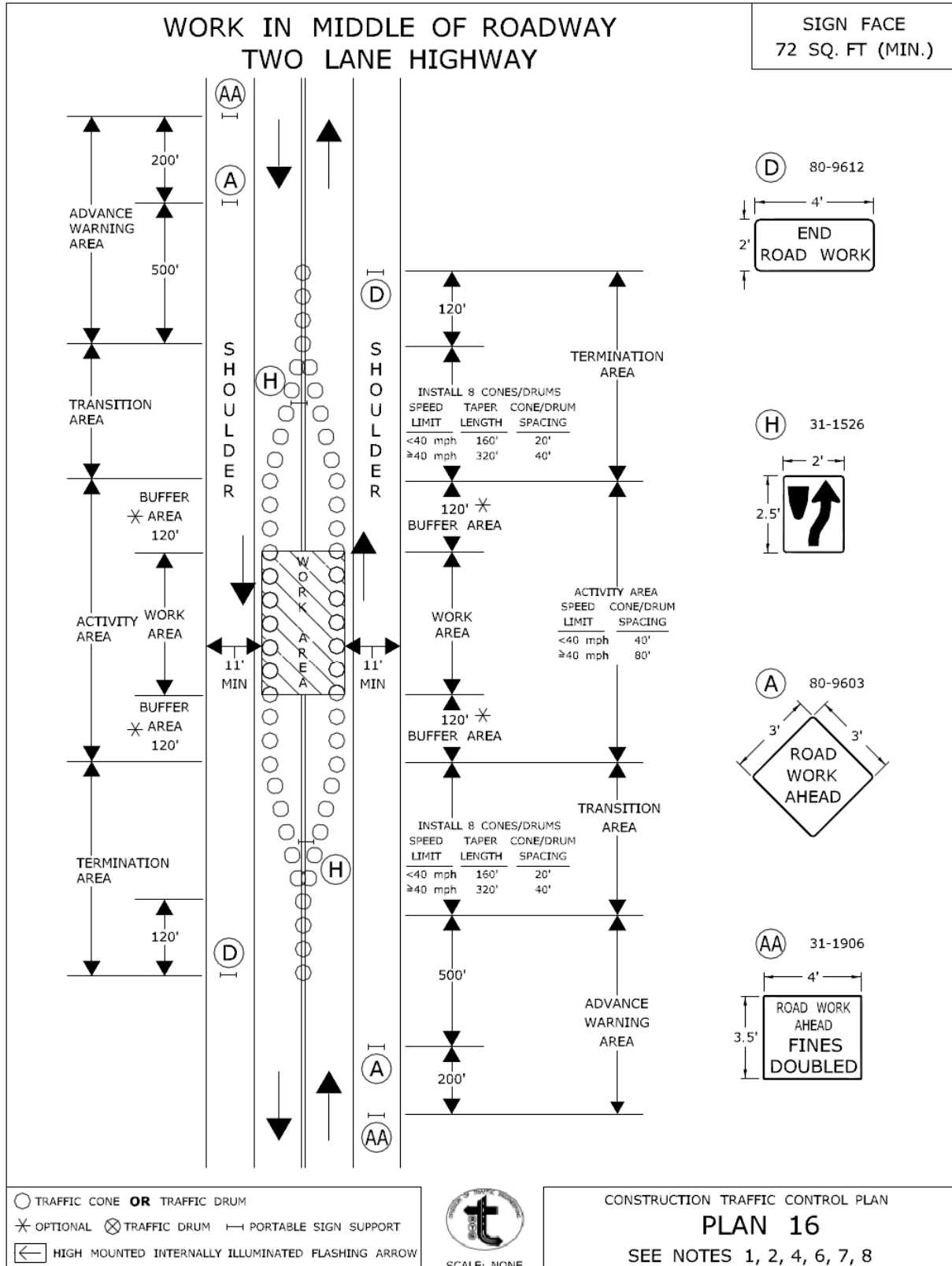
SEE NOTES 1, 2, 4, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED

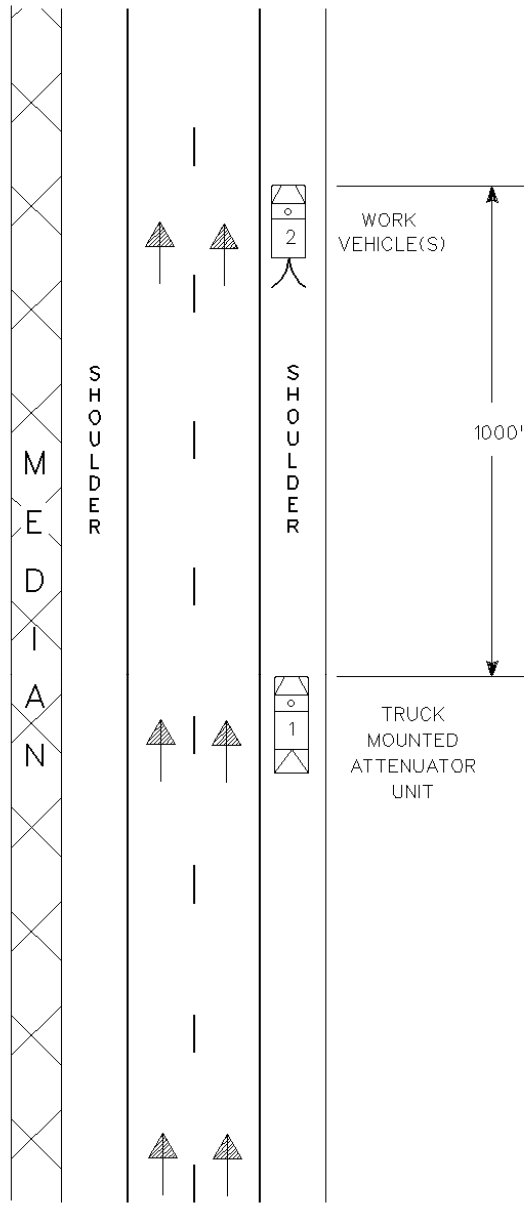
Charles S. Harlow
PRINCIPAL ENGINEER

Charles S. Harlow
2012.06.05 15:56:29-04'00"

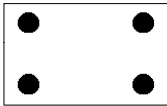


APPROVED *Charles S. Harlow*
 Charles S. Harlow
 2012.08.05 15:56:51-04'00"
 PRINCIPAL ENGINEER

MOVING OPERATION ON RIGHT SHOULDER MULTILANE HIGHWAY & SECONDARY ROADWAYS



SIGN MOUNTED ON TRUCK 1



DEPARTMENT APPROVED
ARROW BOARD
(FLASHING YELLOW MODE)

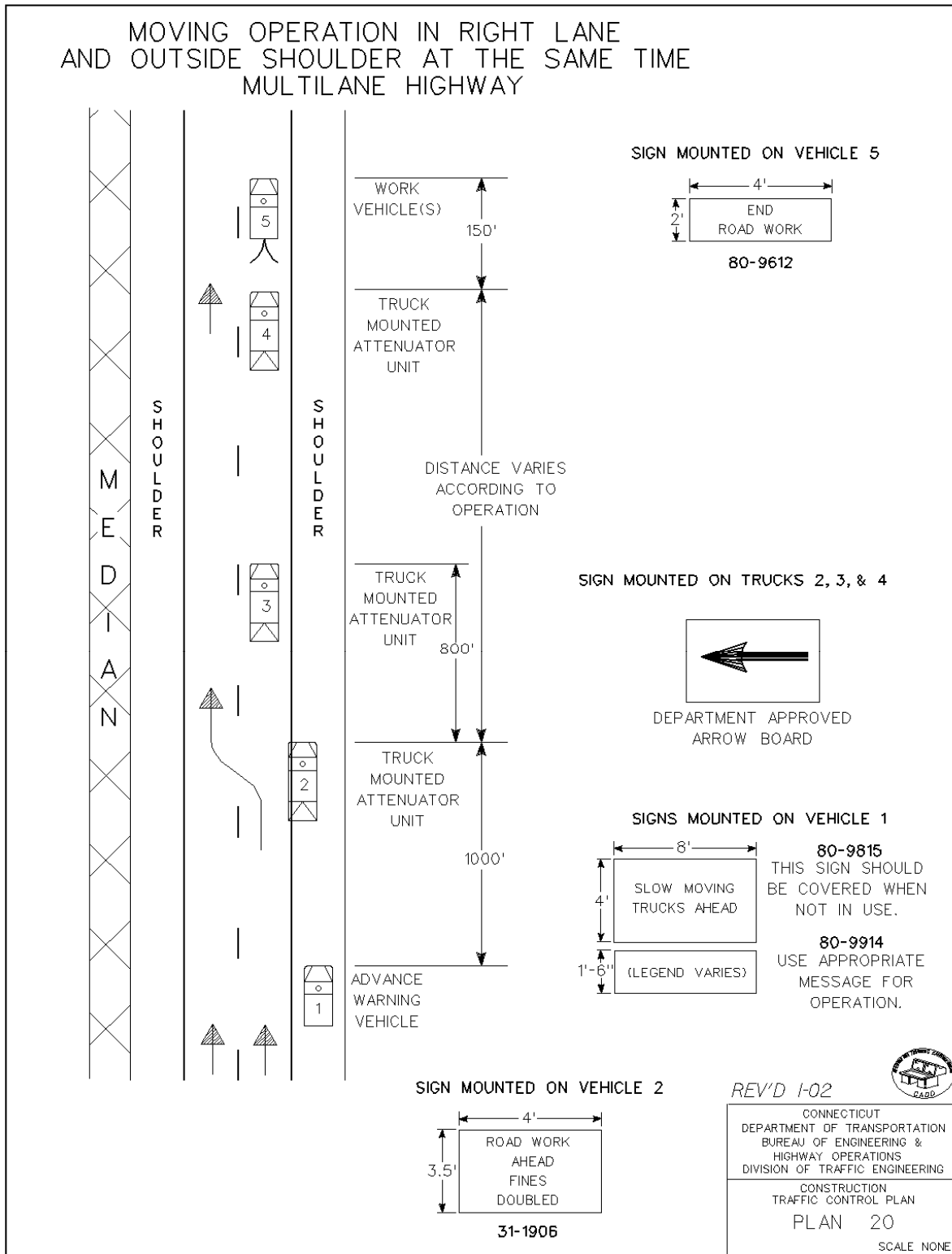
REV'D 1-02



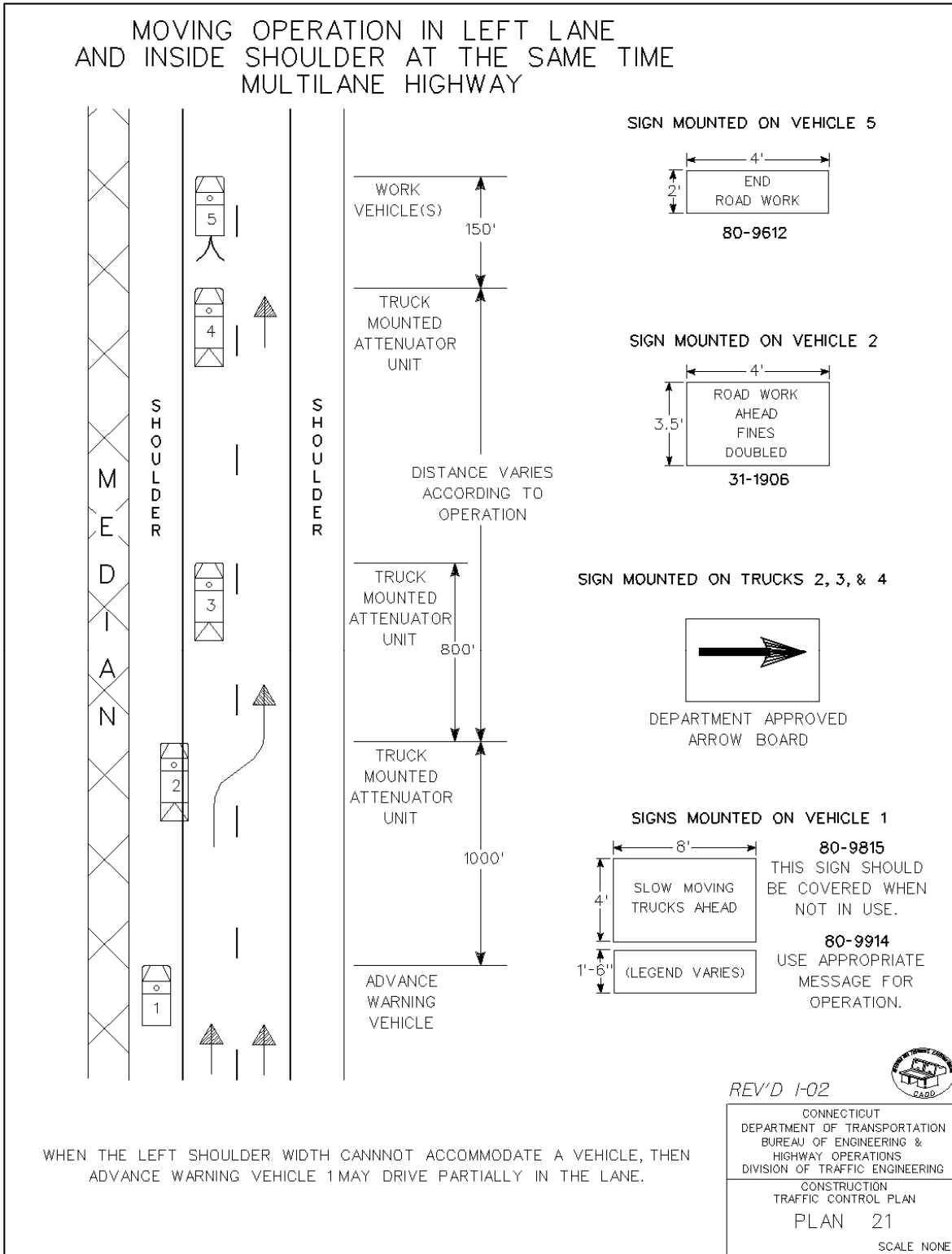
CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING &
HIGHWAY OPERATIONS
DIVISION OF TRAFFIC ENGINEERING

CONSTRUCTION
TRAFFIC CONTROL PLAN
PLAN 19
SCALE NONE

APPROVED J. McCall DATE 1-30-02
PRINCIPAL ENGINEER

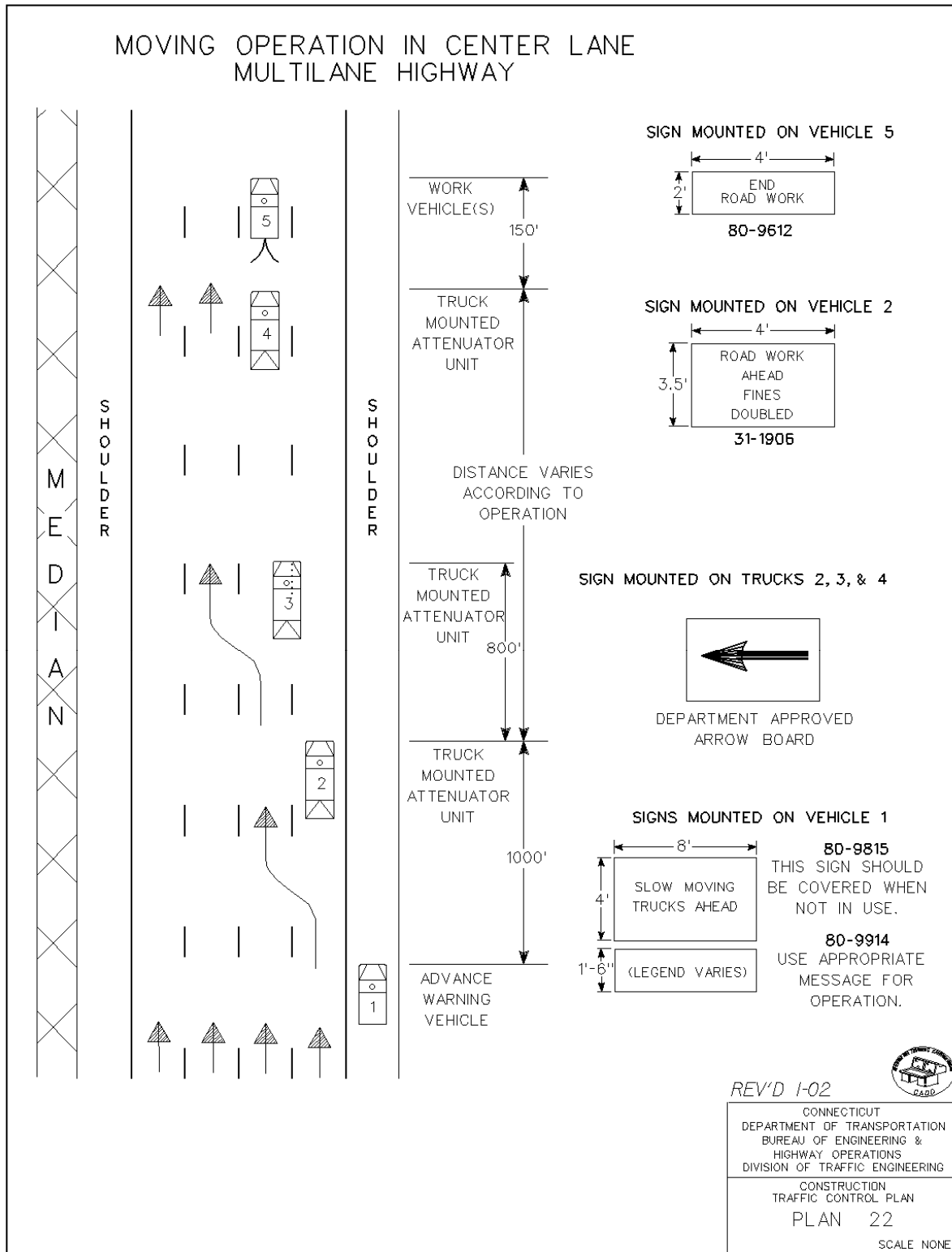


APPROVED John D. McCall DATE I-30-02
PRINCIPAL ENGINEER



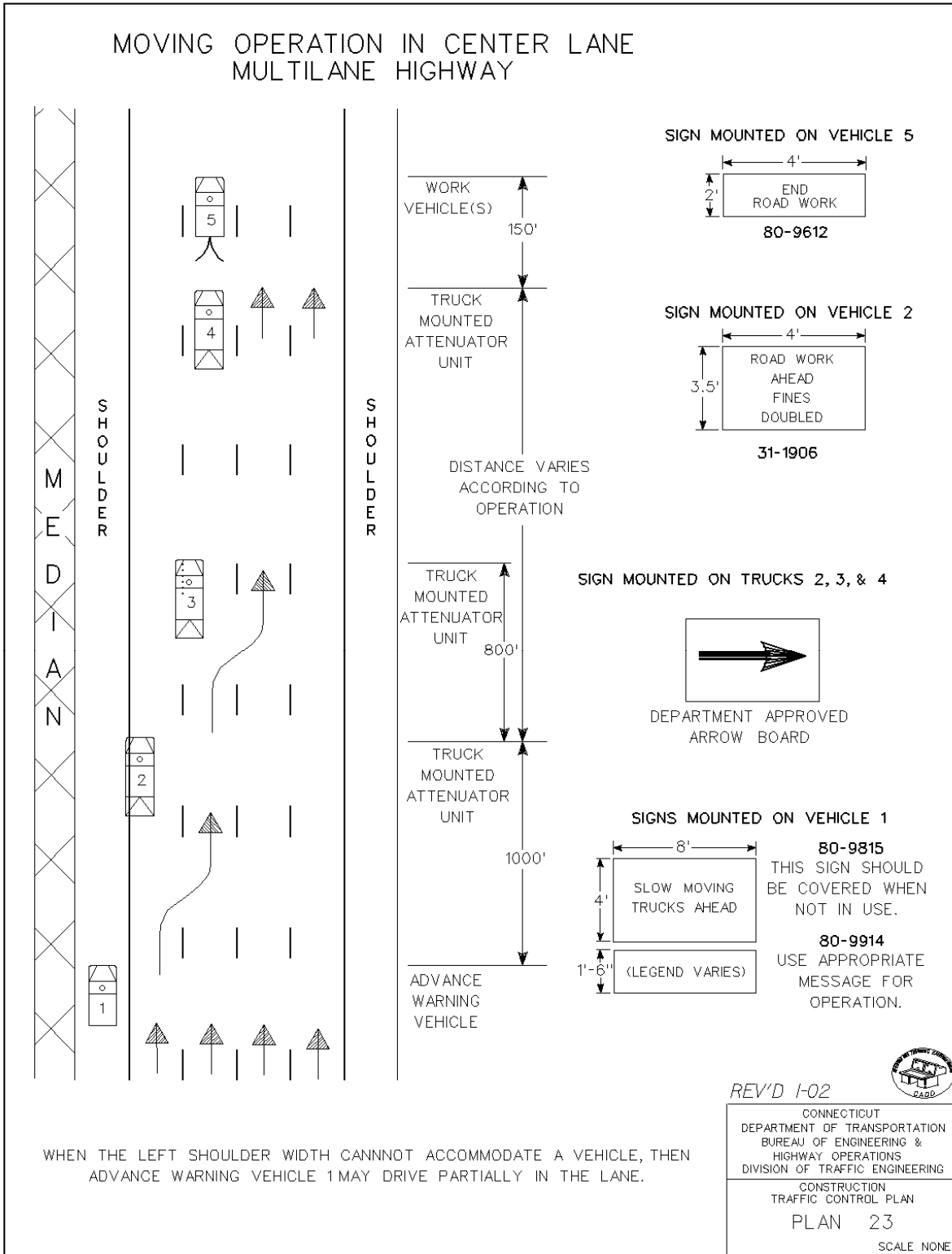
APPROVED John D. McCall DATE I-30-02
PRINCIPAL ENGINEER

MOVING OPERATION IN CENTER LANE MULTILANE HIGHWAY



APPROVED John D. McCall DATE 1-30-02
PRINCIPAL ENGINEER

MOVING OPERATION IN CENTER LANE MULTILANE HIGHWAY



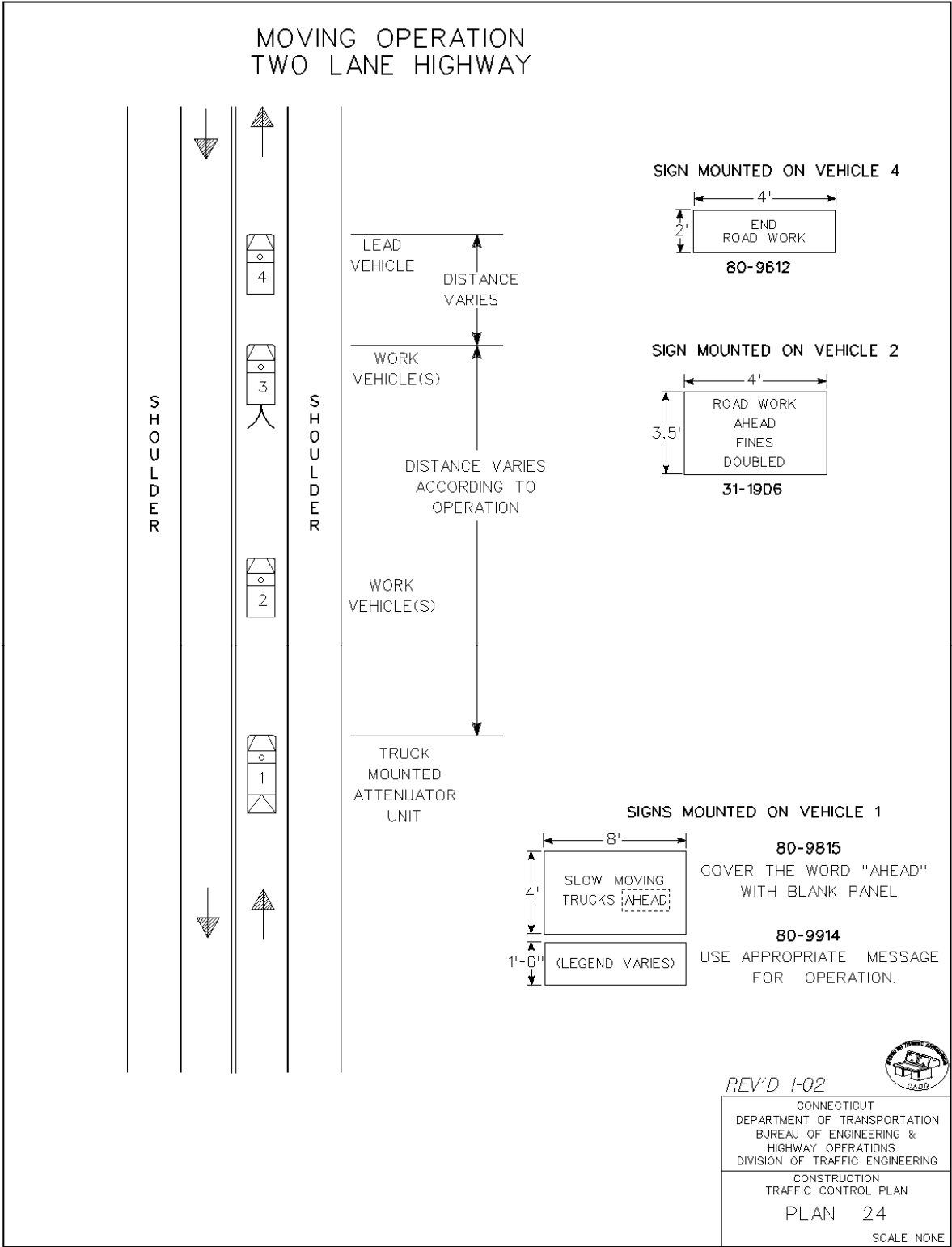
WHEN THE LEFT SHOULDER WIDTH CANNOT ACCOMMODATE A VEHICLE, THEN ADVANCE WARNING VEHICLE 1 MAY DRIVE PARTIALLY IN THE LANE.

REV'D I-02

CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING &
HIGHWAY OPERATIONS
DIVISION OF TRAFFIC ENGINEERING

CONSTRUCTION
TRAFFIC CONTROL PLAN
PLAN 23
SCALE NONE

APPROVED John D. Micali DATE I-30-02
PRINCIPAL ENGINEER



APPROVED John D. McCall DATE 1-30-02
 PRINCIPAL ENGINEER

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 #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 #1208931A - SIGN FACE - SHEET ALUMINUM (TYPE IX RETROREFLECTIVE SHEETING)

Section 12.08 is supplemented and amended as follows:

12.08.01—Description:

Add the following:

This item shall also include field testing of metal sign base posts as directed by the Engineer.

12.08.03—Construction Methods:

Delete the last sentence and add the following:

Metal sign base posts shall be whole and uncut. Sign base post embedment and reveal lengths shall be as shown on the plans. The Contractor shall drive the metal sign base posts by hand tools, by mechanical means or by auguring holes. If an obstruction is encountered while driving or placing the metal sign base post, the Contractor shall notify the Engineer who will determine whether the obstruction shall be removed, the sign base post or posts relocated, or the base post installation in ledge detail shall apply. Backfill shall be thoroughly tamped after the posts have been set level and plumb.

Field Testing of Metal Sign Posts: When the sign installations are complete, the Contractor shall notify the Engineer the Project is ready for field testing. Based on the number of posts in the Project, the Engineer will select random sign base posts which shall be removed by the Contractor for inspection and measurement by the Engineer. After such inspection is completed at each base post location, the Contractor shall restore or replace such portions of the work to the condition required by the Contract. Refer to the table in 12.08.05 for the number of posts to be field tested.

12.08.04—Method of Measurement:

Add the following:

The work required to expose and measure sign base post length and embedment depth using field testing methods, and restoration of such work, will not be measured for payment and shall be included in the general cost of the work.

12.08.05—Basis of Payment:

Replace the entire Article with the following:

This work will be paid for at the Contract unit price per square foot for “Sign Face - Sheet Aluminum” of the type specified complete in place, adjusted by multiplying by the applicable Pay Factor listed in the table below. The price for this work shall include the completed sign, metal sign post(s), span-mounted sign brackets and mast arm-mounted brackets, mounting hardware, including reinforcing plates, field testing, restoration and replacement of defective base post(s), and all materials, equipment, and work incidental thereto.

Pay Factor Scale: Work shall be considered defective whenever the base post length or base post embedment depth is less than the specified length by more than 2 inches. If the number of defects results in rejection, the Contractor shall remove and replace all metal sign base posts on the Project, at no cost to the Department.

Number of Posts to be Tested and Pay Factors (Based on Number of Defects)

Number of Posts in Project =>	51-100	101-250	251-1000	>1000
Sample Size=>	5 Posts	10 Posts	40 Posts	60 Posts
0 Defects	1.0	1.0	1.025	1.025
1 Defect	0.9	0.95	0.975	0.983
2 Defects	Rejection	0.9	0.95	0.967
3 Defects	Rejection	Rejection	0.925	0.95
4 Defects	Rejection	Rejection	0.9	0.933
5 Defects	Rejection	Rejection	Rejection	0.917
6 Defects	Rejection	Rejection	Rejection	0.9
7 or more Defects	Rejection	Rejection	Rejection	Rejection

Note: Projects with 50 or fewer posts will not include field testing

ITEM #130008A - DEWATER, CONTROL AND DIVERSION OF WATER (WATER MAIN)

Description:

The work under this item shall consist of that work necessary to collect and control groundwater and surface water and/or stormwater runoff to maintain water main work areas in suitable condition for performing removals, installations and modifications shown or required, including trench excavations and backfills, to prevent erosion caused by water main work, and to provide for diversion of water to suitable receiving bodies or areas, free of sedimentation and in accordance with local and state regulation.

Dewatering shall be maintained until water main structures, piping systems, and appurtenances to be constructed or removal work completed to such an extent that it will not be damaged by water.

Bracing and related work necessary to prevent flotation of structures, piping systems, accessories or appurtenances is also included.

Approved measures shall be taken to capture and/or settle sediments pumped or running off from piping trenches and water main excavations in accordance with project procedures. Disposal methods shall prevent contamination of adjacent wetlands, water courses and waterbodies, injury to public health, damage to public and private property, and damage to the work completed or in progress.

Materials:

Provide temporary pumps, hoses, piping, slotted PVC well casing, filter fabric, siltation and sedimentation control devices, parts and accessories as necessary to protect and secure the work, and to prevent damage or pollution to receiving piping systems, water conveyances, wetlands, water courses, water bodies, and public or private property. Maintain adequate stockpile of consumable materials to handle adverse weather, anticipated and unanticipated water generating events.

Construction Methods:

Construct temporary sumps within or bordering trench and construction excavations with crushed stone, coarse sand or other suitable and approved materials surrounding temporary well casing, if necessary to exclude silt from temporary pumps.

Provide sedimentation control for pump hose or piping system discharge, with periodic monitoring as necessary to capture silt and sediments, such that discharged groundwater,

surface or runoff water enters existing conveyance systems or vegetated areas approved by the Engineer, in a calm and quiescent manner, free of silt and sediments.

Monitor and maintain silt and sediment control devices, replacing elements before capture has reached capacity and defeated the function of the device. Anticipate capacity needs in advance of forecast inclement weather and clean, refresh or replace silt and sediment control devices accordingly.

Any damage resulting from the dewatering operations, failure of the Contractor to maintain the work in a suitably dry condition, or breach of silt and sedimentation control systems, shall be repaired by the Contractor at no additional cost.

Method of Measurement:

This work will be not be measured for payment. All labor, materials, equipment, incidentals, inspection, maintenance, monitoring, repair, and regulatory costs necessary to dewater, control, and divert water from the water main work areas as required and as directed by the Engineer, whether or not specified, shall be included.

Basis of Payment:

This work applies to all underground water main work, including portions done in advance of bridge superstructure replacement, related underground work within the scope of water main work, (e.g. sanitary encasements for water main crossings), underground portions of temporary relocated water main Item #1301019A-Temporary Relocation of Water Main, permanent water main underground and modifications to permanent underground water main- Item #1301078A-Ductlie Iron Pipe (Water Main).

Dewatering, control and diversion of water related to advance, underground preparatory work performed by the Connecticut Water Company, is not included.

This work will be paid for at the contract lump sum price for **Item #1300008A-Dewater, Control and Diversion of Water (Water Main):**

<u>Description</u>	<u>Unit</u>
Dewater, Control and Diversion of Water (Water Main)	LS

**ITEM #1300015A - ROCK IN TRENCH EXCAVATION 0'-10' DEEP
(WATER MAIN)**

This work shall conform to Section 2.86 of Form 818, supplemented as follows:

Article 2.86.04 – Method of Measurement: Replace with the following:

When rock, cement masonry, or concrete structures conforming to the description given under Article 2.86.01 is encountered within the payment lines for rock in water main trench excavation, its removal will be measured and paid for at the contract unit price per cubic yard for "Rock in Trench Excavation 0-10 Feet Deep (Water Main)".

Those portions of trench excavation classified and paid for as "Rock in Trench Excavation 0-10 Feet Deep (Water Main)" of the various depths will include the actual volumes of all material including soils, rock, cement masonry or concrete structures, excavated within the payment lines at the applicable bottom depth price, for installation of permanent new underground ductile iron water main, and for cutting in fittings, valves and accessories in or onto existing water main piping where shown on the plans, for encasement of sanitary forcemain and gravity sewer, for installation of water main stop collar, and where replacement of existing underground ductile iron water main piping is shown or directed by the Engineer. Also included is excavation of existing piping behind bridge end walls for the purpose of applying insulation as shown on the drawings, and re-bedding the pipe. In all cases, vertical payment limits shall be from top of existing grade at time of excavation not to exceed original grade, to 1 foot below pipe. Horizontal payment limits shall be nominal pipe inside diameter plus 2 feet, and trench length shall be as required, not to exceed 7 feet beyond the working trench area.

Where inspection and/or retrofit of existing underground ductile iron pipe joint restraints is shown, excavation shall first be performed to uncover pipe joints within the designated piping run, and payment for that portion as "Rock in Trench Excavation 0-10 Feet Deep (Water Main) shall be defined as the volume determined by the horizontal pay limit width of nominal pipe inside diameter plus 2 feet, length corresponding to pipe run area shown on the plans, and vertical pay limit from existing grade at time of excavation not to exceed original grade, down to top of pipe barrel. (Note that for retrofit of pipe joints with restraint, or where ordered by the Engineer, hand or machine excavation to expose the joint for retrofit is included in the joint retrofit item, Item #1304070A-Restraint Existing Pipe Joint, and re-bedding included in Item #1307001A-Bedding Material (Water Main)).

The above prices shall include all materials, tools, equipment and labor, and all transport, handling, and disposal costs for excess materials, rock, cement masonry and concrete structures, necessary to complete, backfill with approved or specified granular fill materials, and compact the excavation in conformity with the plans or as ordered.

This item is only applicable to unit price water main trench excavation performed in concert with ITEM # 130178A DUCTILE IRON PIPE (WATER MAIN), and including above-listed scope items. Rock in trench excavations for portions of water main work that are paid for on a lump sum basis are included with that respective item number at no additional cost.

Article 2.86.05 – Basis of Payment: Replace with the following:

Payment will be made on a unit price basis per cubic yard (CY) of trench or other ordered excavation measured as defined above.

Pay Item	Pay Unit
Rock in Trench Excavation 0'-10' Deep (Water Main)	CY

ITEM #1301019A - TEMPORARY RELOCATION OF WATER MAIN

ITEM #1303202A - INSTALL FIRE HYDRANT

ITEM #1303195A - REMOVE HYDRANT (WATER MAIN)

Description:

The existing 12" ductile iron water main on Benson Road is owned and operated by the Connecticut Water Company (CWC). The pipeline spans I-84 via attachment to the Benson Road bridge. That portion of the water main shall be temporarily relocated to permit rehabilitation of the bridge, in accordance with the plans. In preparation for the project, CWC will in advance, install 12"x12"x12" tees with 3 isolation valves each, outboard of each end of the bridge, leaving the branch connections plugged or capped, and restore the roadway. The work of this item is to attach to the branch tee isolation valves, and extend temporary 12" ductile iron water main through the eastern embankments of Benson Road, transitioning to temporary 12" HDPE spanning I-84 via a temporary utility bridge, thus completing a loop around the existing bridge. Exposed ductile iron pipe and portions of underground ductile iron pipe will be field insulated. HDPE pipe will be factory pre-insulated. Thrust restraint and supports are included in the work.

Included in this work shall be all labor, tools, materials, accessories, appurtenances, equipment, hauling, transport, incidentals, coordination, shop drawing submissions, documentation, trenching and backfill, bedding, supports, vent/drain and testing/flushing provisions, thrust restraint, concrete encasement, testing, disinfection, flushing, and any incidental work not specifically mentioned but necessary to result in a complete, acceptable, and operational system, all included in the lump sum cost for the temporarily relocated water main. A temporary hydrant will be supplied by CWC, for installation by the contractor.

Also included in this work is maintenance of uninterrupted water service, coordination among related work items, and coordination with CWC and parties having jurisdiction. The contractor shall permit CWC, their agent or inspector, to inspect the work at any time. Additionally, upon restoration of water service through the new water main attached to the bridge, removal and off-site legal disposal of all temporary pipe, valves, fittings, supports, insulation, temporary thrust restraint and thrust blocks, and temporary accessories and appurtenances, is also included. The temporary hydrant shall be returned to CWC. Existing water main that will remain, shall be maintained safe during removal of the temporary relocated water main, and finalized via caps/plugs with restraints and thrust blocks as detailed on the plans, and/or directed by CWC, branch valve curb box removed and the branch valve direct buried -closed, plugged and restrained. Main and branch valves shall only be operated by CWC, and contractor coordination and advance notice is required.

Further, the contractor will construct reinforced concrete encasements around the sanitary force main and the gravity sewer, as detailed on the drawings, and in coordination with piping joint locations, for the temporary relocated water main crossings. Certain work associated with the crossings as well as pressure testing to demonstrate proper jointing, will be witnessed by CWC,

the Town of Middlebury, the Engineer, and/or regulatory agencies or designated representatives, requiring associated coordination by the contractor as an integral part of this work. Coordination of the installation and witnessed testing of temporary and permanent water mains with installation and witnessed testing of sanitary sewer force main and gravity sewer piping, is required of the contractor as an integral part of this work.

The temporary utility bridge is furnished and installed via a separate contract item. The temporary utility bridge will carry temporarily relocated water main, sanitary sewer force main, Eversource gas main, and potentially other utilities. The temporary utility bridge line and grade is to accommodate the temporary sanitary force main, without introducing high or low pockets. The contractor will lay out the temporary water main in coordination with the temporary sanitary forcemain.

Certain related work depicted on the plans will be performed by others, or paid for under another item. If not otherwise addressed in this specification or called out on the plans, all work shall be done by the contractor performing the water main temporary relocation, on a lump sum basis.

Materials:

The Contractor shall submit to the Engineer manufacturer's specifications, data, catalog cuts, etc., for all water distribution system materials and products incorporated into the work. All materials proposed for use shall be acceptable to the CWC. The CWC reserves the right to inspect and approve all materials furnished by the Contractor at the manufacturer's plant. All pipe and appurtenances shall be subject to inspection by the CWC at the point of delivery. Material found to be defective due to manufacture or damage in shipment shall be rejected, recorded on the bill of lading and removed from the job site. The CWC may perform tests as specified in the applicable AWWA standard to ensure conformance with the standard. In case of failure of the pipe or appurtenance to comply with such specifications, the replacement of the defective materials shall become the responsibility of the Contractor. All brass items shall conform to the "Lead Free Brass Standards" as approved by the AWWA.

Ductile Iron Water Main:

Pipe shall be Thickness Class 54, with a minimum pressure rating of 350 PSI, manufactured and finished in The United States of America and in accordance with ANSI/AWWA C151/A21.51-02 or the latest revisions thereof. All ductile iron pipe shall be double cement mortar-lined and double bituminous seal coated inside and bituminous seal coated on the exterior per ANSI/AWWA C104/A21.4-03. Piping shall be certified per NSF/ANSI 61 and marked to distinguish it from non-certified pipe that may be on site.

All fittings shall be ductile iron manufactured in the US in accordance with ANSI/AWWA C153/A21.53, rated for 350 PSI working pressure, double cement lined and double seal coated inside and bituminous seal coated on the exterior per ANSI/AWWA C104/A21.4-03.

Pipe and fitting joints shall be push-on type with mechanical or restrained flexible jointing (TR Flex) configuration matching connecting pipe, and/or as identified on the drawings. Fittings shall be certified per NSF/ANSI 61. All pipe and fitting joints shall employ a single, elongated grooved rubber gasket to affect the joint seal.

Approved Manufacturers of Mechanical Joint Ductile Iron Pipe / Fittings

Tyler Union
McWane Ductile
American Cast Iron Pipe Company
United States Pipe & Foundry Company

All ductile iron pipe, valves, fittings, and specialty items installed in the temporary portion of the system, in the underground portion of the permanent system, and where called out, shall have mechanical joints utilizing ductile iron restraints rated for 350 PSI pipeline pressure. Restraints shall consist of a ductile iron harness bolted to the flange of the adjacent pipe bell, and utilizing serrated wedge type anchors to grip the pipe barrel. The harness shall be constructed of ASTM A 536 ductile iron. The harness shall be a one-piece design. The anchors shall employ torque limiting twist-off nuts. Set screw type restraints shall not be used.

Approved manufacturers of joint restraints

Megalug Series 1100 or 1100SD, manufactured by EBAA Iron Inc.
Romagrip MJ Restraining gland, manufactured by Romac Industries, Inc.

Ductile iron valves and fittings may utilize bolt-through MJ adapters for temporary joint restraint (Foster Adapter). Adapters shall be manufactured for ASTM A536 ductile iron, with SBR MJ gaskets, Assembly bolts of weathering steel (Corten), and SAE Gr 5 nuts with black oxide coating. 12" Adaptor shall be rated for 350 psi. Adapter shall have NSF 61 asphaltic seal coating per ANSI/AWWAC104/A21.4.

Approved Foster Adapters:

Foster Adaptor by InFact Corporation
Foster Adaptor by Tyler Union

Gaskets shall be Styrene Butadiene Rubber (SBR) conforming to the requirements of ANSI A21.11/AWWA C111, supplied by the pipe or fitting manufacturer.

Gate Valves:

Main line and hydrant branch valves shall be resilient-seated gate valves of full weight ductile iron body, non-rising stem, mechanical joint, complete with Type 316 stainless steel stainless steel trim, O-ring seals, 2" x 2" operating nut, manufactured in the United States and in accordance with ANSI/AWWA C509-01 or the latest revision thereof. *Note: Lightweight/thin wall ductile iron body valves are **not** accepted.*

As a minimum, the inside of the valve body and bonnet are to be coated with a fusion bonded epoxy in accordance with ANSI/AWWA C550-05 or the latest revision thereof. All bolts shall be stainless steel ASTM F593.

Valves shall have a working pressure rating of 200 PSI. Gate valve opening direction shall be coordinated with CWC.

Approved Manufacturers and Products

Mueller Company A-2362-20 (MJ)
U.S. Pipe Resilient Seat Valve A USP223

Valve Boxes

Valve boxes shall be iron-body with close fitting dirt-tight covers, 2-piece (26 inch top, 36 inch bottom,) 5 ¼-inch shaft adjustable slide type. The top of the cover shall be flush with the top of the box rim with the word “WATER” clearly marked.

Approved Manufacturers

Bingham & Taylor #4908
Bibby St. Croix #V683 (5664)
Tyler/Union Foundry #7126

Restrained Couplings:

Restrained couplings shall consist of a coupling sleeve of ductile iron per ASTM A536, with end restraint rings of ductile iron per ASTM A536, with gaskets and corrosion resistant, low alloy high strength, double ended threaded rods with nuts per AWWA C111/A21.11. Steel sleeves or steel restraint rings shall not be used. Wetted parts shall be lined with a minimum 15 mil fusion bonded epoxy coating per ANSI/AWWA C213, conforming to ANSI/NSF-61. Restraint rings shall have a heat cured protective coating and shall employ heat cured epoxy coated serrated wedges with torque limiting nuts to grip the connecting pipe. Set screw types shall not be used. The restrained coupling assembly shall be rated for 350 PSI.

Approved Manufacturers

Restrained coupling shall be Series 3800 by EBAA Iron, Eastland, TX,
Alpha restrained Joint Coupling by Romac Industries

Warning Tape:

Warning tape shall be a minimum 3-inch wide, 4.0 mil polyethylene film suitable for buried service. The tape shall be blue in color per the A.P.W.A. National Color Code and shall be permanently imprinted with a warning label indicating a “Water Main Buried Below.”

Thrust Blocks:

Thrust blocks shall be provided at all tees, at all bends 45 degrees bends and greater, and where indicated on the plans. Reinforcement shall be as indicated on the plans. Concrete shall have a 28 day minimum compressive strength of 3,000 PSI.

Corporation Stops (valves)

Corporation stops shall be Mueller ball type corporations B25008N1 rated for 300 psi bronze-body ground key design manufactured in the United States or Canada in accordance with

ANSI/AWWA Standard C800-05. The inlet shall have a standard AWWA corporation valve inlet thread (Mueller - CC) and the outlet shall be a compression connection for copper tubing.

Factory Insulated High Density Polyethylene (HDPE) Water Main

Service Pipe:

Service pipe and fittings shall be made from the same resin meeting the requirements of the Plastic Pipe Institute (PPI) material designation PE 4710, conforming to ATSM D3350 with a cell classification of 445574C/E, and listed in PPI Technical Report TR-4 with an expiration date current as of project installation. The pipe shall have a minimum Hydrostatic Design Basis (HDB) of 1,600 psi at 73 degrees F. The material shall be UV stabilized.

All materials which come in contact with water, including lubricants, shall be evaluated, tested, and certified for conformance with ANSI/NSF Standard 61. All pipe and fittings shall be manufactured in ductile iron pipe sizes (DIPS) only, in accordance with AWWA Standard C906.

The pipe shall contain no recycled compound except for rework material generated in the manufacturer's own plant that has the same cell classification as the material to which it is being added. The pipe shall be homogeneous throughout and free of visible cracks, holes, voids, foreign inclusions, or other defects that may affect the wall integrity. Permanent identification of water piping service shall be provided by co-extruding longitudinal blue stripes into the pipe outside surface. The striping material shall be the same material as the pipe material except for color. Stripes printed or painted on the outside surface shall not be acceptable.

The nominal pipe diameter is specified on the Contract Drawings. The DR (dimension ratio) and the pressure rating of the pipe shall be as noted on the plans. The minimum pressure rating will be 200 psi.

Piping shall be furnished in nominal 40 FT lengths, and fusion welded on site.

Compression fittings and retainer glands shall not be used for jointing. Only approved restraints specifically designed for joining HDPE to ductile iron pipe or fittings, are permitted where indicated on the drawings.

Insulation for factory-insulated HDPE:

The insulation shall be a foamed in place closed cell polyurethane which completely fills the annular space between the carrier pipe and the exterior casing. The insulation shall have the following physical properties:

Minimum Density (lb./cu. ft.) 2.0 ASTM D-1621
"K" Factor BTU/Hr. sq. ft. °F/in. .147 ASTM C-177
90-95 % Closed Cell ASTM D-2856

Exterior Casing (jacket): *

The exterior casing shall be

(1) Seamless, extruded white PVC Type 1, Grade 1, Class 12454-B per ASTM D-1784 **or**
(2) Seamless, High Density Polyethylene (H.D.P.E.) ASTM D-1248 with the following physical properties:

ASTM D-638.....Ultimate Elongation 850%

ASTM D-638.....Tensile Yield Strength 3300 psi

ASTM D-3350.....Resin Type III, Grade P34

ASTM D-790.....Tangent Flexural Modules 175,000 psi

***No tape casings will be allowed.**

Jacket shall be held on with Type 316 stainless steel bands or screws, or other approved methods.

The manufacturer shall provide joint kits for field installation of insulation and casing at joints.

HDPE Fittings:

HDPE temporary piping system fittings shall be fusion welded, of the type and configuration indicated on the drawings. Adaptor flanges shall be full face, fusion welded ASME/ANSI B16.1 Class 125 for joining as indicated on the drawings. Slip ring type flanges are not acceptable

Approved Manufacturers of Factory Insulated HDPE Piping:

Tricon Piping Systems, Inc.

Urecon Pre-insulated Pipe

Fire Hydrants

Fire hydrants shall be provided by CWC for installation by the contractor per Item #1303202A, in sequence with the work of this item.

Expansion/Contraction Joints:

Expansion/Contraction joints ("expansion joints" or "joints") shall be manufactured of ductile iron per ASTM A536, corresponding to the material properties of ANSI/AWWA C153/A21.53, and consist of single or multiple stationary and sliding sleeve segments with seal rings. Joint design shall accommodate field addition of additional sleeves, and shall require no maintenance. The joint shall be self-restrained at full extension, without the use of external tie rods. The joint shall be rated for 350 PSI, and factory tested at rated pressure. Seals shall conform to ANSI/AWWA C111/A21.11. Expansion joints outlets shall be configured for mechanical joint flanges with O-ring gaskets per ANSI/AWWA C110/A21.10. Joints shall be configured and coordinated for ductile iron x HDPE piping. Gasket and seal materials shall be NSF-61 approved. All wetted parts of the ductile iron joint shall be coated with an NSF-61 approved fusion bonded epoxy conforming to ANSI/AWWA C213, with a minimum of 6 mils thickness. Expansion joints shall be provided with restraints for connecting pipe rated for 350 PSI, as specified herein.

Additional sleeve segments shall be factory installed and tested to suit expansion/contraction needs from ambient temperature at installation to service temperature or other conditions corresponding to maximum temperature differential. The coefficient of thermal expansion shall be as per HDPE pipe manufacturer, and is generally taken as 8×10^{-5} inches/inch °F. Any field disassembly/assembly shall be done under the direction of the manufacturer's representative at no additional cost.

Expansion/contraction joints shall be Ex-Tend[®] as manufactured by EBAA Iron, Eastland, TX, or TR Flex[®]/HP Lok[®] telescoping sleeves with ductile iron adapters at each end to join to restrained MJ ductile iron and HDPE, or Engineer approved equal satisfying the above requirements.

Field-Applied Insulation:

Field applied insulation on all types of pipe, and whether temporary or permanent, shall be closed cell, rigid, cellular plastic foam of polyurethane or polyurethane modified polyisocyanurate, supplied in preformed sections free of voids, and conforming to outside pipe diameter or outside diameter of inner insulation layer where insulation overlaps at fittings or special piping components, and with the following properties:

Property	Value
Thickness, inches	2
Minimum density, LB/FT ³ per ASTM D1622	2.05
Minimum Compressive Strength parallel / perpendicular to rise – thickness, in LB/IN ² per ASTM D1621	24 / 30
R-Value per inch, at 180 days, 75°F, in HR-FT ² -°F/BTU, per ASTM C518	5.3
Closed Cell Content, in % per ASTM D6226	90
Water Absorption, maximum, in % by volume, 24 hr absorption, per ASTM C272	0.7
Water Vapor Permeability, maximum, perm-inch, per ASTM E96	4
Service Temperature range °F	(-) 297 to (+) 300
Flame Spread Index per ASTM E84	≤ 25

Insulation shall be Trymer[™] 2000XP by ITW Insulation Systems, Corafoam[®] by Duna-USA or approved equal.

Insulation jacket (exterior casing)* shall be UV inhibited, 50 mil, High Density Polyethylene (H.D.P.E.) ASTM D-1248 with the following physical properties:

- ASTM D-638.....Ultimate Elongation 850%
- ASTM D-638.....Tensile Yield Strength 3300 psi
- ASTM D-3350.....Resin Type III, Grade P34
- ASTM D-790.....Tangent Flexural Modules 175,000 psi

***No tape casings will be allowed.**

Jacket shall be held on with Type 316 stainless steel bands or screws, or other approved methods.

Pipe Supports:

Structural shapes for temporary pipe support elements shall be fabricated from supplemental steel matching bridge steel specifications, AASHTO M270 Grade 50T2, except that metalizing or hot dip galvanizing is not required. Temporary structural steel for pipe supports may be cleaned after fabrication and primed with cold galvanizing spray.

Structural bolting material for temporary supports shall be as follows: Bolts shall be as per ASTM F315 Grade A325; nuts shall be ASTM A563, D.H.; washers shall be ASTM F436; all structural bolting material shall be hot dip galvanized per ASTM F2329.

Pipe rolls and other prefabricated hardware shall be sized for the nominal outside diameter of the insulated pipe, except where otherwise shown on the plans. Prefabricated hardware material for temporary support components shall be as shown on the drawings, custom dimensioned as required; certain components (e.g. U Bolts) shall be fabricated with larger than standard diameters, and/or longer legs than standard, to attach to the host surface/frame. Minimum factor of safety to be employed in component selection is 1.7. Prefabricated hardware is based on the pipe support products of Anvil International, National Pipe Hanger Corporation, or Engineer approved equal.

Strap Service Saddles:

Service saddles for temporary vents and drains or where directed, shall be double strap type, and shall have epoxy or nylon coated body and stainless steel nuts, bolts and double straps. Taps shall be CC (Mueller) Thread unless otherwise noted.

Approved Manufacturers

Smith-Blair #313 or #317 or #239
Romac #202N
Ford FCD 202
Mueller #DE2S
U.S. Pipe #DR2S

Construction Methods:

Inspection During Construction

CWC will appoint an Agent or “Inspector” to inspect all materials and workmanship and to see that the work conforms with the specifications and drawings.

The failure of the Inspector to reject or condemn improper materials and workmanship shall not prevent CWC from rejecting materials and workmanship found defective at any time prior to the final acceptance of the completed work, nor shall it be considered as a waiver of any defects which may be discovered later, or as preventing CWC at any time subsequently from recovering damages for work actually defective.

The Contractor shall provide sufficient, safe and proper facilities at all times for inspection.

The Inspector shall be furnished by the Contractor with every reasonable facility for examining and inspecting the work and for ascertaining that the Work is being performed in accordance with the requirements and intent of the Contract, even to the extent of requiring the uncovering of portions of finished work by the Contractor.

Should the work thus uncovered prove satisfactory, the cost of uncovering and the replacement thereof shall be considered as extra work unless the original work was done in violation of the Contract or in the absence of the Inspector and without his written authorization, in which case said cost shall be borne by the Contractor. Should the work uncovered prove unsatisfactory, said cost shall be borne by the Contractor.

Material Storage and Handling

All pipe, fittings, valves, live taps, hydrants and accessories shall be loaded and unloaded by lifting with hoists or skid/pallet handling equipment in order to avoid shock or damage. Under no circumstances shall such material be dropped. Pipe handled on pallets or skidways shall not be rolled or skidded against pipe on the ground. Lifting and handling equipment shall be padded and used in such a manner as to prevent damage to the exterior surface or internal lining of the pipe. Pipe and fittings shall not be handled by insertion of forks or tongs or any device designed for insertion, in order to prevent damage to the lining. All Materials shall be protected from damage. The interior of all pipes, fittings and other appurtenances shall be kept free from dirt or foreign matter at all times. Valves and hydrants shall be drained and stored in such a manner to protect them from damage by freezing or accumulation of water or snow melt. Pipe shall not be stacked higher than the limits shown in Table 1. The bottom tier shall be kept off the ground on timbers, rails or concrete. Pipe in tiers shall be alternated: bell, plain end; bell, plain end. At least two rows of timbers shall be placed between tiers and chocks, affixed to each in order to prevent movement. The timbers shall be large enough to prevent contact between the pipes in adjacent tiers.

All gaskets for mechanical and push-on joints shall be stored in a cool location protected from direct sunlight. Gaskets shall NOT come in contact with petroleum products. Gaskets shall be used on a first-in, first out basis. Mechanical-joint nuts and bolts shall be handled and stored in such a manner to ensure proper use with respect to types and sizes.

TABLE 1 - Maximum Stacking Heights for Ductile Iron Pipe*

Nominal Pipe Size (in)	Number of Tiers
6 & 8	11
10	10
12	9

* For 18 or 20 foot (5.5 or 6.1m) lengths.

For factory insulated HDPE, follow manufacturer's instructions for handling, storage and stacking lengths of pipe.

Construction Sequencing:

Construction sequencing shall generally follow the progression outlined in the Notes on the plans. Specific attention shall be paid to temporary bypass piping, temporary service connections and any other requirements necessary for the water main relocation. **The following conditions shall be strictly adhered to during water main relocation:**

1. Main line and branch valves may only be operated by the CWC. Lockout/Tagout (LOTO) procedures shall be employed.
2. All new taps (i.e, corporation stops) that may be installed in the permanent portion of the underground piping system for the benefit of testing, disinfecting or flushing the temporary portion of the system, shall be installed by the CWC.

Installation of the north-south portion of temporary relocated water main shall proceed in the high to low, (south to north) direction. Ductile iron portions of the south end shall be anchored prior to assembly of the factory insulated HDPE portion from the south end downhill towards the mid-point expansion/contraction joint. The expansion/contraction joint shall be installed with extension set per the manufacturer's instructions for ambient temperature at the time of installation, then mid-point anchor installed and secured to the temporary utility bridge. Following completion of the mid-point anchor installation, the factory insulated HDPE shall be installed from mid-point anchor downhill to the north, and the expansion/contraction joint installed with extension set per the manufacturer's instructions for ambient temperature at time of installation, and the continuing ductile iron pipe segment anchored as shown on the drawings.

Installation of insulation on ductile iron or HDPE joints applied in advance of obtaining acceptable leak and pressure testing, is entirely at the contractor's risk.

Trenching, Bedding, Backfill, and Restoration:

The contractor shall lay out his trench according to pipe alignment, and for encasing sanitary force main and gravity sewer, as shown on the drawings. If the contractor's construction sequence provides for laying temporary relocated water main across Benson Road from the 12"x12"x12" valved tees installed in advance by CWC, and re-opening Benson Road to traffic prior to commencement of reconstruction of the Benson Road bridge and associated road closure, the contractor shall saw cut the pavement in accordance with drawing details. Temporary restoration of the trench for this instance shall be completed with 8" of compacted processed aggregate base, and 4" of HMA S0.375 applied in two equal lifts as per drawing details, included in this lump sum for temporary relocation of water main.

Trench excavation and rock in trench excavation shall include sand, gravel, ashes, loam, clay, organics, swamp muck, soft or disintegrated rock, hardpan, solid rock in place, detached rocks, boulders, masonry structures and concrete. Trench excavation and rock in trench excavation shall be performed in accordance with Section 2.86 of Form 818, and as detailed on the drawings, with all costs including removal and disposal of pavement, rock and excess material, unsuitable material, and provision of pipe bedding and backfill, is included this lump sum item for temporary relocation of water main. Trench excavation and rock in trench excavation shall include refilling trenches under pipelines.

Excavation shall be made in open cut. No tunneling or blasting will be permitted. Any necessary sheeting or shoring, dewatering and related work, is included. Trench repairs for any reason, and maintenance of trenches for the duration of the work, is included.

Water main, branch and hydrant branch piping shall be bedded in select fine gravel material obtained from approved natural deposits and unprocessed except for the removal of unacceptable material and stones larger than the maximum size permitted. It shall not contain vegetation. It shall be free from loam and other organic matter, clay, and other fine or harmful substances, and have a gradation within the following limits:

<u>Sieve Size</u>	<u>Percentage by Weight Passing</u>
3 in.	100
1/2 in.	80-100
No. 4	60-80
No. 40	10-30
No. 200	0-10

Existing material not suitable for trench backfill shall be disposed of and replaced with bank run gravel. Bank run gravel shall have a gradation within the limits given below. It shall be obtained from approved natural deposits and unprocessed except for the removal of unacceptable material and stones larger than the maximum size permitted. It shall not contain vegetation, masses of roots, or individual roots. It shall be substantially free from loam and other organic matter, clay, and other fine or harmful substances.

<u>Sieve Size</u>	<u>Percentage by Weight Passing</u>
6 in.	100
3-1/2 in.	90-100
1-1/2 in.	55-95
1/4 in.	25-60
No. 10	15-45
No. 40	5-25
No. 100	0-10
No. 200	0-5

Dewatering, Control and Diversion of Water:

Dewatering required for maintaining trenches in firm condition for supporting pipe, shall be performed as the work progresses, in accordance with Item #1300008A – DEWATER, CONTROL AND DIVERSION OF WATER (WATER MAIN)

Alignment and Grade:

The water mains shall be laid and maintained to the lines and grades established by the plans and specifications as coordinated, with fittings, valves, tapped or bossed outlets and hydrants at the required locations unless otherwise directed or necessary to allow proper operation. Line and grade shall be coordinated with the sanitary forcemain.

When crossing existing pipelines or other structures, alignment and grade shall be adjusted as necessary, with the approval of the Engineer, to provide clearance as required by federal, state and local regulations or as deemed necessary by the Engineer to prevent future damage or contamination. A clearance of 18” shall be maintained at any sewer crossing except where reinforced concrete encasement is employed and specific dimensions are shown on the drawings, and a 12” minimum clearance is required for other utilities. Jointing of both water and sewer shall be staggered so as to permit minimum 10’ separation of joint centerlines.

Coverage requirement on all water lines is minimally 5'-6", except where shown otherwise on the drawings, in which case insulation is applied as shown or specified.

The contractor shall follow AWWA, CWC, and CT DOT construction guidelines, and in the event of a discrepancy, follow CWC standards.

General Water Main Installation:

Proper implements, tools and facilities shall be provided and used for the safe and convenient performance of the work. All pipe, fittings, valves and hydrants shall be lowered carefully into the trench or utility bridge by means of a crane, excavator, slings or other suitable tools or equipment in such a manner as to prevent damage to water main materials and protective coatings and linings. Under no circumstances shall water main materials be dropped or dumped into the trench.

All pipes, fittings, valves, hydrants and other appurtenances shall be examined carefully for damage and other defects immediately before installation. Defective materials shall be marked and held for inspection by the Engineer, who may prescribe corrective repairs or reject the materials.

Foreign material shall be prevented from entering the pipe while it is being placed in the trench. No debris, tools, clothing or other materials shall be placed in the pipe at any time.

As each length of the pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with approved backfill material.

At times when pipe laying is not in progress, the open ends of pipe shall be closed by a water-tight plug or other means approved by the Engineer. The plug shall be fitted with a means for venting. When practical, the plug shall remain in place until the trench is pumped completely dry. Care must be taken to prevent pipe flotation should the trench fill with water. Prior to removal of the plug from extending the line or any other reason, air and/or water pressure in the line shall be released.

Where coverage over temporary relocated water main is shallow, place road plate over the compacted piping trench as detailed, to protect the insulated pipe from construction loads. Place pavement around the perimeter and across the top of the road plate, to hold it in place during construction traffic.

Mechanical Joint Ductile Iron Water Main Installation:

All ductile iron piping for the temporary relocated water main shall be restrained mechanical joint type. All lumps, blisters and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end and the inside of the bell shall be wiped clean and dry and be free from dirt, sand, grit or any foreign materials before the pipe is laid.

The Contractor shall ensure that the plain end is beveled; square or sharp edges may damage or dislodge the gasket and cause a leak. Field cutting of ductile iron pipe shall only be done on "gauged" pipe, that is, pipe so marked at the factory as to be within proper O.D. diameter and out of round tolerance for proper jointing at any position along the length.

Place the gland rings of the restraint assembly on the bell and plain ends respectively, and use joint gasket lubricant from sterile cans. Assemble the pipe joint and restraint per manufacturer's instructions, seating the pipe before making any necessary deflection. Deflection shall not exceed 75% of manufacturer's published limits. When pulling the pipe into the bell of fitting, do not use chain hooks directly on the pipe ends, where damage and/or chipping of the cement lining can occur. When pushing, use timbers against the pipe so as to prevent damage to bell or cement lining. Complete assembly of the restrained joint by uniformly taking up the gap between wedge bolts and pipe wall, then tightening in sequential order repetitively in steps recommended by the manufacturer before final torque twist-off of the wedge bolt heads. Set screw type restraints shall not be used.

Coordinate with the temporary utility bridge configuration. Provide rigid blocking support under anchorage points, with placement and thickness coordinated to permit transition to insulated restrained coupling and/or insulated expansion/contraction joints, such that the follow-on transition to HDPE factory insulated piping continues smoothly to rest on continuous blocking as shown on the drawings. Note where supports such as U-bolts are required to be tight against ductile iron pipe wall for anchorage, or where a gap is shown for U-bolts installed over the outside diameter of insulated portions, and thermal expansion and contraction movement is permitted. Anchorage shall be in place to the satisfaction of the Engineer and CWC, prior to pressure testing.

HDPE Water Main Installation:

Factory insulated HDPE piping across the temporary utility bridge shall be continuously supported by smooth blocking constructed from finished lumber or primed steel, to permit axial movement due to thermal expansion and contraction. U-Bolts shall be installed over the insulation jacket and secured with a small gap at the top, so as to permit axial movement without "snaking" in the horizontal plane.

HDPE piping joints shall be fusion welded. Flanges for connecting to the center span anchor shall be full face, with ANSI B16.1 Class 150 bolt pattern, and assembled with SBR gasket of the 3 ring bulb type. Slip ring flanges shall not be used.

Valve and Fitting Installation:

Prior to installation, valves shall be inspected by the Engineer for direction of opening, number of turns to open, freedom of operation, tightness of pressure-containing bolting and test plugs, cleanliness of valve ports and especially seating surfaces, handling damage, and cracks. Defective valves shall be corrected and replaced. Valves shall be closed before being installed. Valve opening direction shall be as per CWC.

Valves, fittings, plugs and caps shall be set and joined to the pipe in the manner specified in the specifications for cleaning, laying and joining pipe, except that 12-inch and larger valves should

be provided with special support, such as treated timbers, crushed stone, concrete pads or a sufficiently tamped trench bottom so that the pipe will not be required to support the weight of the valve. Valves shall be installed in the closed position.

A valve box shall be installed for every valve. The valve box shall not transmit shock or stress to the valve and shall be centered over the operating nut of the valve with the box cover flush with the surface of the finished ground surface. Extension risers shall be installed on every valve and set with the operating nut within six inches of finished grade.

In no case shall valves be used to bring misaligned pipe into alignment during installation. Pipe shall be supported in such a manner as to prevent stress on the valve. All dead ends on new mains shall be closed with plugs or caps that are suitable restrained to prevent blowing off under test pressure.

Field Installed Pipe Insulation:

Rigid closed cell foam insulation shall be placed around the water main to protect against freezing where a storm line crosses directly above or below the new main, and where temporary water main is offset vertically to cross encased sanitary sewer forcemain and gravity sewer pipe. Temporary relocated water main shall be insulated where exposed, and extending into the embankments to the length and depth shown on the drawings.

Insulation shall be applied as per manufacturer's instructions. Use pre-formed pipe insulation for pipe and fittings, butting joints tightly and securing with stainless steel wire or other recommended means until jacket is installed. Jacket shall be secured with screws, stainless steel bands, or other approved methods. Jacket seams and larger diameter fitting cover jackets overlapping pipe barrel jackets, shall be caulked where pipe is anchored, but not caulked to allow a sliding fit where shown and where pipe expansion/contraction movement is permitted.

Hydrant Installation (hydrant furnished by CWC):

Prior to installation, the Engineer shall inspect all hydrants for direction of opening, nozzle threading, operating-nut and cap-nut dimensions, tightness of pressure-containing bolting, cleanliness of inlet elbow, handling damage and cracks. Defective hydrants shall be corrected or replaced.

All hydrants shall stand plumb and shall have their nozzles parallel with, or at right angles to, the curb with pumper nozzle facing the curb. Hydrants shall be set to the established grade with the centerline of the lowest nozzle 1 above guide rail, or as directed by the Engineer. Each hydrant shall be connected to the main with a 6-inch branch controlled by an independent 6-inch valve.

Hydrant bowl to piping connection shall be restrained, and a thrust block placed as detailed on the drawings

When a hydrant is set in soil that is pervious, drainage shall be provided at the base of the hydrant by placing (1/3) one third cubic yard of (3/4") three quarters inch crushed stone to at least 6-inches above the drain port opening in the hydrant and to a distance of (2') two feet around the elbow, as detailed on the drawings.. A layer of (8) eight mil polyethylene sheeting shall be placed on top of the crushed stone prior to backfilling. Where groundwater rises above the drain port or when the hydrant is located within ten feet of a sanitary sewer main, the drain

port shall be plugged and no crushed stone installed. The top of the hydrant shall be painted fire hydrant red and a 2-inch diameter red anodized aluminum tag engraved with the words “**HYDRANT MUST BE PUMPED OUT AFTER USE**” shall be attached to the pumper nozzle chain.

Hydrants shall be located as shown on the plans or as directed by the Engineer.

After installation and before backfilling, the Contractor shall apply a pressure test to both the hydrant seat and barrel to make sure that all joints are pressure tight, operate to full position, opened and closed to check operation and valve shut off. The Contractor shall check hydrants for drainage by removing the nozzle cap and placing palm of hand over nozzle outlet. Drainage rate should be sufficiently rapid to create suction. After backfilling, operate the hydrant to flush out foreign material. The Engineer shall be present during hydrant testing. A defective hydrant installation shall be corrected or replaced as directed by the Engineer.

Tighten nozzle caps and back-off on threads slightly so that the caps will not be excessively tight, but leave sufficient frictional resistance to prevent removal by hand.

Tests After Installation:

Strap Service Saddles with fittings and branch valved connections for vent, drain, fill and pressure gage connections, and capture of disinfection water, shall be installed at approximate high and low points. After the pipe has been installed and backfilled, all newly installed pipe shall be subjected to a pressure and leakage test conducted in accordance with AWWA Standard C600-99, Section 5 and as follows.

A) Pressure Test:

All newly installed pipe shall be subjected to a hydrostatic pressure of 1.5 times the working (system) pressure at the point of testing (provided by CWC), but in no case less than 1.25 times the working pressure at the highest point along the test section. The test pressure shall not exceed pipe or thrust restraint design limits, twice the rated pressure of closed valves or hydrants located within the test area, or the rated pressure of closed resilient-seated gate or butterfly valves. The test shall be maintained for a minimum of two hours with no more than a 5 psi variation during the test period.

B) Leakage Test:

The leakage test will be conducted at the same time as the pressure test. Leakage is the quantity of water required to maintain the pressure within 5 psi of the specified test pressure, it is not the measured drop in pressure. Leakage shall not exceed the number of gallons per hour as determined by CWC/their agent, and is indicated in Table 6 of the above specified AWWA Section.

C) General.

Before applying the specified test pressure, all air shall be expelled from the pipe. If hydrants or blow offs are not available at high places, CWC shall make the necessary taps at points of highest elevation before the test is made and insert the plugs, if desired, after the test has been completed. The section to be tested shall be closed by valves, temporary flanges, plugs or bulkheads as required.

Each valved section of pipe shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the inspector. The pipe connection and all necessary apparatus including pump shall be furnished by the Contractor. CWC will furnish the gauges for the test. The Contractor shall furnish all necessary labor and materials for conducting the tests.

If leakage is either visible or indicated by the above test procedure, the Contractor shall do whatever is necessary to locate and repair said leak at his own expense. Upon completion of the repair the pipeline shall be retested.

Disinfection and Flushing:

Prior to any section of pipeline being put into service, it shall be thoroughly disinfected in accordance with AWWA Standard C651-14, AWWA Standard for Disinfecting Water Mains, Section 4.4, Continuous-Feed Method of Chlorination (or the latest revision thereof).

The Contractor is responsible for developing a detailed plan for the disinfection procedure with liquid sodium hypochlorite solution (conforming to ANSI/AWWA B300) and capture and/or de-chlorination of discharge water for the water main installation. The contractor may elect to capture chlorinated test water via tanker truck, and dispose via sanitary manhole designated by the Middlebury WPCA. The detailed plan shall be submitted to the CWC for approval. This submittal should identify the location of injection and discharge points, the materials (conforming to CWC specs) and disinfection and de-chlorination products (if elected to be used). This submittal shall also identify any proposed subcontractors for this activity and provide references (3) and list of comparable projects (3) recently completed by them. The contractor shall only proceed with this procedure upon approval of the submittal by the CWC.

The CWC will typically perform the flushing of the water main in preparation for disinfection. A temporary hydrant is being installed as shown on the drawings, for this purpose. As needed the contractor shall support the CWC with this effort to meet the following guidelines. The completed line shall be slowly filled with water to eliminate air pockets and flushed to remove particulates. The flushing velocity in the main shall not be less than 3.0 ft/sec (0.91 m/sec). Flushing shall be performed for a sufficient period of time to allow for a minimum of 3 volume changes of water in the main (approximately 16 minutes per 1,000 feet of main at a flow rate that produces 3.0 ft/sec rate).

Introduce chlorine to the main at a constant rate from a point not more than 10 ft. downstream from the beginning of the new main, such that the water will have at least 25 mg/L free chlorine.

The heavily chlorinated main shall remain at static pressure for no less than 24-hrs. (not to exceed 48-hrs.). Chlorine residual remaining after 24 hours must be at least 10 mg/L. If less than 10/mg/L chlorine is measured after 24 hours, the Contractor shall repeat flushing and disinfection procedures.

**Flushing and Dosing Reference Values
(From AWWA C651 Table 3 and Table 4)**

Pipe Diameter (in)	Flushing Flow Rate to Produce 3.0 ft./sec (gpm)	1% Chlorine Solution Required to Produce 25 mg/L concentration in 100 feet of pipe (gal)
4	120	0.16
6	260	0.36
8	470	0.65
12	1,060	1.44

The Contractor shall be responsible for the capture and/or dechlorination of disinfection discharge water. The discharge of heavily chlorinated water (concentrations greater than system residual) to the environment is prohibited. The contractor shall capture chlorinated water via tanker truck from the low point drain for disposal via Town of Middlebury WPCA designated location, or discharge water must be dechlorinated satisfactory to the CWC before released to the environment. Dechlorination will be incidental to the activity. During dechlorination, a neutralizing chemical shall be applied to the water to be wasted to thoroughly neutralize the residual chlorine (see ANSI/AWWA C655 for neutralizing chemicals). Where necessary, federal, state, local, or provincial regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water.

Upon completion of flushing, disinfection, and dechlorinating, a water sample from the section shall be collected by the CWC for third-party analysis.

No section of main shall be put into service without the approval of the CWC, and should the analysis be unsatisfactory, the section shall again be disinfected and retested until an analysis satisfactory to the CWC is obtained. All costs for additional disinfection and retesting shall be borne by the Contractor. All temporary taps and discharge points for the disinfection and flushing process shall be permanently abandoned upon successful testing unless approved by the CWC to stay in place. Abandonment of temporary taps includes positioning the corporation 'off' and installing a Mueller H-15451 coupling and corresponding NPT plug. Abandonment of disinfection taps and blow-offs will be incidental to the activity and shall be coordinated with the CWC representative.

Upon acceptance of all tests, CWC will clear their LOTO tags from the 12"x12"x12" valved tee branch valves, and open the branch valves, placing the temporary relocated water main loop in service, and closing and implementing LOTO procedures on the main line valves controlling water flow through water main piping across the bridge. The contractor will provide assistance to CWC as requested for this operation.

Removal of Temporary Relocated Water Main:

Following removal of the temporary relocated water main from service and valve LOTO, the contractor will drain the line, and remove the piping from the 12"x12"x12" valved tees, install restrained caps or plugs, and pour a thrust block against the valve cap/plug. The branch valve curb boxes will be removed and returned to CWC, and the valves buried directly, in the closed position.

All remaining temporary relocated water main shall be removed and legally disposed of off site, including supports, insulation, accessories and appurtenances. Reinforced concrete encasements around sanitary forcemain and gravity sewer pipe, shall remain in place.

Method of Measurement:

Temporary Relocation of Water Main, being paid for on a lump sum basis, will not be measured for payment.

Fire Hydrant installation (hydrant furnished by CWC) will not be measured, and the completed and accepted hydrant installation will consist of one each, for the Item #1303202A-Install Fire Hydrant payment item.

Removal of Fire Hydrant will not be measured for payment and the completed work and return of the hydrant to CWC will consist of one each, for Item #1303195A-Remove Hydrant (Water Main).

Dewatering, Control and Diversion of Water (Water Main), being paid for on a lump sum basis for all such work, both Item #1301019A-Temporary Relocation of Water Main, and Item #1301078A-Ductile Iron Pipe (Water Main), will not be measured for payment.

Basis of Payment:

This work will be paid for at the Contract Lump Sum price bid for **ITEM #1301019 – TEMPORARY RELOCATION OF WATER MAIN** which price shall include the complete, tested, disinfected and accepted temporary relocated water main shown on the drawings, specified and as required, inclusive of all materials and labor needed to accomplish the temporary relocation, including but not limited to, trenching, pipe bedding, the furnishing and installing of water mains, fittings, valves, taps, hydrants, supports, restraints, thrust blocks, removal and disposal of temporary water main upon placement of new water main in service, related and appurtenant work, as necessary and/or shown on the plans and in accordance with the specifications.

Fire Hydrant installation will be paid for on a one each basis under **Item #1303202A-INSTALL FIRE HYDRANT**.

Hydrant removal will be paid for on a one each basis under **Item #1303195A-REMOVE HYDRANT (WATER MAIN)**.

Dewatering will be paid on a lump sum basis under **Item #1300008A – DEWATER, CONTROL, AND DIVERSION OF WATER (WATER MAIN)**, which is applicable to and common for all water main installation items.

ITEM #1301078A - DUCTILE IRON PIPE (WATER MAIN)

ITEM #1303202A - INSTALL FIRE HYDRANT

ITEM #1304070A - RESTRAINT EXISTING PIPE JOINT

ITEM #1304083A - POLYETHYLENE ENCASEMENT OF PIPE (WATER MAIN)

ITEM #1307001A - BEDDING MATERIAL (WATER MAIN)

Description:

Overview - The existing Benson Road bridge over I-84 in Middlebury supports a 12" water main owned and operated by The Connecticut Water Company (CWC). The overall project effort includes installation of temporary water main outboard of the existing bridge, and reinstallation of water main on the newly reconstructed bridge, then removal of the temporary water main. This overall project effort is divided among several special provision items. The work of this item covers that portion of the piping system that is underground ductile iron pipe, for permanent installation. A portion of this work will be performed in advance of the project by CWC, as defined herein and indicated on the plans, and in accordance with this special provision.

Work under this item includes coordination with CWC for connection to the advance portion installed by CWC, for required inspections by CWC, and for witnessing and documentation of testing, disinfection and flushing, and as additionally outlined below.

The advance work performed by CWC consists of installation of 12"x12"x12" tees with valves, at each end of the Benson Road bridge, as depicted on the drawings. Pipe restraint, thrust blocks and thrust collars will be installed by CWC only where indicated. CWC will perform trenching and pavement restoration for this advance work, and cap or plug the 12" valved branch connection of each tee, for continuation by the contractor. All other work shown on the drawings for the underground portion of the main 12" line on either side of the tee, is the work of this item. All other work shown on the drawings for the branch connection of each tee, is the work of Item #1301019 TEMPORARY RELOCATION OF WATER MAIN. The exposed water main piping supported by the Benson Road Bridge is the work of Item #1301654A 12" DUCTILE IRON PIPE INSTALLED ON BRIDGE (WATER MAIN). Any water main work not described in the above two items or excluded below, is the work of this item.

Included in this work shall be all labor, tools, materials, accessories, appurtenances, equipment, hauling, transport, incidentals, coordination, shop drawing submissions, documentation, As-Builts, disposal of any components replaced as a part of this work, installation of one fire hydrant supplied by CWC in coordination with the on-going work, but paid separately, polyethylene encasement, and any incidental work not specifically mentioned but necessary to result in a complete, acceptable, and operational system, all included in the unit cost. Existing pipe joints in designated areas shall be inspected and retrofitted with restraint as shown on the plans and specified herein, paid for separately but performed in coordination with the on-going work of

this item. Installation of insulation on pipe for short segments behind bridge end walls, as well as sealing of end wall penetrations, all as shown on the drawings, is also included. Similarly, pipe bedding shall be placed in coordination with the work of this item, and paid for separately.

Also included in this work is maintenance of uninterrupted water service, coordination among related work items, coordination with CWC and parties having jurisdiction, and coordination with other utility custodians having adjacent facilities.

Materials:

The Contractor shall submit to the Engineer manufacturer's specifications, data, catalog cuts, etc., for all water distribution system materials and products incorporated into the work. All materials proposed for use shall be acceptable to the CWC. The CWC reserves the right to inspect and approve all materials furnished by the Contractor at the manufacturer's plant. All pipe and appurtenances shall be subject to inspection by the CWC at the point of delivery. Material found to be defective due to manufacture or damage in shipment shall be rejected, recorded on the bill of lading and removed from the job site. The CWC may perform tests as specified in the applicable AWWA standard to ensure conformance with the standard. In case of failure of the pipe or appurtenance to comply with such specifications, the replacement of the defective materials shall become the responsibility of the Contractor. All brass items shall conform to the "Lead Free Brass Standards" as approved by the AWWA.

Ductile Iron Water Main:

Pipe shall be Thickness Class 54, with a minimum pressure rating of 350 PSI, manufactured and finished in The United States of America and in accordance with ANSI/AWWA C151/A21.51-02 or the latest revisions thereof. All ductile iron pipe shall be double cement mortar-lined and double bituminous seal coated inside and bituminous seal coated on the exterior per ANSI/AWWA C104/A21.4-03. Piping shall be certified per NSF/ANSI 61 and marked to distinguish it from non-certified pipe on site.

All fittings shall be ductile iron in accordance with ANSI/AWWA C153/A21.53, rated for 350 PSI working pressure, double cement lined and double seal coated inside and bituminous seal coated on the exterior per ANSI/AWWA C104/A21.4-03.

Pipe and fitting joints shall be push-on type with mechanical or restrained flexible jointing (TR Flex) configuration matching connecting pipe, and/or as identified on the drawings. Fittings shall be certified per NSF/ANSI 61. All pipe and fitting joints shall employ a single, elongated grooved rubber gasket to affect the joint seal.

Approved Manufacturers of Mechanical Joint Ductile Iron Pipe / Fittings

McWane Ductile
American Cast Iron Pipe Company
United States Pipe & Foundry Company

All ductile iron pipe, valves, fittings, and specialty items installed in the permanent underground water main system, and where called out, shall have mechanical joints utilizing ductile iron

restraints rated for 350 PSI pipeline pressure. Restraints shall consist of a ductile iron harness bolted to the flange of the adjacent pipe bell, and utilizing serrated wedge type anchors to grip the pipe barrel. The harness shall be constructed of ASTM A 536 ductile iron. The harness shall be a one-piece design. (See below for retrofit of existing joints with restraints). The anchors shall employ torque limiting twist-off nuts. Set screw type restraints shall not be used.

Approved manufacturers of joint restraints

Megalug Series 1100, manufactured by EBAA Iron Inc.

Romagrip MJ Restraining gland, manufactured by Romac Industries, Inc.

Gaskets shall be Styrene Butadiene Rubber (SBR) conforming to the requirements of ANSI A21.11/AWWA C111, supplied by the pipe or fitting manufacturer.

Pipe Bedding Material

Water main, branch and hydrant branch piping, and any existing underground pipe joints requiring retrofit with restraint, shall be bedded in select fine gravel material obtained from approved natural deposits and unprocessed except for the removal of unacceptable material and stones larger than the maximum size permitted. It shall not contain vegetation. It shall be free from loam and other organic matter, clay, and other fine or harmful substances, and have a gradation within the following limits:

<u>Sieve Size</u>	<u>Percentage by Weight Passing</u>
3 in.	100
1/2 in.	80-100
No. 4	60-80
No. 40	10-30
No. 200	0-10

Gate Valves:

Main line and hydrant branch valves shall be resilient-seated gate valves of full weight ductile iron body, non-rising stem, mechanical joint, complete with Type 316 stainless steel trim, O-ring seal with a 2" x 2" operating nut, manufactured in the United States and in accordance with ANSI/AWWA C509-01 or the latest revision thereof. *Note: Lightweight/thin wall ductile iron body valves are **not** accepted.*

As a minimum, the inside of the valve body and bonnet are to be coated with a fusion bonded epoxy in accordance with ANSI/AWWA C550-05 or the latest revision thereof. All bolts shall be stainless steel ASTM F593.

Valves shall have a working pressure rating of 200 PSI. Gate valve opening direction shall be coordinated with CWC.

Approved Manufacturers and Products

Mueller Company A-2362-20 (MJ)

U.S. Pipe Resilient Seat Valve AUSP223

Valve Boxes

Valve boxes shall be iron-body with close fitting dirt-tight covers, 2-piece (26 inch top, 36 inch bottom,) 5 ¼-inch shaft adjustable slide type. The top of the cover shall be flush with the top of the box rim with the word “WATER” clearly marked.

Approved Manufacturers

Bingham & Taylor #4908
Bibby St. Croix #V683 (5664)
Tyler/Union Foundry #7126

Restrained Couplings:

Restrained couplings shall consist of a coupling sleeve of ductile iron per ASTM A536, with end restraint rings of ductile iron per ASTM A536, with gaskets and corrosion resistant, low alloy high strength, double ended threaded rods with nuts per AWWA C111/A21.11. Steel sleeves or steel restraint rings shall not be used. Wetted parts shall be lined with a minimum 15 mil fusion bonded epoxy coating per ANSI/AWWA C213, conforming to ANSI/NSF-61. Restraint rings shall have a heat cured protective coating and shall employ heat cured epoxy coated serrated wedges with torque limiting nuts to grip the connecting pipe. Set screw types shall not be used. The restrained coupling assembly shall be rated for 350 PSI.

Approved Manufacturers

Restrained coupling shall be Series 3800 by EBAA Iron, Eastland, TX,
Alpha restrained Joint Coupling by Romac Industries

Retrofit Restraint for Existing Pipe Joints:

Existing pipe joints found without acceptable restraint and designated to be retrofitted with joint restraint will utilize the following restraints by pipe joint type:

Mechanical joint pipe – Restraints shall consist of a split ductile iron harness bolted to the flange to the adjacent pipe bell, utilizing serrated wedge type anchors to grip the pipe barrel. The harness shall be constructed of ASTM A 536 ductile iron. The harness shall be a split type for retrofit to existing joints without disassembling the joint. Harness anchors shall employ torque limiting twist-off nuts. Set screw type restraints shall not be used.

Approved Manufacturers

Megalug Series 1100SD by EBAA Iron
Split Stargrip Series 3000S by Star Pipe Products

Push-On joint pipe – Restraints shall consist of a split ring ductile iron harness designed to fit behind the pipe bell, and a split ring harness for the joining pipe barrel, utilizing serrated wedge type anchors to grip the pipe barrel. The harnesses shall be constructed of ASTM A 536 ductile iron. Harnesses shall be joined by corrosion resistant rods and nuts. Harness anchors shall employ torque limiting twist-off nuts. The assembly shall have a minimum pipeline pressure rating of 300 PSI. Set screw type restraints shall not be used.

ITEM #1301078A, #1303202A, 1304070A,
#1304083A, #1307001A

Approved Manufacturers

Megalug Series 1100HD by EBAA Iron
Split Stargrip Series 3100S by Star Pipe Products

Warning Tape:

Warning tape shall be a minimum 3-inch wide, 4.0 mil polyethylene film suitable for buried service. The tape shall be blue in color per the A.P.W.A. National Color Code and shall be permanently imprinted with a warning label indicating a “Water Main Buried Below.”

Thrust Blocks:

Thrust blocks shall be provided at all tees, at all bends 45 degrees bends and greater, and where indicated on the plans. Reinforcement shall be as indicated on the plans. Concrete shall have a 28 day minimum compressive strength of 3,000 PSI.

Corporation Stops (valves)

Corporation stops shall be Mueller ball type corporations B25008N1 rated for 300 psi bronze-body ground key design manufactured in the United States or Canada in accordance with ANSI/AWWA Standard C800-05. The inlet shall have a standard AWWA corporation valve inlet thread (Mueller - CC) and the outlet shall be a compression connection for copper tubing.

Underground Pipe Insulation

Field-applied insulation underground behind bridge end walls shall be closed cell, rigid, cellular plastic foam of polyurethane or polyurethane modified polyisocyanurate, supplied in preformed sections free of voids, and conforming to outside pipe diameter or outside diameter of inner insulation layer where insulation overlaps at fittings or special piping components, and with the following properties:

Property	Value
Thickness, inches	2
Minimum density, LB/FT ³ per ASTM D1622	2.05
Minimum Compressive Strength parallel / perpendicular to rise – thickness, in LB/IN ² per ASTM D1621	24 / 30
R-Value per inch, at 180 days, 75°F, in HR-FT ² -°F/BTU, per ASTM C518	5.3
Closed Cell Content, in % per ASTM D6226	90
Water Absorption, maximum, in % by volume, 24 hr absorption, per ASTM C272	0.7
Water Vapor Permeability, maximum, perm-inch, per ASTM E96	4
Service Temperature range °F	(-) 297 to (+) 300
Flame Spread Index per ASTM E84	≤ 25

Insulation shall be Trymer™ 2000XP by ITW Insulation Systems, Corafoam® by Duna-USA or approved equal.

Insulation jacket (exterior casing)* shall be UV inhibited, 50 mil, High Density Polyethylene (H.D.P.E.) ASTM D-1248 with the following physical properties:

- ASTM D-638.....Ultimate Elongation 850%
- ASTM D-638.....Tensile Yield Strength 3300 psi
- ASTM D-3350.....Resin Type III, Grade P34

ASTM D-790.....Tangent Flexural Modules 175,000 psi

***No tape casings will be allowed.**

Jacket shall be held on with Type 316 stainless steel bands or screws, or other approved methods.

Caulk/Sealant (End Wall)

A silicon rubber type “through penetration sleeve” insulating sealant system shall be provided for bridge end wall piping penetrations. The system shall be suitable for piping penetrations eccentric with respect to the sleeve, and where pipe and sleeve axes do not align. The system shall include inert silicone rubber shapes or “pillows” to fill the void of the annular space between pipe OD and sleeve ID, to within the prescribed “pocket” depth from face of wall, following which the pockets will then be filled solid with caulk grade of silicon rubber, and troweled smooth, flush with face of wall or projecting sleeve. The material shall be non-toxic in case of fire, water tight, UV and ozone resistant, remain flexible in winter temperatures, and permit thermal expansion and contraction of the pipe. Approved manufacturer systems include “Through Penetration Fire Stops” as manufactured by 3M, NOFIRNO as manufactured by Beele Engineering, or approved equal.

Construction Methods:

Material Storage and Handling

All pipe, fittings, valves, live taps, hydrants and accessories shall be loaded and unloaded by lifting with hoists or skid/pallet handling equipment in order to avoid shock or damage. Under no circumstances shall such material be dropped. Pipe handled on pallets or skidways shall not be rolled or skidded against pipe on the ground. Lifting and handling equipment shall be padded and used in such a manner as to prevent damage to the exterior surface or internal lining of the pipe. Pipe and fittings shall not be handled by insertion of forks or tongs or any device designed for insertion, in order to prevent damage to the lining. All Materials shall be protected from damage. The interior of all pipes, fittings and other appurtenances shall be kept free from dirt or foreign matter at all times. Valves and hydrants shall be drained and stored in such a manner to protect them from damage by freezing or accumulation of water or snow melt. Pipe shall not be stacked higher than the limits shown in Table 1. The bottom tier shall be kept off the ground on timbers, rails or concrete. Pipe in tiers shall be alternated: bell, plain end; bell, plain end. At least two rows of timbers shall be placed between tiers and chocks, affixed to each in order to prevent movement. The timbers shall be large enough to prevent contact between the pipes in adjacent tiers.

All gaskets for mechanical and push-on joints shall be stored in a cool location protected from direct sunlight. Gaskets shall NOT come in contact with petroleum products. Gaskets shall be used on a first-in, first out basis. Mechanical-joint nuts and bolts shall be handled and stored in such a manner to ensure proper use with respect to types and sizes.

Rigid closed cell foam insulation shall be placed around the water main to protect against freezing where a storm line crosses directly above or below the new main.

TABLE 1 - Maximum Stacking Heights for Ductile Iron Pipe*

Nominal Pipe Size (in)	Number of Tiers
6 & 8	11
10	10
12	9

* For 18 or 20 foot (5.5 or 6.1m) lengths.

Alignment and Grade:

Trenchwork and dewatering are addressed in their respective items. The water mains shall be laid and maintained to the lines and grades established by the plans and specifications with fittings, valves, tapped or bossed outlets and hydrants at the required locations unless otherwise in a manner to allow proper operation.

Coverage requirement on all water lines is minimally 5'-6", unless shown otherwise on the plans.

Water Main Installation:

Main line valves may only be operated by the CWC. The contractor shall coordinate accordingly.

The contractor shall follow AWWA, CWC, and CT DOT construction guidelines, and in the event of a discrepancy, follow CWC standards.

Proper implements, tools and facilities shall be provided and used for the safe and convenient performance of the work. All pipe, fittings, valves and hydrants shall be lowered carefully into the trench by means of a crane, slings or other suitable tools or equipment in such a manner as to prevent damage to water main materials and protective coatings and linings. Under no circumstances shall water main materials be dropped or dumped into the trench.

All pipes, fittings, valves, hydrants and other appurtenances shall be examined carefully for damage and other defects immediately before installation. Defective materials shall be marked and held for inspection by the Engineer, who may prescribe corrective repairs or reject the materials.

All lumps, blisters and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end and the inside of the bell shall be wiped clean and dry and be free from dirt, sand, grit or any foreign materials before the pipe is laid.

Foreign material shall be prevented from entering the pipe while it is being placed in the trench. No debris, tools, clothing or other materials shall be placed in the pipe at any time.

Polyethylene encasement shall be placed on the pipe, holding the ends back to allow jointing. As each length of the pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. Polyethylene encasement shall be rolled out and secured, and the pipe

shall be maintained in place with approved bedding material to the limits shown on plan details, and the trench backfilled with approved granular fill, as shown on plan details.

At times when pipe laying is not in progress, the open ends of pipe shall be closed by a water-tight plug or other means approved by the Engineer. The plug shall be fitted with a means for venting. When practical, the plug shall remain in place until the trench is pumped completely dry. Care must be taken to prevent pipe flotation should the trench fill with water. Prior to removal of the plug from extending the line or any other reason, air and/or water pressure in the line shall be released.

Water Main Joint Assembly:

Mechanical Joints (Restrained):

The Contractor shall wipe clean the socket and the plain end. The plain end, socket and gasket should be washed with a soap solution to improve gasket seating. Place the restraint gland on the plain end with the lip extension toward the plain end, followed by the gasket with the narrow edge of the gasket toward the plain end. Use approved mechanical joint restraint system at all joints made up under this item. Insert the pipe into the socket and press the gasket firmly and evenly into the gasket recess. Keep the joint straight during assembly. Make deflection after joint assembly but before tightening bolts. Push the restraint gland toward the socket and center it around the pipe with the gland lip against the gasket. Insert bolts and hand-tighten nuts. Mechanical joint bolts (3/4-inch) for pipe sizes ranging from 4" to 24" diameter shall be tightened to the normal sequence and range of bolt torque recommended by the manufacturer, while at all times maintaining approximately the same distance between the restraint gland and the face of the flange at all points around the socket. This can be accomplished by partially tightening the bottom bolt first, then the top bolt, next the bolts at either side, finally the remaining bolts, or follow the manufacturer's recommended alternation sequence. Repeat the process until all bolts are within the appropriate range of torque. The final torque application will wring off the retainer bolt heads.

Water Main Joint Deflection:

When it is necessary to deflect the pipe from a straight line in either the horizontal or vertical plane, the amount of joint deflection shall not exceed 75% of that shown in Table 2. The following maximum deflections listed are manufacturer's recommended maximum deflections. These specifications allow the Contractor to install piping joints up to 75% of maximum joint deflection shown below, and this "75% of joint deflection limit" shall not be exceeded.

TABLE 2 - Maximum Joint Deflection Full-Length Pipe-Mechanical Joint Pipe

Nominal Pipe Size (in.)	Deflection Angle (degrees)	Maximum Offset (in.)		Approx. Radius of Curve Produced by Succession of Joints (ft.)	
		18 ft. Length	20 ft. Length	18 ft. Length	20 ft. Length
3	8-18	31	35	125	140
4	8-18	31	35	125	140
6	7-07	27	30	145	160
8	5-21	20	22	195	220
10	5-21	20	22	195	220
12	5-21	20	22	195	220
14	3-35	13-1/2	15	285	320
16	3-35	13-1/2	15	285	320

Water Main Pipe Cutting:

Cutting pipe for insertion of valves, fittings or closure pieced shall be done in conformance with all safety recommendations of the manufacturer of the cutting equipment. Field cutting of ductile iron pipe shall only be done on "gauged" pipe, that is, pipe so marked at the factory as to be within proper O.D. diameter and out of round tolerance for proper jointing at any position along the length. Cutting shall be done in a safe, workmanlike manner without creating damage to the pipe or cement-mortar lining. Ductile-iron pipe may be cut using an abrasive pipe saw, rotary wheel cutter, guillotine pipe saw, or milling wheel saw. Oxyacetylene or plasma torch or any flame cutting method shall not be used. Cut ends and rough edges shall be ground smooth, and sufficiently beveled for gasket makeup.

Water Main Insulation:

Insulation with jacket shall be applied to underground water main for a length of 5 feet behind both bridge end walls, in conjunction with excavation for retrofit of restraints on existing pipe joints. Insulation shall be applied as per manufacturer's instructions. Use pre-formed pipe insulation, coping for angle of bridge end wall and butting joints tightly. Secure with stainless steel wire or other recommended means until jacket is installed. Jacket shall be secured with screws, stainless steel bands, or other approved methods. Jacket seams shall be caulked, and both ends also caulked to prevent ground water from flowing between insulation and pipe or insulation and jacket, to leak through end wall penetration.

Caulk/Sealant (End Wall)

End wall penetration annular space between existing pipe and inside of sleeve shall be thoroughly cleaned out of scale and debris, to permit adhesion of sealant material to all surfaces. Caulk sealant system shall be installed per manufacturer’s instructions in the annular space between pipe wall and sleeve, employing solid silicone rubber shapes completely filling the center part of the annular space, then topping the remaining space to outboard faces of wall, finishing smoothly.

Pipe Bedding Material

Water main, branch and hydrant branch piping shall be bedded in select fine gravel material obtained from approved natural deposits and unprocessed except for the removal of unacceptable material and stones larger than the maximum size permitted. It shall not contain vegetation. It shall be free from loam and other organic matter, clay, and other fine or harmful substances, and have a gradation within the following limits:

<u>Sieve Size</u>	<u>Percentage by Weight Passing</u>
3 in.	100
1/2 in.	80-100
No. 4	60-80
No. 40	10-30
No. 200	0-10

Valve and Fitting Installation:

Prior to installation, valves shall be inspected for direction of opening, number of turns to open, freedom of operation, tightness of pressure-containing bolting and test plugs, cleanliness of valve ports and especially seating surfaces, handling damage, and cracks. Defective valves shall be corrected and replaced. Valves shall be closed before being installed.

Valves, fittings, plugs and caps shall be set and joined to the pipe in the manner specified in the specifications for cleaning, laying and joining pipe, except that 12-inch and larger valves should be provided with special support, such as treated timbers, crushed stone, concrete pads or a sufficiently tamped trench bottom so that the pipe will not be required to support the weight of the valve. Valves shall be installed in the closed position.

A valve box shall be installed for every valve, blowoff valve and blowoff plug. The valve box shall not transmit shock or stress to the valve and shall be centered over the operating nut of the valve with the box cover flush with the surface of the finished ground surface. Extension risers shall be installed on every valve and set with the operating nut within six inches of finished grade.

In no case shall valves be used to bring misaligned pipe into alignment during installation. Pipe shall be supported in such a manner as to prevent stress on the valve. All dead ends on new mains shall be closed with plugs or caps that are suitable restrained to prevent blowing off under test pressure.

Dewatering:

Trench dewatering, control and diversion of water shall be employed where necessary to support the work of this item, as defined in Item #1300008A-Dewater, Control and Diversion of Water (Water Main).

Thrust Restraint:

All pipe joints, fittings, valves, main, branch and hydrant valves shall be installed with thrust restraining glands or retainers, as described above.

All plugs, caps, valves, tees and bends 45 degrees and greater, unless otherwise specified, shall be installed with a concrete thrust block as specified in the plan details.

The top bend of vertical offsets shall be installed with a thrust block as shown on the plans or in the plan details.

Provide reinforcing bars with end hooks, sized and detailed where indicated on the plans or in the plan details.

Restraint Existing Pipe Joint

Thrust restraint of existing joints requires that portions of existing underground pipe shown on the drawings shall be excavated to top of pipe, or the extent necessary to locate joints for determination of type (e.g. mechanical, push-on) and existence of thrust restraints. Non-restrained joints shall be additionally excavated to sufficient depth to permit retrofit with split harness adaptors, as listed above for the specific joint type, then re-bedded, backfilled and compacted.

Hydrant Installation (Hydrant furnished by CWC)

Prior to installation, the Engineer shall inspect all hydrants for direction of opening, nozzle threading, operating-nut and cap-nut dimensions, tightness of pressure-containing bolting, cleanliness of inlet elbow, handling damage and cracks. Defective hydrants shall be corrected or replaced.

All hydrants shall stand plumb and shall have their nozzles parallel with, or at right angles to, the curb with pumper nozzle facing the curb. Hydrants shall be set to the established grade with the centerline of the lowest nozzle 1 above guide rail, or as directed by the Engineer. Each hydrant shall be connected to the main with a 6-inch branch controlled by an independent 6-inch valve.

Hydrant bowl to piping connection shall be restrained, and a thrust block placed as detailed on the drawings.

When a hydrant is set in soil that is pervious, drainage shall be provided at the base of the hydrant by placing (1/3) one third cubic yard of (3/4") three quarters inch crushed stone to at least 6-inches above the drain port opening in the hydrant and to a distance of (2') two feet around the elbow, as detailed on the drawings.. A layer of (8) eight mil polyethylene sheeting shall be placed on top of the crushed stone prior to backfilling. Where groundwater rises above the drain port or when the hydrant is located within ten feet of a sanitary sewer main, the drain

port shall be plugged and no crushed stone installed. The top of the hydrant shall be painted fire hydrant red and a 2-inch diameter red anodized aluminum tag engraved with the words “HYDRANT MUST BE PUMPED OUT AFTER USE” shall be attached to the pumper nozzle chain.

Hydrants shall be located as shown on the plans or as directed by the Engineer.

After installation and before backfilling, the Contractor shall apply a pressure test to both the hydrant seat and barrel to make sure that all joints are pressure tight, operate to full position, opened and closed to check operation and valve shut off. The Contractor shall check hydrants for drainage by removing the nozzle cap and placing palm of hand over nozzle outlet. Drainage rate should be sufficiently rapid to create suction. After backfilling, operate the hydrant to flush out foreign material. The Engineer shall be present during hydrant testing. A defective hydrant installation shall be corrected or replaced as directed by the Engineer.

Tighten nozzle caps and back-off on threads slightly so that the caps will not be excessively tight, but leave sufficient frictional resistance to prevent removal by hand.

Polyethylene Encasement

Polyethylene encasement shall be installed around new water main pipe installations and exposed portions of existing underground DIP where practicable, in sequence with the work and prior to bedding and backfill, as defined in Special Provision Item #1304083A.

Pressure Testing, Leak Testing, Disinfection and Flushing

Pressure testing, leak testing, disinfection and flushing of piping systems installed under this item, shall be performed together with those same activities for the branch line for temporary relocation of the water main off the valved 12”x12”x12” tee installed by CWC, and for the main line over the bridge in the run of the tee installed by CWC, under their respective item numbers 1301019A and 1301654A. Acceptance of the piping system is determined in part, on the basis of allowable leakage. Note that leak testing will require visual examination of the joints.

Stop Collars

The lay direction of the existing 12” water main is unknown. The stop collar included in this item (north end of bridge) will be installed behind the bell of the nearest pipe joint to the location shown on the plans, approximately Station 58+04 regardless of lay direction, and in accordance with the plan details for stop collars. Furnish and install pipe clamp, formwork size, concrete and rebar per plan details, paid for as a unit pipe restraint item.

Method of Measurement:

Ductile Iron Pipe (Water Main) will be measured on a linear foot basis of installed pipe, from centerline of terminal joint, coupling, valve or stop collar, to centerline of joint, coupling, valve or stop collar, between the limits described. The work of this item is only on the main north-south run of the existing water main, and is bounded by and between the 12”x12”x12” tees

installed by CWC at each end of the bridge as shown on the plans, and defined further as follows:

1. North of Benson Road bridge:
Beginning at the valve on the south side of the 12"x12"x12" tee installed by CWC at approximately Station 58+57, working south towards the bridge end wall at approximately Station 57+64.
2. South of Benson Road bridge:
Beginning at the existing stop collar installed by CWC that is located on the north side of the 12"x12"x12" tee and north side valve installed by CWC at approximately Station 54+18, north towards the southern bridge end wall, ending at approximately Station 54+74.

Additionally, the approximate 5 foot length of field applied pipe insulation with jacket, retrofitted to existing underground pipe outboard of each bridge end wall, as well as caulk/sealant of existing piping penetrations through end wall piping sleeves, shall be measured from inboard face of end wall to outboard end of buried insulation, and be counted as linear foot of installed pipe.

Restraint Existing Pipe Joint requires delineation and measurement of included work under various items as follows:

1. Excavation from existing grade not to exceed original grade to top of pipe shall be measured in actual volume within pay limits defined as depth from existing grade not to exceed original grade to top of pipe, width of nominal pipe inside diameter plus 2 feet, and trench length corresponding to delineation for this work shown on the drawings. Removal and compacted reinstallation of this calculated volume will be paid for under Item #1300015A-ROCK IN TRENCH EXCAVATION 0'-10' DEEP (WATER MAIN)
2. Machine excavation and hand digging to completely expose joint from top of pipe to below joint sufficient to install restraint, and installation of restraint shall not be measured, and payment will be on a "per each" basis of completed joint restraint, via Item #1304070A-RESTRAINT EXISTING PIPE JOINT
3. Measurement for re-bedding the joints following retrofit of restraints is defined in the following paragraph for overall pipe bedding computation.
4. Installation of stop collar to be located on existing water main at approximately Station 58+04 shall not be measured and will be counted as 1 each for Item #1304070A-RESTRAINT EXISTING PIPE JOINT constructed in accordance plan details and above description. Measurement for re-bedding the pipe in the stop collar excavation is defined below for inclusion in total CY for retrofit of existing pipe joints with restraint.

Pipe bedding will be measured and the total computed in cubic yards (CY) as follows:

1. For new pipe in trench, actual volume in cubic yards installed within pay limits defined as width being nominal inside pipe diameter plus 2 feet, depth being nominal inside pipe diameter plus 1 foot, and length being actual trench length for which bedding is placed.

2. For inspection and retrofit of existing pipe joints with restraint, actual volume in cubic yards installed, summed over affected number of joints, within pay limits defined as width being nominal inside pipe diameter plus 2 feet, depth being nominal inside pipe diameter plus 2 feet, and length not to exceed 7 feet per joint.

Hydrant installation will not be measured, and the completed and accepted hydrant installation will consist of one each, for the Item #1303202A-Install Fire Hydrant payment item.

Polyethylene encasement will be measured on a linear foot basis of installed encasement for the Item #1304083A-Polyethylene Encasement of Pipe (Water Main).

Any trench dewatering necessary to support the work of this item will not be measured for payment and included in the lump sum (LS) Item #1300008A-DEWATER, CONTROL AND DIVERSION OF WATER (WATER MAIN) as a part of the overall scope of that item.

Basis of Payment:

This work will be paid for at the Contract unit price bid per linear foot for **ITEM #1301078A – DUCTILE IRON PIPE (WATER MAIN)** which price shall include the costs for maintenance of uninterrupted water service, coordination among parties and related work items, coordination with CWC and parties having jurisdiction, and the costs of all labor, tools, materials, accessories, appurtenances, equipment, hauling, transport, incidentals, shop drawing submissions, documentation, As-Builts, disposal of any components replaced as a part of this work, and any incidental work not covered in related items or specifically mentioned, but necessary to result in a complete, acceptable, and operational system, all included in the unit cost.

Payment for testing, disinfection and flushing will be included with and paid under Item #1301019A TEMPORARY RELOCATION OF WATER MAIN, and/or Item #1301654A 12” DUCTILE IRON PIPE INSTALLED ON BRIDGE (WATER MAIN).

Payment for trenching and backfill will be paid for on a cubic yard (CY) basis under **Item #1300015A ROCK IN TRENCH EXCAVATION 0-10’ DEEP (WATER MAIN)**.

Pipe bedding material will be paid on a cubic yard (CY) basis under **Item #1307001A BEDDING MATERIAL (WATER MAIN)**.

Dewatering will be paid for on a lump sum (LS) basis under **Item #1300008A DEWATER, CONTROL AND DIVERSION OF WATER (WATER MAIN)**.

Payment for fire hydrant installation will be made on a per each (EA) basis under **Item #1303202A-INSTALL FIRE HYDRANT**.

Polyethylene encasement will be paid on a linear foot (LF) basis under **Item #1304083A POLYETHYLENE EXCASEMENT OF PIPE (WATER MAIN)**.

ITEM #1301645A - 12" DUCTILE IRON PIPE INSTALLED ON BRIDGE (WATER MAIN)

Description:

The existing 12" ductile iron water main on Benson Road is owned and operated by the Connecticut Water Company (CWC). The pipeline spans I-84 via attachment to the Benson Road bridge. The bridge superstructure is being replaced. Work under this item includes installation of new factory insulated ductile iron pipe (DIP) and supports attached to the new bridge superstructure, joined to underground DIP at the bridge end walls, as shown on the drawings and specified herein.

Work under this item includes coordination with CWC and with the work of Item #1301078A DUCTILE IRON PIPE (WATER MAIN) which covers work on existing underground water main to the bridge end wall where the work of this item connects, and coordination with CWC for required inspections by their agent or inspector, and for witnessing and documentation of testing, disinfection and flushing, and as additionally outlined below. The contractor shall also verify LOTO procedures on the main line valves that isolate the pipe work of this item from water system pressure, supplementing accordingly.

Testing, disinfection and flushing for pipe installed under this item, will be performed with the adjoining pipe Item #1301078A DUCTILE IRON PIPE (WATER MAIN).

Included in this work shall be all labor, tools, materials, accessories, appurtenances, rigging, equipment, hauling, transport, incidentals, coordination, shop drawing submissions, documentation, supports and restraints, post water fill adjustments, and any incidental work not specifically mentioned but necessary to result in a complete, acceptable, and operational system, all included in the lump sum cost.

Materials:

The Contractor shall submit to the Engineer manufacturer's specifications, data, catalog cuts, etc., for all water distribution system materials and products incorporated into the work. All materials proposed for use shall be acceptable to the CWC. The CWC reserves the right to inspect and approve all materials furnished by the Contractor at the manufacturer's plant. All pipe and appurtenances shall be subject to inspection by the CWC at the point of delivery. Material found to be defective due to manufacture or damage in shipment shall be rejected, recorded on the bill of lading and removed from the job site. The CWC may perform tests as specified in the applicable AWWA standard to ensure conformance with the standard. In case of failure of the pipe or appurtenance to comply with such specifications, the replacement of the defective materials shall become the responsibility of the Contractor. All brass items shall conform to the "Lead Free Brass Standards" as approved by the AWWA.

Factory Pre-Insulated Ductile Iron Water Main:

Core pipe:

Core pipe shall be Thickness Class 54 with a minimum pressure rating of 350 PSI, long span/bridge crossing ductile iron pipe, manufactured and finished in The United States of America and in accordance with ANSI/AWWA C151/A21.51-02 or the latest revisions thereof. All ductile iron pipe shall be double cement mortar-lined and double bituminous seal coated inside and bituminous seal coated on the exterior per ANSI/AWWA C104/A21.4-03. Piping shall be certified per NSF/ANSI 61.

Pipe joints shall be flexible, restrained, push-on style, with deflection capability up to 5 degrees and 350 PSI pressure rating, of the TRFlex style, from an approved manufacturer. All pipe bells shall employ a single, elongated grooved rubber gasket to effect the joint seal, and an integral groove for slide-in ductile iron locking segments that engage behind the circumferential weld bead (retainer weldment) of the mating pipe spigot, to prevent pull-out and maintain the joint locked with pipe deflection in any direction. Alternate jointing systems for locking plain end pipe without circumferential weld beads into mating pipe bells, i.e, jointing systems that rely on split compression rings bolted around the spigot, shall not be used.

The contract drawings indicate pipe lengths corresponding to pipe support and bridge diaphragm spacing to maintain adequate room for installation, inspection and maintenance of supports where adjacent to bridge girder diaphragms, resulting in segments that are shorter in places than a nominal 18' standard pipe length. The contractor shall coordinate with the bridge structural drawings to prepare pipe layout drawings determining the precise length of each piping segment, for factory fabrication. Field cutting of pre-insulated pipe requires gaged pipe, field stripping of the insulation and field welding of the retainer weldment, which requires controlled conditions and specialized welding procedures for ductile iron, and shall not be permitted without Engineer approval and factory monitoring for maintenance of warranty pressure rating.

Approved Manufacturers of Flexible Restrained Joint Ductile Iron Core Pipe

United States Pipe & Foundry Company
McWane Ductile

Gaskets shall be Styrene Butadiene Rubber (SBR) conforming to the requirements of ANSI A21.11/AWWA C111, supplied by the pipe or fitting manufacturer.

Insulation for factory-insulated TRFlex DIP:

The insulation shall be a foamed in place closed cell polyurethane which completely fills the annular space between the carrier pipe and the exterior casing. The insulation shall have the following physical properties:

Minimum Density (lb./cu. ft.)- 2.1 ASTM D-1622

“K” Factor BTU/Hr. sq. ft. °F/in. -0.147 ASTM C-518

Minimum 90 % Closed Cell content ASTM D-2856

Minimum compressive strength (lbs/in²)- 30 ASTM D-1621

Water Absorption (max % by volume) 4 ASTM D2842

Exterior Casing (jacket): *

The exterior casing shall be seamless, UV inhibited, 50 mil, High Density Polyethylene (H.D.P.E.) ASTM D-1248 with the following physical properties:

ASTM D-638.....Ultimate Elongation 850%

ASTM D-638.....Tensile Yield Strength 3300 psi

ASTM D-3350.....Resin Type III, Grade P34

ASTM D-790.....Tangent Flexural Modules 175,000 psi

***No tape casings will be allowed.**

The manufacturer shall provide joint kits for field installation of insulation and casing at joints.

Approved manufacturers of factory pre-insulated ductile iron pipe

Tricon Piping Systems, Inc

Urecon Pre-insulated Pipe

Restrained Couplings:

Restrained couplings shall consist of a coupling sleeve of ductile iron per ASTM A536, with end restraint rings of ductile iron per ASTM A536, with gaskets and corrosion resistant, low alloy high strength, double ended threaded rods with nuts per AWWA C111/A21.11. Steel sleeves or steel restraint rings shall not be used. Wetted parts shall be lined with a minimum 15 mil fusion bonded epoxy coating per ANSI/AWWA C213, conforming to ANSI/NSF-61. Restraint rings shall have a heat cured protective coating and shall employ heat cured epoxy coated serrated wedges with torque limiting nuts to grip the connecting pipe. Set screw types shall not be used. The restrained coupling assembly shall be rated for 350 PSI.

Approved Manufacturers

Restrained coupling shall be Series 3800 by EBAA Iron, Eastland, TX,

Alpha restrained Joint Coupling by Romac Industries

Field-Applied Insulation:

Field applied insulation on all types of pipe couplings and transitions points, shall be closed cell, rigid, cellular plastic foam of polyurethane or polyurethane modified polyisocyanurate, supplied in preformed sections free of voids, and conforming to outside pipe diameter or outside diameter of inner insulation layer where insulation overlaps at fittings or special piping components, and with the following properties:

Property	Value
Thickness, inches	2
Minimum density, LB/FT ³ per ASTM D1622	2.05
Minimum Compressive Strength parallel / perpendicular to rise – thickness, in LB/IN ² per ASTM D1621	24 / 30
R-Value per inch, at 180 days, 75°F, in HR-FT ² -°F/BTU, per ASTM C518	5.3
Closed Cell Content, in % per ASTM D6226	90
Water Absorption, maximum, in % by volume, 24 hr absorption, per ASTM C272	0.7

Water Vapor Permeability, maximum, perm-inch, per ASTM E96	4
Service Temperature range °F	(-) 297 to (+) 300
Flame Spread Index per ASTM E84	≤ 25

Insulation shall be Trymer™ 2000XP by ITW Insulation Systems, Corafoam® by Duna-USA or approved equal.

Pipe Supports:

Structural shapes for pipe support frame and elements shall be fabricated from supplemental steel matching bridge steel specifications, AASHTO M270 Grade 50T2, and metalized as per bridge steel specifications.

Structural bolting material shall be as follows: Bolts shall be as per ASTM F315 Grade A325; nuts shall be ASTM A563, D.H.; washers shall be ASTM F436; all structural bolting material shall be hot dip galvanized per ASTM F2329.

Threaded rod for pipe roller supports shall be Type 904L, of the sizes indicated on the drawings, with Type 904L nuts and jamb nuts.

Bearing plates shall be Type 316 stainless steel of the size and thickness shown on the drawings, rolled to match the OD of the pre-insulated pipe jacket, and secured to the insulation jacket with Type 316 stainless steel screws or bands.

Pipe rolls/prefabricated hardware shall be sized for the nominal outside diameter of the insulated pipe, including rolled bearing plate as recommended by the manufacturer. Finish shall be hot dip galvanized. Pipe rolls shall be as manufactured by Anvil International, Cooper Industries, or approved equal.

Construction Methods:

Inspection During Construction

CWC will appoint an Agent or “Inspector” to inspect all materials and workmanship and to see that the work conforms with the specifications and drawings.

The failure of the Inspector to reject or condemn improper materials and workmanship shall not prevent CWC from rejecting materials and workmanship found defective at any time prior to the final acceptance of the completed work, nor shall it be considered as a waiver of any defects which may be discovered later, or as preventing CWC at any time subsequently from recovering damages for work actually defective.

The Contractor shall provide sufficient, safe and proper facilities at all times for inspection.

The Inspector shall be furnished by the Contractor with every reasonable facility for examining and inspecting the work and for ascertaining that the Work is being performed in accordance with the requirements and intent of the Contract, even to the extent of requiring the uncovering of portions of finished work by the Contractor.

Should the work thus uncovered prove satisfactory, the cost of uncovering and the replacement thereof shall be considered as extra work unless the original work was done in violation of the Contract or in the absence of the Inspector and without his written authorization, in which case said cost shall be borne by the Contractor. Should the work uncovered prove unsatisfactory, said cost shall be borne by the Contractor.

Material Storage and Handling

All pre-insulated pipe and accessories shall be loaded and unloaded by lifting with fabric slings and hoists or skid/pallet handling equipment in order to avoid shock, or damage to exterior casing. Under no circumstances shall such material be dropped. Pipe handled on pallets or skidways shall not be rolled or skidded against pipe on the ground. Lifting and handling equipment shall be padded and used in such a manner as to prevent damage to the exterior surface or internal lining of the pipe. Pipe and fittings shall not be handled by insertion of forks or tongs or any device designed for insertion, in order to prevent damage to the interior surfaces. All Materials shall be protected from damage. The interior of all pipes and appurtenances shall be kept free from dirt or foreign matter at all times. Pre-insulated pipe shall not be stacked higher than the manufacturer's recommendations limits shown in Table 1. The bottom tier shall be kept off the ground on timbers, and chocked to prevent rolling.

All gaskets for restrained flexible joints shall be stored in a cool location protected from direct sunlight. Gaskets shall NOT come in contact with petroleum products. Gaskets shall be used on a first-in, first out basis.

Construction Sequencing:

Construction sequencing shall generally follow the progression outlined in the Notes on the plans. Specific attention shall be paid to completion status of restraint modifications to existing underground DIP piping performed under Item # 130178A-DUCTILE IURON PIPE (WATER MAIN) to which the pipe installed under this section attaches. The contractor shall prepare and submit a plan detailing installation sequencing, for approval by the Engineer and CWC.

The following conditions shall be strictly adhered to during water main work:

1. Main line valves connecting to the pipe installed under this item may only be operated by the CWC. Lockout/Tagout (LOTO) procedures shall be employed.
2. All new taps (i.e, corporation stops) that may be installed in the permanent portion of the underground piping system for the benefit of testing, disinfecting or flushing the permanent underground DIP together with the pipe installed under this item, shall be installed by the CWC.

Installation of the pipe shall proceed in the high to low, (south to north) direction. Restraint retrofits of the underground ductile iron pipe joints south of the south bridge end wall, to and including the reinforced concrete thrust collar installed by CWC at the 12"x12"x12" tee shown on the plans, shall be completed prior to attachment of the pipe installed under this item. A restrained coupling shall be utilized to attach to the stub of underground DIP projecting through the bridge end wall, then a special PE x PE pipe segment with factory retainer weldment at each end, or a bell x spigot pipe segment attached to the restrained coupling, depending upon the contractors approved lay direction. The TRFlex joint requires full extension after locking segments are installed, then release to allow the gasket "memory" to retract the pipe for the

proper fractional amount. Working from the high south end to the low north end, will assist in maintaining all joints extended to the proper extent, under the dead weight of the pipe. (Note that installation under certain winter conditions may require adjustment of the normal full joint extension, as recommended by the manufacturer.)

Pipe supports shall be adjusted as joint assembly progresses to maintain line and grade, and again after all bridge dead weight of slabs, parapets and related construction is in place, to maintain constant dimension* from pipe joint centerline to underside of bridge deck, taking into account girder deflection.

*Note - The dimension from pipe joint centerline to underside of bridge deck shall also be adjusted in even increments across the span, to make up for any difference in dimension from underside of bridge deck to existing end wall pipe penetrations, for south vs north ends.

Completion of piping segment connection to restrained coupling attached to DIP stub penetrating the north (low) bridge end wall, shall be done in similar fashion as for the south (high) end. The final pipe section shall not be fabricated and installed until measured for required dimension after all dead weight is applied to the bridge.

After adjustment of supports as required, joint insulation kits provided by the manufacturer, shall be applied in sequence with testing, to complete the installation.

General Water Main Installation:

Proper implements, tools and facilities shall be provided and used for the safe and convenient performance of the work. All pipe, fittings, valves and hydrants shall be lowered carefully into place via crane or raised from grade using suitable equipment. Hoisting shall be done using fabric slings or hoisting equipment recommended by the manufacturer to prevent damage to the exterior casing, insulation or pipe projection. Under no circumstances shall water main materials be dropped or dumped onto grade.

All pipe shall be examined carefully for damage and other defects immediately before installation. Defective materials shall be marked and held for inspection by the Engineer, who may prescribe corrective repairs or reject the materials.

Foreign material shall be prevented from entering the pipe while it is being placed. No debris, tools, clothing or other materials shall be placed in the pipe at any time.

The contractor will determine the sequence of assembly of pipe support frames to girder connection plates, with installation of pipe and balance of support components. Pipe installation and jointing shall be accomplished per manufacturer's instructions.

At times when pipe installation is not in progress, the open ends of pipe shall be closed by a water-tight plug or other means approved by the Engineer. The plug shall be fitted with a means for venting.

All supports and anchorage shall be in place and adjusted and satisfactory to the Engineer and CWC, prior to filling the pipe with water, for testing, disinfection and flushing.

Field Installed Pipe Insulation:

Rigid closed cell foam insulation shall be applied as per manufacturer's instructions to non-factory insulated DIP stubs and couplings. Use pre-formed pipe insulation for pipe and couplings, butting joints tightly and securing with stainless steel wire or other recommended means until jacket is installed. Insulation for larger diameter portions shall overlap smaller diameter portions by a minimum of 2" and shall include flat insulation stock cut for the end sections, with jacket applied. Insulation jacket shall overlap a minimum of 2" at longitudinal seams, or greater if recommended by the insulation manufacturer, and be secured with Type 316 stainless steel bands or screws, or other approved methods. Longitudinal jacket lap seams shall be oriented towards the bottom. Jacket seams for larger diameter insulation sections over couplings, shall be caulked on the uphill side of the pipe jacket, and not caulked on the downhill side to allow a sliding fit for thermal expansion and contraction.

Tests After Installation:

Testing disinfection and flushing of the pipe installed under this item, shall also include testing, disinfection and flushing of existing and new underground DIP installed under ITEM# 1301078A – DUCTILE IRON PIPE (WATER MAIN) to the inboard (facing bridge) valves on the 12"x12"x12" water main tees installed by CWC to support the work of this project.

Strap Service Saddles with fittings and branch valved connections for vent, drain, fill and pressure gage connections, and capture of disinfection water, shall not be permitted on the piping attached to the bridge, unless approved by the Engineer and the CWC. Provisions for venting, filling, disinfection, draining, flushing, and pressure gage connections will be via the underground connecting DIP at each end of the bridge, and will utilize corporation taps and/or blowoffs as directed by CWC, and the north end hydrant, per the plan developed by the contractor and approved by the Engineer and CWC.

All pipe shall be subjected to a pressure and leakage test conducted in accordance with AWWA Standard C600-99, Section 5 and as follows.

A) Pressure Test:

All newly installed pipe shall be subjected to a hydrostatic pressure of 1.5 times the working (system) pressure at the point of testing (provided by CWC), but in no case less than 1.25 times the working pressure at the highest point along the test section. The test pressure shall not exceed pipe or thrust restraint design limits, twice the rated pressure of closed valves or hydrants located within the test area, or the rated pressure of closed resilient-seated gate or butterfly valves. The test shall be maintained for a minimum of two hours with no more than a 5 psi variation during the test period.

B) Leakage Test:

The leakage test will be conducted at the same time as the pressure test. Leakage is the quantity of water required to maintain the pressure within 5 psi of the specified test

pressure, it is not the measured drop in pressure. Leakage shall not exceed the number of gallons per hour as determined by CWC/their agent, and is indicated in Table 6 of the above specified AWWA Section.

No leakage shall be allowed for the portion of the piping system attached to the bridge or extending to the back side of the end walls.

C) General.

Before applying the specified test pressure, all air shall be expelled from the pipe. If hydrants or blow offs are not available at high places, CWC shall make the necessary taps at points of highest elevation before the test is made and insert the plugs, if desired, after the test has been completed. The section to be tested shall be closed by valves, temporary flanges, plugs or bulkheads as required.

Each valved section of pipe shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the inspector. The pipe connection and all necessary apparatus including pump shall be furnished by the Contractor. CWC will furnish the gauges for the test. The Contractor shall furnish all necessary labor and materials for conducting the tests.

If leakage is either visible or indicated by the above test procedure, the Contractor shall do whatever is necessary to locate and repair said leak at his own expense. Upon completion of the repair the pipeline shall be retested.

Disinfection and Flushing:

Prior to any section of pipeline being put into service, it shall be thoroughly disinfected in accordance with AWWA Standard C651-14, AWWA Standard for Disinfecting Water Mains, Section 4.4, Continuous-Feed Method of Chlorination (or the latest revision thereof).

The Contractor is responsible for developing a detailed plan for the disinfection procedure with liquid sodium hypochlorite solution (conforming to ANSI/AWWA B300) and capture and/or de-chlorination of discharge water for the water main installation. The contractor may elect to capture chlorinated test water via tanker truck, and dispose via sanitary manhole designated by the Middlebury WPCA. The detailed plan shall be submitted to the CWC for approval. This submittal should identify the location of injection and discharge points, the materials (conforming to CWC specs) and disinfection and de-chlorination products (if elected to be used). This submittal shall also identify any proposed subcontractors for this activity and provide references (3) and list of comparable projects (3) recently completed by them. The contractor shall only proceed with this procedure upon approval of the submittal by the CWC.

The CWC will typically perform the flushing of the water main in preparation for disinfection. A temporary hydrant is being installed as shown on the drawings, for this purpose. As needed the contractor shall support the CWC with this effort to meet the following guidelines. The completed line shall be slowly filled with water to eliminate air pockets and flushed to remove particulates. The flushing velocity in the main shall not be less than 3.0 ft/sec (0.91 m/sec). Flushing shall be performed for a sufficient period of time to allow for a minimum of 3 volume

changes of water in the main (approximately 16 minutes per 1,000 feet of main at a flow rate that produces 3.0 ft/sec rate).

Introduce chlorine to the main at a constant rate from a point not more than 10 ft. downstream from the beginning of the new main, such that the water will have at least 25 mg/L free chlorine. The heavily chlorinated main shall remain at static pressure for no less than 24-hrs. (not to exceed 48-hrs.). Chlorine residual remaining after 24 hours must be at least 10 mg/L. If less than 10/mg/L chlorine is measured after 24 hours, the Contractor shall repeat flushing and disinfection procedures.

**Flushing and Dosing Reference Values
(From AWWA C651 Table 3 and Table 4)**

Pipe Diameter (in)	Flushing Flow Rate to Produce 3.0 ft./sec (gpm)	1% Chlorine Solution Required to Produce 25 mg/L concentration in 100 feet of pipe (gal)
4	120	0.16
6	260	0.36
8	470	0.65
12	1,060	1.44

The Contractor shall be responsible for the capture and/or dechlorination of disinfection discharge water. The discharge of heavily chlorinated water (concentrations greater than system residual) to the environment is prohibited. The contractor shall capture chlorinated water via tanker truck from the low point drain for disposal via Town of Middlebury WPCA designated location, or discharge water must be dechlorinated satisfactory to the CWC before released to the environment. Dechlorination will be incidental to the activity. During dechlorination, a neutralizing chemical shall be applied to the water to be wasted to thoroughly neutralize the residual chlorine (see ANSI/AWWA C655 for neutralizing chemicals). Where necessary, federal, state, local, or provincial regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water.

Upon completion of flushing, disinfection, and dechlorinating, a water sample from the section shall be collected by the CWC for third-party analysis.

No section of main shall be put into service without the approval of the CWC, and should the analysis be unsatisfactory, the section shall again be disinfected and retested until an analysis satisfactory to the CWC is obtained. All costs for additional disinfection and retesting shall be borne by the Contractor. All temporary taps and discharge points for the disinfection and flushing process shall be permanently abandoned upon successful testing unless approved by the CWC to stay in place. Abandonment of temporary taps includes positioning the corporation 'off' and installing a Mueller H-15451 coupling and corresponding NPT plug. Abandonment of disinfection taps and blow-offs will be incidental to the activity and shall be coordinated with the CWC representative.

Upon acceptance of all tests, flushing and final inspection, CWC will clear their LOTO tags from the 12"x12"x12" valved tee main line valves, open them, and close and LOTO the branch valves, placing the water main attached to the newly reconstructed Benson Road bridge, into service.

Disposition of the 12"x12"x12" branch valve for the temporary relocated water main, is addressed in Item# 1301019A-TEMPORARY RELCOATION OF WATER MAIN. The contractor will provide assistance to CWC as requested for this operation.

Method of Measurement:

12" Ductile Iron Pipe Installed on Bridge (Water Main), being paid for on a lump sum basis, will not be measured for payment. Piping system installation is bounded by the bridge end walls, between approximate Stations 54+74 and 57+64.

Testing, disinfection and flushing includes the portions of ITEM #1301078A-DUCTILE IRPON PIPE (WATER MAIN) between the inboard boundary valves located at approximate Stations 58+57 and 54+18 which additionally includes the pipe installed under this work item, attached to the bridge. Testing, disinfection and flushing will not be measured for payment and is included in the lump sum basis in the work of this item.

Basis of Payment:

This work will be paid for at the Contract Lump Sum price bid for **ITEM #1301645A-12" DUCTILE IRON PIPE ON BRIDGE (WATER MAIN)** which price shall include the complete, tested, disinfected and accepted water main shown on the drawings, specified and as required, inclusive of all materials and labor needed to accomplish the temporary relocation, including but not limited to, furnishing and installing of pre-insulated restrained water mains, couplings, field insulation, supports, restraints, support adjustments, testing, disinfection, flushing, disposal of chlorinated test water, documentation, placement of water main into permanent service, related and appurtenant work, as necessary and/or shown on the plans and in accordance with the specifications.

ITEM #1303238A - RESET FIRE SUPPRESSION SYSTEM

Specific to Project No. 0130-0184

Description: This work shall consist of removing, modifying, and resetting the existing fire suppression system. This includes furnishing, fabricating, transporting and installing all necessary components and all appurtenances for fire protection at locations shown on the plans and in accordance with this specification. This work shall also include all piping support, mounting hardware and concrete inserts. Fire Department Sign is also included in this item.

All work shall conform to the requirements of the current edition of the National Fire Protection Association's "NFPA 14 – Standards for the Installation of Standpipe and Hose Systems”, and the latest AASHTO “LRFD Brdige Design Specification”.

The existing stand pipe system and its components and attachments shall be reused except for concrete anchoring hardware. In addition, it shall be extended vertically to fit with the new superstructure as shown in the Contract Documents. Where new components are required, as approved by the Engineer, they shall comply with the requirements noted herein.

Materials: Certified Test Reports, Materials Certificate, and Certificate of Compliance

The Contractor shall furnish the Owner with a written certification, signed by the pipe manufacturer, the pipe fittings manufacturer, the pipe joint gasket manufacturer, and the anchorage system manufacturer; all duly notarized, certifying that the particular products provided for this contract are suitable for the intended use (i.e. conveyance of potable water under high pressure); and that the manufacturer has supplied the same product for other jobs with similar applications. The form of certification shall be, in all respects, in conformance with Section 1.06.07, and satisfactory to the Engineer.

Pipe Supports: Structural steel for support members and anchorage plates shall conform to the requirements of ASTM A709, Grade 36 and shall be galvanized after fabrication to meet the requirements of ASTM A123.

Threaded rods, anchor bolts, bolts, nuts and washers shall conform to the requirements of ASTM F1554, Grade 36, A563 Grade DH, F436 as applicable. All hardware shall be galvanized in accordance with the requirements of ASTM F2329.

Welding required for fabrication of the pipe supports shall be in accordance with the current AWS specifications. Welding of pipe to supports shall not be permitted.

Anchorage System: Threaded concrete inserts shall be compatible with the galvanized steel threaded rods and capable of developing the required loads as shown on the plans.

Storz Couplings: The existing storz coupling and caps (top and bottom) shall be inspected and reused. If discovered as defective, it shall be promptly removed and replaced with in-kind.

Steel Pipe, Fittings and Couplings: Existing steel pipe, fittings and couplings shall be reused. Where new components are required, as approved by the Engineer, they shall comply with the requirements noted herein:

Pipe shall be mild steel, seamless or welded, Schedule 40, galvanized, ASTM A53, with threaded or cut grooved connections. No rolled groove connections will be permitted.

Fittings shall be malleable iron threaded Class 150, galvanized, ANSI/ASTM B16.3, and ductile iron fittings for grooved connections, galvanized.

Pipe couplings shall be ductile iron, galvanized, at least 300psi maximum working pressure and 10,000lb maximum end load, flexible or rigid type, as indicated on the Contract Drawings. Flexible couplings shall be Victualic Style 77 (Approved manufacturers: Groovelock or Anvil) or approved equal, rigid couplings shall be Victualic Style 07 Zero-Flex (Approved manufacturers: Groovelock or Anvil) or approved equal. Gaskets for grooved connections must be as recommended by the couplings manufacturer for the required service.

Other acceptable manufacturers of fittings and couplings for grooved connections are Anvil International and Tyco Fire Products. All fittings, couplings and gaskets for grooved connections must be from one manufacturer.

Pipe Anchors: Pipe Anchors shall be as shown on the drawings. All elements of the anchor shall be galvanized. U-bolts shall be tightened securely to provide reliable anchoring of the pipe.

Galvanizing: Areas in which galvanizing has been damaged shall be given two (2) coats of zinc paint conforming to the requirements of the Federal Specification TT-P-641b or Military Specification MIL-P-21035.

Signs: Provide at the bottom of each standpipe as shown on the plans, a 1" drain outlet with a 1" normally open drain valve to spill on grade. Provide a sign at each drain outlet "DRY STANDPIPE: OPEN DRAIN VALVE AFTER USE".

A Fire Department Sign shall be of dimensions shown on the drawings, or approved by the engineer. Wording of the sign is to be adjusted to meet site conditions and submitted to the Engineer for approval prior to fabrication. The sign shall be made from plastic or galvanized metal with a red background and white lettering.

Construction Methods:

Shop Drawings:

Prior to the commencement of work and fabrication of any materials, the Contractor shall take all field measurements necessary to assure proper fit of the finished standpipe assemblies, and shall submit Shop Drawings to the Engineer for approval in accordance with Article 1.05.02-3. These drawings shall include, but not be limited to the following information:

- a. A layout plan and elevation indicating pipe lengths for vertical and horizontal

standpipe runs indicating sections of existing standpipe system being reused and shop drawings for any new components, type and number of fittings, couplings, supports and appurtenances for each location.

b. Commercial items shall be identified by manufacturer, trade name and catalog number. Catalog sheets, including pertinent specifications, shall be included with the submission.

c. All pipe supports, as shown on the plans, shall be detailed.

d. All field measurements shall be submitted for reference.

Horizontal standpipe runs shall be installed with a minimum 0.5% cross slope to assure proper drainage of the system.

Installation:

Install flexible connections so that pipes are in alignment at 50 degrees Fahrenheit.

Welding of pipe joints and welding of piping to supports shall not be permitted.

All existing and new pipe, fittings and such other items shall be carefully examined for defects immediately prior to installation and no pipe or fittings shall be used which is known to be defective in any way. Any pipe or fittings discovered as defective shall be promptly removed and replaced at no additional cost to the State. Proper and suitable tools and equipment for the safety and convenient handling and laying of the pipe, fittings and appurtenance shall be used, and great care shall be taken to prevent damage to the pipe coating and lining.

Pipe and fittings shall be thoroughly cleaned before being installed and shall be kept clean until accepted in the completed work. Open ends shall be closed with wooden or other suitable bulkheads at all times when pipe laying is not actually in progress.

Jointing of pipe or fittings shall be made only by persons thoroughly skilled in this work. All adjoining parts shall be thoroughly cleaned and inspected and the jointing done in strict accordance with the manufacturer's recommendations.

Testing: Upon completion of the installations, each standpipe system shall be tested by the City/Town Fire Department in accordance with NFPA-14 – "Installation of Standpipe and Hose Systems"; and shall meet or exceed a minimum "Rated Working Pressure" of 150psi and tested to a minimum pressure of 200psi for two hours.

At the completion and acceptance of the test, the standpipe system shall be drained by the municipal fire department.

All visible leaks in the joints shall be stopped and any cracked or defective pipe, or fittings shall

be removed and replaced.

The Contractor shall coordinate all system testing with the municipal fire department and shall provide temporary shoulder or lane closing as required to preform the testing. All traffic protection shall be in accordance with the contract requirements for “Maintenance and Protection of Traffic” and “Prosecution and Progress”.

Method of Measurement: This work shall be measured for payment by the number of fire suppression standpipe systems removed, reset and accepted with a system defined as a complete functional standpipe from inlet connection to outlet connection.

Basis of Payment: This work will be paid for at the Contract unit price for "Reset Fire Suppression System", complete and accepted in place, which price shall include removing, modifying, and resetting the existing fire suppression system, furnishing, fabricating, transporting, installing, surface preparation, galvanizing, and all materials, equipment, tools and labor incidental thereto. Cost of clearing and/or removal of vegetation and/or debris and additional maintenance shall be included in the bid for this item. Traffic protection for both the installation and testing of the systems shall be paid for under the applicable traffic items with the exception that if an initial pressure test of a standpipe fails, then all costs for traffic protection for the subsequent testing shall be borne by the Contractor.

Pay Item	Pay Unit
Reset Fire Suppression System	ea.

ITEM #1304060A - TEMPORARY PAVEMENT REPAIRS (WATER MAIN)

Description:

The work under this item shall consist of the installation of temporary bituminous concrete pavement as indicated on the plans and for water main trench repair, and as directed by the Engineer. The work for this item includes sawcutting, removal of existing pavement and curbing, excavation, formation of subgrade, backfilling, disposal of surplus material, processed aggregate base, tack coat, bituminous concrete pavement and bituminous concrete lip curbing where existing or as shown on the plans.

Materials:

Bituminous concrete shall conform to the provisions of Sections 4.06 and Article M.04 of the Standard Specifications.

Material for Tack Coat shall conform to the provisions of Sections 4.06 and Article M.04 of the Standard Specifications.

Processed Aggregate Base shall conform to the provisions of Section 3.04 and Article M.05.01 of the Standard Specifications.

Construction Methods:

Excavation and grading shall be performed in accordance with the provisions of Article 2.02.03 of the Standard Specifications.

Processed Aggregate Base shall be placed and compacted in accordance with Section 3.04.03 of the Standard Specifications, to a minimum 8" depth

Bituminous concrete courses shall be constructed in accordance with the provisions of Article 4.06.03 of the Standard Specifications. Bituminous concrete pavement for temporary pavement repairs shall be 4" of HMA S0.375 placed in two equal lifts.

Method of Measurement:

This work will be measured by the actual number of square yards of completed temporary bituminous concrete pavement, only to the limits shown on the plans or trench details, or as directed by the Engineer.

Basis of Payment:

This work will be paid for at the contract unit price per square yard for **ITEM #1304060A – TEMPORARY PAVEMENT REPAIRS (WATER MAIN)**, complete in place, which shall include sawcutting, removal of existing pavement and curbing, excavation, formation of subgrade, backfilling, disposal of pavement, curbing and surplus material, processed aggregate base, tack coat, bituminous concrete pavement and

bituminous concrete lip curbing (where originally installed) and all equipment, tools labor and materials incidental thereto.

<u>Description</u>	<u>Unit</u>
Temporary Pavement Repairs (Water Main)	SY

ITEM #1304065A - REMOVE WATER MAIN

Description:

The existing Benson Road bridge over I-84 in Middlebury supports a 12" insulated ductile iron pipe water main owned and operated by the Connecticut Water Company (CWC). Work performed under this item consists of removal of the water main and support elements from the existing Benson Road bridge superstructure to permit removal and reconstruction. In advance of the work of this item, CWC will install 12"x12"x12" valved tees at the outboard ends of the bridge as shown on the plans, to permit temporary relocation of the water main from the branch valves of these tees, around the bridge, per related Item #1301019A-Temporary Relocation of Water Main. Once the temporary water main is accepted and in service, the work of this item may proceed as authorized by CWC.

Work includes lockout/tagout (LOTO) of the 12"x12"x12" valved tee main valves that if open, would permit flow through this portion of water main. Included is coordination with CWC for each phase of the work. The contractor shall submit a plan for approval by the Engineer and CWC, outlining steps for the safe draining of the water main, preventing damage to the portions of the water main that will remain projecting through the bridge end walls, initial breach of the water main, joint disassembly, removal of water main pipe sections and support elements, stripping of insulation and disposal of metals and non-metal components of the former water main. The plan shall include provisions for neutralization of chlorine if water drained from the water main is released into the environment.

The existing water main insulation is believed to be an ordinary closed cell thermoplastic foam product, to be handled via standard disposal procedures. The contractor is cautioned that if any non-thermoplastic foam insulation is found, to stop work and notify the Engineer immediately.

Included in this work shall be all labor, tools, materials, accessories, appurtenances, equipment, lifting and hoisting apparatus, hauling, transport, disposal, incidentals, coordination, shop drawing submissions, documentation, temporary supports, venting and draining provisions, and any incidental work not specifically mentioned but necessary to result in a complete and acceptable, demolition and disposal, all included in the lump sum cost.

Materials:

Provide tools, equipment, temporary supports, debris shields, working platforms, falsework, incidentals, consumables, containers, covers, wraps and all such items to support the safe draining, disassembly, demolition, temporary storage as approved, and disposal of the water main and related support elements.

Construction Methods:

The contractor shall prepare and submit written procedures and working drawings in accordance with Section 1.05.02 of Form 818. The submittal shall include the following:

- Proposed equipment and removal method
- Operating and storage locations(s) of equipment and materials
- Containment and disposal of debris, including insulation and outer jacket, and lead paint where required
- Installation and removal of any required debris shields, working platforms, and falsework

Pressure release and draining of the water main shall be done in a manner acceptable to the Engineer and CWC, and that prevents release of high pressure and/or high volumes of water that would otherwise endanger personnel or property, or cause erosion and sedimentation. Means and methods shall be taken for neutralization of chlorine from water released into the environment, approved by CWC

Flame cutting of pipe or pipe support elements shall not be done without Engineer and CWC approval. Abrasive saw cutting, grinding, and any other methods for severing pipe support elements from bridge connection plates, shall be approved by the Engineer.

The contractor shall employ a temporary staged or cabling and support system to prevent water main sections from falling during disassembly to the failure of lifting or hoisting equipment, or jointing or support materials that can become overloaded by cantilevered weight from partially disassembled sections. Measures shall be taken for the temporary safe support of remaining lengths of pipe. The contractor is cautioned that the existing bridge deflection may decrease and the bridge move up as the weight of lengths of water main is removed, increasing load on remaining pipe supports that may pull up on restrained pipe joints, requiring temporary adjustment and/or supplemental supports to safely mitigate sudden or unintended failure.

Demolition of water main shall not proceed when personnel, equipment, or traffic is passing beneath or within a safe length beyond the closest remaining pipe support to the work area, as submitted and approved by the Engineer.

Insulation, jacket, and non-metallic components shall be stripped off the pipe and segregated for disposal. Once water main piping sections have been stripped of insulation and jacket and cleaned as necessary for the receiving location, they shall be loaded and removed from the site for disposal. If water main piping sections are temporarily stockpiled prior to stripping of insulation, they shall be covered to prevent blowing off of loose insulation or jacket damaged in the removal. Insulation and jacket stripped from pipe sections shall be immediately placed in covered containers, to prevent wind from discharging them. The work area shall be maintained free of demolition debris.

Pipe, aluminum insulation jacket, steel support elements and any other metals shall be recycled to the maximum extent possible.\

Any damage to remaining elements of the bridge, or to public or private property resulting from the contractor's work in removal and disposal of the water main, shall be repaired by the contractor to the satisfaction of the owner at no additional cost.

Method of Measurement:

This work, being lump sum, will not be measured for payment.

Basis of Payment;

Payment for removal of water main will be made at the Contract lump sum price for removal of water main from the bridge, and off-site legal disposal.

Pay Item	Pay Unit
Remove Water Main	LS

ITEM #1400004A - ROCK IN TRENCH EXCAVATION 0'-10' DEEP
(SANITARY SEWER)

This work shall conform to Section 2.86 of Form 818, supplemented as follows:

Article 2.86.04 – Method of Measurement: Replace with the following:

When rock, cement masonry, or concrete structures conforming to the description given under Article 2.86.01 is encountered within the payment lines for rock in sanitary sewer trench excavation, its removal will be measured and paid for at the contract unit price per cubic yard for "Rock in Trench Excavation 0-10 Feet Deep (Sanitary sewer)".

Those portions of trench excavation classified and paid for as "Rock in Trench Excavation 0-10 Feet Deep (Sanitary Sewer)" of the various depths will include the actual volumes of all material including soils, rock, cement masonry or concrete structures, excavated within the payment lines at the applicable bottom depth price, for installation of permanent new underground ductile iron sanitary sewer forcemain, and for cutting in fittings, valves and accessories in or onto existing sanitary sewer forcemain piping where shown on the plans, for PVC gravity sewers, encasement of sanitary forcemain and gravity sewer, for installation of sanitary sewer stop collar, and where replacement of existing underground ductile iron sanitary sewer piping is shown or directed by the Engineer. Also included is excavation of existing piping behind bridge end walls for the purpose of applying insulation as shown on the drawings, and re-bedding the pipe. In all cases, vertical payment limits shall be from top of existing grade at time of excavation not to exceed original grade, to 1 foot below pipe. Horizontal payment limits shall be nominal pipe inside diameter plus 2 feet, and trench length shall be as required, not to exceed 7 feet beyond the working trench area.

Where inspection and/or retrofit of existing underground ductile iron pipe joint restraints is shown, excavation shall first be performed to uncover pipe joints within the designated piping run, and payment for that portion only as "Rock in Trench Excavation 0-10 Feet Deep (Sanitary sewer) shall be defined as the volume determined by the horizontal pay limit width of nominal pipe inside diameter plus 2 feet, length corresponding to pipe run area shown on the plans, and vertical pay limit from existing grade at time of excavation not to exceed original grade, down to top of pipe barrel. (Note that for retrofit of pipe joints with restraint, or where ordered by the Engineer, hand or machine excavation to expose the joint for retrofit is included in Item #1401237A-6" Ductile Iron Pipe Force Main (Sanitary Sewer), and re-bedding included in Item #1405103A-Bedding Material (Sanitary sewer).

The above prices shall include all materials, tools, equipment and labor, and all transport, handling, and disposal costs for excess materials, rock, cement masonry and concrete structures, necessary to complete, backfill with approved or specified granular fill materials, and compact the excavation in conformity with the plans or as ordered.

This item is only applicable to unit price sanitary sewer trench excavation performed in concert with ITEM #1401237A-6” DUCTILE IRON PIPE FORCE MAIN (SANITARY SEWER), and including above-listed scope items. (Rock in trench excavations for portions of sanitary sewer work that are paid for on a lump sum basis are included with that respective item number at no additional cost.)

Article 2.86.05 – Basis of Payment: Replace with the following:

Payment will be made on a unit price basis per cubic yard (CY) of trench or other ordered excavation measured as defined above.

Pay Item	Pay Unit
Rock in Trench Excavation 0’-10’ Deep (Sanitary Sewer)	CY

ITEM #1400051A - DEWATERING (SANITARY SEWER)

Description:

The work under this item shall consist of that work necessary to collect and control groundwater and surface water and/or stormwater runoff to maintain sanitary forcemain and gravity sewer pipe and structure (sanitary sewer system) work areas in suitable condition for performing removals, installations and modifications shown or required, including trench excavations and backfills, to prevent erosion caused by sanitary sewer system work, and to provide for diversion of water to suitable receiving bodies or areas, free of sedimentation and in accordance with local and state regulation.

Dewatering shall be maintained until sanitary sewer system structures, piping systems, and appurtenances to be constructed or removal work completed to such an extent that it will not be damaged by water.

Bracing and related work necessary to prevent flotation of structures, piping systems, accessories or appurtenances is also included.

Approved measures shall be taken to capture and/or settle sediments pumped or running off from piping trenches and water main excavations in accordance with project procedures. Disposal methods shall prevent contamination of adjacent wetlands, water courses and waterbodies, injury to public health, damage to public and private property, and damage to the work completed or in progress.

Materials:

Provide temporary pumps, hoses, piping, slotted PVC well casing, filter fabric, siltation and sedimentation control devices, parts and accessories as necessary to protect and secure the work, and to prevent damage or pollution to receiving piping systems, water conveyances, wetlands, water courses, water bodies, and public or private property. Maintain adequate stockpile of consumable materials to handle adverse weather, anticipated and unanticipated water generating events.

Construction Methods:

Construct temporary sumps within or bordering trench and construction excavations with crushed stone, coarse sand or other suitable and approved materials surrounding temporary well casing, if necessary to exclude silt from temporary pumps.

Provide sedimentation control for pump hose or piping system discharge, with periodic monitoring as necessary to capture silt and sediments, such that discharged groundwater, surface or runoff water enters existing conveyance systems or vegetated areas approved by the Engineer, in a calm and quiescent manner, free of silt and sediments.

Monitor and maintain silt and sediment control devices, replacing elements before capture has reached capacity and defeated the function of the device. Anticipate capacity needs in advance of forecast inclement weather and clean, refresh or replace silt and sediment control devices accordingly.

Any damage resulting from the dewatering operations, failure of the Contractor to maintain the work in a suitably dry condition, or breach of silt and sedimentation control systems, shall be repaired by the Contractor at no additional cost.

Method of Measurement:

This work will be not be measured for payment. All labor, materials, equipment, incidentals, inspection, maintenance, monitoring, repair, and regulatory costs necessary to dewater, control, and divert water from the sanitary sewer system work areas as required and as directed by the Engineer, whether or not specified, shall be included.

Basis of Payment:

This work applies to all underground sanitary sewer system work, including portions done in advance of bridge superstructure replacement, including valve vaults, related underground work within the scope of sanitary sewer system work, underground portions of temporary relocated sanitary forcemain-Item #1403615A-Relocate Sanitary Sewer, and permanent sanitary sewer forcemain and gravity sewer underground and modifications to permanent underground sanitary sewer forcemain, including thrust restraint retrofits and underground insulation, all as per Item #1401237A-6” Ductile Iron Pipe Force Main (Sanitary Sewer), and removal of the designated existing sanitary manhole and installation of the replacement new sanitary manhole as per Item #1403001A-Manhole (Sanitary Sewer).

This work will be paid for at the contract lump sum price for **Item #1400051A-Dewatering (Sanitary Sewer):**

<u>Description</u>	<u>Unit</u>
Dewatering (Sanitary Sewer)	LS

ITEM #1401237A - 6" DUCTILE IRON PIPE FORCE MAIN (SANITARY SEWER)

ITEM #1405103A - BEDDING MATERIAL (SANITARY SEWER)

Description:

Overview - The existing Benson Road bridge over I-84 in Middlebury supports a 6" active sanitary sewer forcemain (sanitary forcemain) and a spare inactive 6" sanitary forcemain, owned and operated by The Town of Middlebury WPCA (WPCA). The bridge is to be reconstructed. The overall project effort includes installation of temporary relocated sanitary forcemain outboard of the existing bridge, and reinstallation of a single new sanitary forcemain on the newly reconstructed bridge, then removal of the temporary sanitary forcemain. This overall project effort is divided among several special provision items. The work of this item covers that portion of the sanitary forcemain piping system that is permanently installed underground ductile iron pipe, and new ductile iron pipe installed on the newly reconstructed bridge. The work of this item requires advance installation of precast concrete valve vaults at each end of the bridge as shown on the drawings, in order to provide valved main and branch connections for isolation of the sanitary forcemain over the bridge, and for connecting temporary relocated sanitary forcemain. The valve vaults are installed under Item #1401970A-Precast Concrete Valve Vault (Sanitary Forcemain). The work of this item is coordinated with the vaults, accordingly.

Work under this item includes coordination with the WPCA for connection to the valve vaults, and for required inspections by the WPCA and for witnessing and documentation of testing, and as additionally outlined below.

Excepting for installation of the valve vaults and vault branch connection of temporary relocated sanitary forcemain, all other sanitary forcemain piping work shown on the drawings along the main line, north-south direction along Benson Road, is the work of this item. Any sanitary forcemain work not described in the above two items or excluded below, is the work of this item.

Included in this work shall be all labor, tools, materials, accessories, appurtenances, equipment, hauling, transport, incidentals, coordination, shop drawing submissions, documentation, As-Builts, disposal of any underground components replaced as a part of this work, and any incidental work not specifically mentioned but necessary to result in a complete, acceptable, and operational system, all included in the unit cost. Existing sanitary forcemain pipe joints in designated areas shall be inspected and retrofitted with restraint as shown on the plans and specified herein, included in this work item and performed in coordination with the on-going work. Installation of insulation on sanitary forcemain pipe for short segments behind bridge end walls, as well as sealing of end wall penetrations, all as shown on the drawings, is also included. Pipe bedding shall be placed in coordination with the work of this item, but paid for separately.

Also included in this work is maintenance of uninterrupted sanitary forcemain service, coordination among related work items, coordination with the WPCA and parties having jurisdiction, and coordination with other utility custodians having adjacent facilities.

Materials:

The Contractor shall submit to the Engineer manufacturer's specifications, data, catalog cuts, etc., for all sanitary system materials and products incorporated into the work. All materials proposed for use shall be acceptable to the WPCA. The WPCA reserves the right to inspect and approve all materials furnished by the Contractor at the manufacturer's plant. All pipe and appurtenances shall be subject to inspection by the WPCA at the point of delivery. Material found to be defective due to manufacture or damage in shipment shall be rejected, recorded on the bill of lading and removed from the job site. In case of failure of the pipe or appurtenance to comply with such specifications, the replacement of the defective materials shall become the responsibility of the Contractor.

Ductile Iron Sanitary Forcemain for underground installation:

Pipe shall be ductile iron, Thickness Class 54, with a minimum pressure rating of 350 PSI, manufactured and finished in The United States of America and in accordance with ANSI/AWWA C151/A21.51-02 or the latest revisions thereof. All ductile iron pipe shall be double cement mortar-lined and double bituminous seal coated inside and bituminous seal coated on the exterior per ANSI/AWWA C104/A21.4-03.

All fittings shall be ductile iron in accordance with ANSI/AWWA C153/A21.53, rated for 350 PSI working pressure, double cement lined and double seal coated inside and bituminous seal coated on the exterior per ANSI/AWWA C104/A21.4-03.

Approved Manufacturers of Mechanical Joint Ductile Iron Pipe / Fittings

McWane Ductile
American Cast Iron Pipe Company
United States Pipe & Foundry Company

All ductile iron pipe, valves, fittings, and specialty items installed in the permanent underground sanitary forcemain, and where called out, shall have mechanical joints utilizing ductile iron restraints rated for 350 PSI pipeline pressure. Restraints shall consist of a ductile iron harness bolted to the flange of the adjacent pipe bell, and utilizing serrated wedge type anchors to grip the pipe barrel. The harness shall be constructed of ASTM A 536 ductile iron. The harness shall be a one-piece design. (See below for retrofit of existing joints with restraints). The anchors shall employ torque limiting twist-off nuts. Set screw type restraints shall not be used.

Approved manufacturers of joint restraints

Megalug Series 1100, manufactured by EBAA Iron Inc.
Romagrip MJ Restraining gland, manufactured by Romac Industries, Inc.

All pipe and fitting joints shall employ a single, elongated grooved rubber gasket to affect the joint seal. Gaskets shall be Styrene Butadiene Rubber (SBR) conforming to the requirements of ANSI A21.11/AWWA C111, supplied by the pipe or fitting manufacturer.

Factory Pre-Insulated Ductile Iron Sanitary Forcemain:

Core pipe:

Core pipe shall be Thickness Class 54, with a minimum pressure rating of 350 PSI, long span/bridge crossing ductile iron pipe, manufactured and finished in The United States of America and in accordance with ANSI/AWWA C151/A21.51-02 or the latest revisions thereof. All ductile iron pipe shall be double cement mortar-lined and double bituminous seal coated inside and bituminous seal coated on the exterior per ANSI/AWWA C104/A21.4-03.

Pipe joints shall be flexible, restrained, push-on style, with deflection capability up to 5 degrees and 350 PSI pressure rating, of the TRFlex style, from an approved manufacturer. All pipe bells shall employ a single, elongated grooved rubber gasket to effect the joint seal, and an integral groove for slide-in ductile iron locking segments that engage behind the circumferential weld bead (retainer weldment) of the mating pipe spigot, to prevent pull-out and maintain the joint locked with pipe deflection in any direction. Alternate jointing systems for locking plain end pipe without circumferential weld beads into mating pipe bells, i.e, jointing systems that rely on split compression rings bolted around the spigot, shall not be used.

The contract drawings indicate pipe lengths corresponding to pipe support and bridge diaphragm spacing to maintain adequate room for installation, inspection and maintenance of supports where adjacent to bridge girder diaphragms, resulting in segments that are shorter in places than a nominal 18' standard pipe length. The contractor shall coordinate with the bridge structural drawings to prepare pipe layout drawings determining the precise length of each piping segment, for factory fabrication. Field cutting of pre-insulated pipe requires gaged pipe, field stripping of the insulation and field welding of the retainer weldment, which requires controlled conditions and specialized welding procedures for ductile iron, and shall not be permitted without Engineer approval and factory monitoring for maintenance of warranty pressure rating.

Approved Manufacturers of Flexible Restrained Joint Ductile Iron Core Pipe

United States Pipe & Foundry Company
McWane Ductile

Insulation for factory-insulated TRFlex DIP:

The insulation shall be a foamed in place closed cell polyurethane which completely fills the annular space between the carrier pipe and the exterior casing. The insulation shall have the following physical properties:

Minimum Density (lb./cu. ft.)- 2.1 ASTM D-1622

“K” Factor BTU/Hr. sq. ft. °F/in. -0.147 ASTM C-518

Minimum 90 % Closed Cell content ASTM D-2856

Minimum compressive strength (lbs/in²)- 30 ASTM D-1621

Water Absorption (max % by volume) 4 ASTM D2842

Exterior Casing (jacket): *

The exterior casing shall be seamless, UV inhibited, 50 mil, High Density Polyethylene (H.D.P.E.) ASTM D-1248 with the following physical properties:

ASTM D-638.....Ultimate Elongation 850%
ASTM D-638.....Tensile Yield Strength 3300 psi
ASTM D-3350.....Resin Type III, Grade P34
ASTM D-790.....Tangent Flexural Modules 175,000 psi
***No tape casings will be allowed.**

The manufacturer shall provide joint kits for field installation of insulation and casing at joints.

Approved manufacturers of factory pre-insulated ductile iron pipe
Tricon Piping Systems, Inc
Urecon Pre-insulated Pipe

Restrained Couplings:

Restrained couplings shall consist of a coupling sleeve of ductile iron per ASTM A536, with end restraint rings of ductile iron per ASTM A536, with gaskets and corrosion resistant, low alloy high strength, double ended threaded rods with nuts per AWWA C111/A21.11. Steel sleeves or steel restraint rings shall not be used. Wetted parts shall be lined with a minimum 15 mil fusion bonded epoxy coating per ANSI/AWWA C213, conforming to ANSI/NSF-61. Restraint rings shall have a heat cured protective coating and shall employ heat cured epoxy coated serrated wedges with torque limiting nuts to grip the connecting pipe. Set screw types shall not be used. The restrained coupling assembly shall be rated for 350 PSI.

Approved Manufacturers

Restrained coupling shall be Series 3800 by EBAA Iron, Eastland, TX,
Alpha restrained Joint Coupling by Romac Industries

Pipe Supports on Bridge:

Structural shapes for pipe support frame and elements shall be fabricated from supplemental steel matching bridge steel specifications, AASHTO M270 Grade 50T2, and metalized as per bridge steel specifications.

Structural bolting material shall be as follows: Bolts shall be as per ASTM F315 Grade A325; nuts shall be ASTM A563, D.H.; washers shall be ASTM F436; all structural bolting material shall be hot dip galvanized per ASTM F2329.

Threaded rod for pipe roller supports shall be Type 904L, of the sizes indicated on the drawings, with Type 904L nuts and jamb nuts.

Bearing plates shall be Type 316 stainless steel of the size and thickness shown on the drawings, rolled to match the OD of the pre-insulated pipe jacket, and secured to the insulation jacket with Type 316 stainless steel screws or bands.

Pipe rolls/prefabricated hardware shall be sized for the nominal outside diameter of the insulated pipe, including rolled bearing plate as recommended by the manufacturer. Finish shall be hot dip

galvanized. Pipe rolls shall be as manufactured by Anvil International, Cooper Industries, or approved equal.

Pipe Bedding Material

Sanitary forcemain and gravity sewer piping, and any existing underground sanitary forcemain pipe joints requiring retrofit with restraint, shall be bedded in select fine gravel material obtained from approved natural deposits and unprocessed except for the removal of unacceptable material and stones larger than the maximum size permitted. It shall not contain vegetation. It shall be free from loam and other organic matter, clay, and other fine or harmful substances, and have a gradation within the following limits:

<u>Sieve Size</u>	<u>Percentage by Weight Passing</u>
3 in.	100
1/2 in.	80-100
No. 4	60-80
No. 40	10-30
No. 200	0-10

Retrofit Restraint for Existing Pipe Joints:

Existing sanitary forcemain pipe joints found without acceptable restraint and designated to be retrofitted with joint restraint will utilize the following restraints by pipe joint type:

Mechanical joint pipe – Restraints shall consist of a split ductile iron harness bolted to the flange to the adjacent pipe bell, utilizing serrated wedge type anchors to grip the pipe barrel. The harness shall be constructed of ASTM A 536 ductile iron. The harness shall be a split type for retrofit to existing joints without disassembling the joint. Harness anchors shall employ torque limiting twist-off nuts. Set screw type restraints shall not be used.

Approved Manufacturers

Megalug Series 1100SD by EBAA Iron
Split Stargrip Series 3000S by Star Pipe Products

Push-On joint pipe – Restraints shall consist of a split ring ductile iron harness designed to fit behind the pipe bell, and a split ring harness for the joining pipe barrel, utilizing serrated wedge type anchors to grip the pipe barrel. The harnesses shall be constructed of ASTM A 536 ductile iron. Harnesses shall be joined by corrosion resistant rods and nuts. Harness anchors shall employ torque limiting twist-off nuts. The assembly shall have a minimum pipeline pressure rating of 300 PSI. Set screw type restraints shall not be used.

Approved Manufacturers

Megalug Series 1100HD by EBAA Iron
Split Stargrip Series 3100S by Star Pipe Products

Warning Tape:

Warning tape shall be a minimum 3-inch wide, 4.0 mil polyethylene film suitable for buried service. The tape shall be green in color per the A.P.W.A. National Color Code and shall be permanently imprinted with a warning label indicating a “Sewer Main Buried Below.”

Thrust Blocks:

Thrust blocks shall be provided at all tees, at all bends 45 degrees bends and greater, and where indicated on the plans. Reinforcement shall be as indicated on the plans. Concrete shall have a 28 day minimum compressive strength of 3,000 PSI.

Field-Applied Insulation, Exposed and Underground:

Field applied insulation on all types of pipe, couplings and transitions points, shall be closed cell, rigid, cellular plastic foam of polyurethane or polyurethane modified polyisocyanurate, supplied in preformed sections free of voids, and conforming to outside pipe diameter or outside diameter of inner insulation layer where insulation overlaps at fittings or special piping components, and with the following properties:

Property	Value
Thickness, inches	2
Minimum density, LB/FT ³ per ASTM D1622	2.05
Minimum Compressive Strength parallel / perpendicular to rise – thickness, in LB/IN ² per ASTM D1621	24 / 30
R-Value per inch, at 180 days, 75°F, in HR-FT ² -°F/BTU, per ASTM C518	5.3
Closed Cell Content, in % per ASTM D6226	90
Water Absorption, maximum, in % by volume, 24 hr absorption, per ASTM C272	0.7
Water Vapor Permeability, maximum, perm-inch, per ASTM E96	4
Service Temperature range °F	(-) 297 to (+) 300
Flame Spread Index per ASTM E84	≤ 25

Insulation shall be Trymer™ 2000XP by ITW Insulation Systems, Corafoam® by Duna-USA or approved equal.

Caulk/Sealant (End Wall)

A silicon rubber type “through penetration sleeve” insulating sealant system shall be provided for bridge end wall piping penetrations. The system shall be suitable for piping penetrations eccentric with respect to the sleeve, and where pipe and sleeve axes do not align. The system shall include inert silicone rubber shapes or “pillows” to fill the void of the annular space between pipe OD and sleeve ID, to within the prescribed “pocket” depth from face of wall, following which the pockets will then be filled solid with caulk grade of silicon rubber, and troweled smooth, flush with face of wall or projecting sleeve. The material shall be non-toxic in case of fire, water tight, UV and ozone resistant, remain flexible in winter temperatures, and permit thermal expansion and contraction of the pipe. Approved manufacturer systems include “Through Penetration Fire Stops” as manufactured by 3M, NOFIRNO as manufactured by Beele Engineering, or approved equal.

PVC Gravity Sewer Pipe:

Gravity Sewer Pipe shall be Polyvinyl Chloride (PVC) conforming to ASTM Standard Specifications D3034-74, Type PSM SDR-35, manufactured from virgin Type 1 Grade 1, Polyvinyl Chloride compounds as defined and described in ASTM Specification D-1784 for "Rigid Poly (Vinyl Chloride) Compounds and Chlorinated Poly (Vinyl Chloride) Compounds. Clean rework material, generated from the manufacturer's own pipe or fitting production may be used by the same manufacturer provided the pipe and fittings so produced meet the requirements of this specification.

Physical and Chemical Properties - The physical and chemical properties shall conform to those minimums specified for Type 1, Grade 1 Polyvinyl Chloride compound designated in ASTM Specification D-1784 noted above.

Joints shall be the bell and spigot type subject to the approval of the Engineer. Joints shall be sealed with a rubber "O"-ring gasket, approved by the Engineer, and shall be of a composition and texture which is resistant to common ingredients of sewage, industrial wastes including oils and ground water, and which will endure permanently under the conditions likely to be imposed by this use.

The tensile strength shall be at least 1,300 psi. The elongation at rupture shall be such that 2-inch gauge marks shall stretch to not less than 10 inches. Hardness shall be between 40 and 50, as measured with a Shore Durometer. The compression set (constant deflection) shall not exceed 25 percent of the original deflection. The tensile strength after accelerated aging shall be not less than 80 percent of the original strength. The joint, when assembled, must be able to withstand a hydraulic pressure internally of at least 25 psi.

Testing - Pipe shall be tested when requested by the Engineer, and all sizes of pipe so designated shall be tested as follows:

Pipe shall be tested in accordance with ASTM D-2412 Standard Method of Test for External Loading Properties of Plastic Pipe by Parallel-Plate Loading." The minimum value of Pipe Stiffness at 5% deflection computed from data obtained from the above testing procedure shall be 46 PSI.

Marking - Pipe shall be marked along the outside of the barrel in bold style type and shall indicate the manufacturer's name, pipe size, PVC compound used, i.e., PVC Type 1 Grade 1 and the ASTM material specification for the PVC compound used, i.e., ASTM D-1784.

Workmanship - The pipe and fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions or other injurious defects. The pipe shall be as uniform as commercially practical in color, opacity, density and other physical properties. Allowable deflection shall not exceed 5%. Pipe straightness shall not exceed 1/16" per foot.

Polyethylene Encasement

Polyethylene sheeting and tubing used for the external corrosion protection of buried ductile-iron pipe, fittings and appurtenances shall meet American Water Works Association ANSI-AWWA

C105/A21.5-99(10) standards. The material shall be produced from a low density polyethylene with a density of 0.910 to 0.935 and a minimum thickness of .008 inches (8MIL) and shall be black in color.

Polyethylene encasement shall be supplied as a continuous roll, perforated at either 20 or 22 foot intervals, and shall be marked with the following information:

- Name of manufacturer
- ANSI/AWWA C015-A21.5
- 8 MIL LLDPE
- Applicable range of nominal pipe diameter
- Warning – Corrosion Protection – Repair Any Damage

Construction Methods:

Inspection During Construction

The WPCA will designate an Agent or “Inspector” to inspect all materials and workmanship and to see that the work conforms with the specifications and drawings.

The failure of the Inspector to reject or condemn improper materials and workmanship shall not prevent the WPCA from rejecting materials and workmanship found defective at any time prior to the final acceptance of the completed work, nor shall it be considered as a waiver of any defects which may be discovered later, or as preventing the WPCA at any time subsequently from recovering damages for work actually defective.

The Contractor shall provide sufficient, safe and proper facilities at all times for inspection.

The Inspector shall be furnished by the Contractor with every reasonable facility for examining and inspecting the work and for ascertaining that the Work is being performed in accordance with the requirements and intent of the Contract, even to the extent of requiring the uncovering of portions of finished work by the Contractor.

Should the work thus uncovered prove satisfactory, the cost of uncovering and the replacement thereof shall be considered as extra work unless the original work was done in violation of the Contract or in the absence of the Inspector and without his written authorization, in which case said cost shall be borne by the Contractor. Should the work uncovered prove unsatisfactory, said cost shall be borne by the Contractor.

Material Storage and Handling

All ductile iron pipe, fittings pre-insulated pipe and accessories shall be loaded and unloaded and placed into position by lifting with fabric slings and hoists or skid/pallet handling equipment in order to avoid shock, or damage to exterior casing. Under no circumstances shall such material be dropped. Pipe handled on pallets or skidways shall not be rolled or skidded against pipe on the ground. Lifting and handling equipment shall be padded and used in such a manner as to prevent damage to the exterior surface or internal lining of the pipe. Pipe and fittings shall not be handled by insertion of forks or tongs or any device designed for insertion, in order to prevent

damage to the interior surfaces. All Materials shall be protected from damage. The interior of all pipes and appurtenances shall be kept free from dirt or foreign matter at all times. Pre-insulated pipe shall not be stacked higher than the manufacturer's recommendations. Maximum stacking height for non-insulated DIP, are shown in Table 1. The bottom tier shall be kept off the ground on timbers, and chocked to prevent rolling.

TABLE 1 - Maximum Stacking Heights for Ductile Iron Pipe*

Nominal Pipe Size (in)	Number of Tiers
6 & 8	11
10	10
12	9

* For 18 or 20 foot (5.5 or 6.1m) lengths.

All gaskets for restrained flexible joints shall be stored in a cool location protected from direct sunlight. Gaskets shall NOT come in contact with petroleum products. Gaskets shall be used on a first-in, first out basis.

Mechanical-joint nuts and bolts, bolting hardware for pipe support attachment to the bridge, and bolting hardware for pipe supports, shall be segregated and clearly marked, to prevent intermixing of materials of different types.

Trenching, Bedding, Backfill, and Restoration:

The contractor shall lay out his trench according to existing sanitary forcemain pipe alignment, for cut-in work, retrofit of joint restraint, and for pipe work related to the installation of valve vaults performed under Item #14019720A-Precast Concrete Valve Vault (Sanitary Forcemain).

Trench excavation and rock in trench excavation shall include sand, gravel, ashes, loam, clay, organics, swamp muck, soft or disintegrated rock, hardpan, solid rock in place, detached rocks, boulders, masonry structures and concrete. Trench excavation and rock in trench excavation shall be performed in accordance with Section 2.86 of Form 818, and as detailed on the drawings, with all costs including removal and disposal of pavement, rock and excess material, unsuitable material, and provision of pipe bedding and backfill, on a unit price basis

Excavation shall be made in open cut. No tunneling or blasting will be permitted. Any necessary sheeting or shoring, dewatering and related work, is included. Trench repairs for any reason, and maintenance of trenches for the duration of the work, is included.

Trench layout, excavations including backfill and compaction, performed in coordination with the piping work of this item, shall be paid for separately on a unit price basis under Item #1400004A-Rock in Trench Excavation 0-10' Deep (Sanitary Sewer).

Existing on-site material not suitable for trench backfill shall be disposed of and replaced with bank run gravel where directed by the Engineer. Bank run gravel shall have a gradation within the limits given below. It shall be obtained from approved natural deposits and unprocessed except for the removal of unacceptable material and stones larger than the maximum size permitted. It shall not contain vegetation, masses of roots, or individual roots. It shall be substantially free from loam and other organic matter, clay, and other fine or harmful substances.

<u>Sieve Size</u>	<u>Percentage by Weight Passing</u>
6 in.	100
3-1/2 in.	90-100
1-1/2 in.	55-95
1/4 in.	25-60
No. 10	15-45
No. 40	5-25
No. 100	0-10
No. 200	0-5

If the contractor's construction sequence provides for advance vault installation and re-opening Benson Road to traffic prior to commencement of reconstruction of the Benson Road bridge and associated road closure, the contractor shall perform this work in sequence with trench backfill and compaction, on a unit price basis to be paid under Item #1405067A-Bituminous Concrete for Patching (Sanitary Sewer). Pavement shall be sawcut as per drawing trench details, or as directed by the Engineer. Temporary restoration of the trench for this instance shall be completed with 8" of compacted processed aggregate base, and 4" of HMA S0.375 applied in two equal lifts as per drawing details, included in this unit price for pavement patching.

Pipe Bedding:

Underground sanitary forcemain piping shall be bedded in select fine gravel in accordance with drawing details, as the work progresses. It shall not contain vegetation, loam or organic matter, clay or other fine or harmful substances. Sanitary forcemain piping bedded in crushed stone shall include a filter fabric wrap on all sides of the trench, closing at the ends and overlapping a minimum of 2 feet at joints. Pipe bedding shall be placed in coordination with the underground pipe work, and paid for separately on a unit price basis per Item #1405103A-Bedding Material (Sanitary Sewer)

Dewatering, Control and Diversion of Water:

Dewatering required for maintaining trenches in firm condition for supporting underground installation and/or retrofit of sanitary sewer forcemain and gravity piping, shall be performed in coordination with trenching and pipe installation on an as-needed basis, as the work progresses. Dewatering, control and diversion of water is paid for separately under Item #1400051A – DEWATERING (SANITARY SEWER), which applies to all items for sanitary forcemain installation.

Construction Sequencing:

Construction sequencing shall generally follow the progression outlined in the Notes on the plans and shall be coordinated with removal of existing pipe on the bridge, Item #1401947A-Remove Existing Pipe (Sanitary Sewer) and restraint of underground portions. Installation of stop collar and inspection/retrofit of designated underground DIP shall be completed, backfilled and compacted prior to erection of new sanitary force main attached to the newly reconstructed bridge. The contractor shall prepare and submit a plan detailing installation sequencing, for approval by the Engineer and the WPCA.

Sanitary forcemain valves may only be operated by the WPCA. Lockout/Tagout (LOTO) procedures shall be employed.

Installation of the pipe shall proceed in the high to low, (south to north) direction. Restraint retrofits of the underground ductile iron pipe joints south of the south bridge end wall, to and including the reinforced concrete thrust collar adjacent to the south valve vault, and north of the north bridge end wall to the limit shown, shall be completed prior to attachment of new pre-insulated sanitary forcemain pipe to the newly reconstructed bridge.

General Sanitary Forcemain Pipe Installation

All pipes, fittings, and other appurtenances shall be examined carefully for damage and other defects immediately before installation. Defective materials shall be marked and held for inspection by the Engineer, who may prescribe corrective repairs or reject the materials.

All lumps, blisters and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end and the inside of the bell shall be wiped clean and dry and be free from dirt, sand, grit or any foreign materials before the pipe is laid.

Foreign material shall be prevented from entering the pipe while it is being stored or installed. No debris, tools, clothing or other materials shall be placed in the pipe at any time.

At times when pipe installation is not in progress, the open ends of pipe shall be closed by a dust and water-tight plug or other means approved by the Engineer. The plug shall be fitted with a means for venting.

The contractor shall follow AWWA, WPCA, and CT DOT construction guidelines, and in the event of a discrepancy, follow WPCA standards.

Installation of Underground Ductile Iron Sanitary Forcemain (Mechanical Joint)

As each length of the pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with approved bedding material to the limits shown on plan details, and the trench backfilled with approved granular fill, as shown on plan details.

Care must be taken to prevent pipe flotation should the trench fill with water. Prior to removal of the plug from extending the line or any other reason, air and/or water pressure in the line shall be released.

Assembly of sanitary forcemain restrained mechanical joint DIP shall be accomplished per manufacturer's instructions. The Contractor shall wipe clean the socket and the plain end. The plain end, socket and gasket should be washed with a soap solution to improve gasket seating. Place the restraint gland on the plain end with the lip extension toward the plain end, followed by the gasket with the narrow edge of the gasket toward the plain end. Use approved mechanical joint restraint system at all joints made up under this item. Insert the pipe into the socket and press the gasket firmly and evenly into the gasket recess. Keep the joint straight during assembly. Make deflection after joint assembly but before tightening bolts. Push the restraint gland toward the socket and center it around the pipe with the gland lip against the gasket. Insert bolts and hand-tighten nuts. Mechanical joint bolts (3/4-inch) for pipe sizes ranging from 4" to 24" diameter shall be tightened to the normal sequence and range of bolt torque recommended by the manufacturer, while at all times maintaining approximately the same distance between the restraint gland and the face of the flange at all points around the socket. This can be accomplished by partially tightening the bottom bolt first, then the top bolt, next the bolts at either side, finally the remaining bolts, or follow the manufacturer's recommended alternation sequence. Repeat the process until all bolts are within the appropriate range of torque. The final torque application will wring off the retainer bolt heads.

When it is necessary to deflect the pipe from a straight line in either the horizontal or vertical plane, the amount of joint deflection shall not exceed 75% of the manufacturer's allowable.

Cutting pipe for insertion into fittings, couplings or closure pieced shall be done in conformance with all safety recommendations of the manufacturer of the cutting equipment. Field cutting of ductile iron pipe shall only be done on "gauged" pipe, that is, pipe so marked at the factory as to be within proper O.D. diameter and out of round tolerance for proper jointing at any position along the length. Cutting shall be done in a safe, workmanlike manner without creating damage to the pipe or cement-mortar lining. Ductile-iron pipe may be cut using an abrasive pipe saw, rotary wheel cutter, guillotine pipe saw, or milling wheel saw. Oxyacetylene or plasma torch or any flame cutting method shall not be used. Cut ends and rough edges shall be ground smooth, and sufficiently beveled for gasket makeup.

Stop Collars and Thrust Blocks

Reinforced concrete thrust collars and thrust blocks shall be installed where indicated on the drawings, and where directed by the Engineer. The lay direction of the existing 6" sanitary forcemain is unknown. The stop collar included in this item (south end of bridge) and will be installed behind the bell of the nearest pipe joint to the location shown on the plans, approximately Station 54+48 regardless of lay direction, and in accordance with the detail employed for water main work, located on sheet 01.06.10 of the project plans. Furnish and install pipe clamp, formwork size, concrete and rebar per plan details, to be measured and paid for as defined below, as a part of the work of this item.

Installation of Pre-Insulated Ductile Iron Sanitary Forcemain on Bridge:

To install sanitary forcemain pipe under the bridge, a restrained coupling shall be utilized to attach to the stub of underground DIP projecting through the bridge end wall, then a special PE x PE pre-insulated DIP pipe segment with factory retainer weldment at each end, or a bell x spigot pre-insulated pipe segment attached to the restrained coupling, depending upon the contractors approved lay direction. The TRFlex joint requires full extension after locking segments are

installed, then release to allow the gasket “memory” to retract the pipe for the proper fractional amount. Working from the high south end to the low north end, will assist in maintaining all joints extended to the proper extent, under the dead weight of the pipe. (Note that installation under certain winter conditions may require adjustment of the normal full joint extension, as recommended by the manufacturer.)

The contractor will determine the sequence of assembly of pipe support frames to girder connection plates, with installation of pipe and balance of support components. Pipe installation and jointing shall be accomplished per manufacturer’s instructions.

Pipe supports shall be adjusted as joint assembly progresses to maintain line and grade, and again after all bridge dead weight of slabs, parapets and related construction is in place, to maintain constant dimension* from pipe joint centerline to underside of bridge deck, taking into account girder deflection.

*Note - The dimension from pipe joint centerline to underside of bridge deck shall also be adjusted in even increments across the span, to make up for any difference in dimension from underside of bridge deck to existing end wall pipe penetrations, for south vs north ends.

Completion of piping segment connection to restrained coupling attached to DIP stub penetrating the north (low) bridge end wall, shall be done in similar fashion as for the south (high) end. The final pipe section shall not be fabricated and installed until measured for required dimension after all dead weight is applied to the bridge.

After adjustment of supports as required, joint insulation kits provided by the manufacturer, shall be applied in sequence with testing, to complete the installation.

All supports and anchorage shall be in place and adjusted and satisfactory to the Engineer and the WPCA, prior to filling the pipe with water for testing.

Field Installed Pipe Insulation:

Rigid closed cell foam insulation shall be applied as per manufacturer’s instructions to non-factory insulated DIP stubs and couplings, and also underground for an approximate 5’ distance behind bridge end walls. Use pre-formed pipe insulation for pipe and couplings, butting joints tightly and securing with stainless steel wire or other recommended means until jacket is installed. Insulation for larger diameter portions shall overlap smaller diameter portions by a minimum of 2” and shall include flat insulation stock cut for the end sections, with jacket applied. Insulation jacket shall overlap a minimum of 2” at longitudinal seams, or greater if recommended by the insulation manufacturer, and be secured with Type 316 stainless steel bands or screws, or other approved methods. Longitudinal jacket lap seams shall be oriented towards the bottom. Jacket seams for larger diameter insulation sections over couplings, shall be caulked on the uphill side of the pipe jacket, and not caulked on the downhill side to allow a sliding fit for thermal expansion and contraction.

Care shall be taken for underground insulated pipe to caulk jacket seams and both ends to prevent ground water from flowing between insulation and pipe or insulation and jacket, to leak through end wall penetration.

Caulk/Sealant (End Wall)

End wall penetration annular space between existing pipe and inside of sleeve shall be thoroughly cleaned out of scale and debris, to permit adhesion of sealant material to all surfaces. Caulk sealant system shall be installed per manufacturer's instructions in the annular space between pipe wall and sleeve, employing solid silicone rubber shapes completely filling the center part of the annular space, then topping the remaining space to outboard faces of wall, finishing smoothly. Sealant shall be in place prior to insulating either side of end wall.

Restraint of Existing Pipe Joint

Thrust restraint of existing sanitary sewer piping joints requires that existing underground pipe between Stations 54+48 and 54+80, totaling 32 linear feet, and also between Stations 57+75 to 58+15, totaling 40 linear feet, shall be excavated to top of pipe, or the extent necessary to locate joints for determination of type (e.g. mechanical, push-on) and existence of thrust restraints. Trench excavations for this purpose shall be measured and paid for separately under unit price Item #1400004A-Rock In Trench Excavation 0-10' Deep (Sanitary Sewer).

Non-restrained joints shall be additionally excavated to sufficient depth to permit retrofit with split harness adaptors, as listed above for the specific joint type, then re-bedded, backfilled and compacted. Retrofit of existing pipe joints with restraint shall be paid for as defined below with the work of this Item. Re-bedding of the existing pipe joints shall be performed in coordination with the work of this item, but measured as defined below and paid for separately under Item #1405103A-Bedding Material (Sanitary Sewer).

Polyethylene Encasement

Polyethylene encasement shall be installed around new sanitary force main piping and where existing sanitary forcemain pipe is exposed for retrofit of joint restraints, where practicable, and in sequence with the work, prior to bedding and backfill.

Tests After Installation:

Valve Vault trim and/or strap service saddles with fittings and branch valved connections for vent, drain, fill and pressure gage connections, shall be installed at approximate high and low points. After the pipe has been installed and backfilled, all newly installed and existing pipe between main line isolation valves located in the south valve vault (approximately Station 54+37), and the new main line valve located north of the north valve vault at approximate Station 58+64, shall be subjected to a pressure and leakage test conducted in accordance with AWWA Standard C600 (latest revision), except as hereinafter specified

General - Before applying the specified test pressure, all air shall be expelled from the pipe via the temporary high point vent. The section to be tested shall be isolated by the valves at

the indicated stations. The pipe shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the WPCA. The pipe connection, test gages, and all necessary apparatus including pump shall be furnished by the Contractor. The Contractor shall furnish all necessary labor and materials for conducting the tests.

Pressure Test: All new and existing sanitary forcemain piping underground and exposed attached to the Benson Road bridge, installed between isolation plug valves installed in the south valve vault at approximate Station 54+37 to the new isolation plug valve installed north of the north valve vault at approximate Station 58+64, shall be subjected to a hydrostatic pressure. Test pressure shall be 1.5 times maximum working pressure of the line, measured at the north valve vault. This test pressure value shall be 85 PSI, unless directed otherwise by the WPCA. The test shall be maintained for a minimum of two hours with no more than a 5 psi variation during the test period.

Leakage Test: The leakage test will be conducted at the same time as the pressure test. Leakage is the quantity of water required to maintain the pressure within 5 psi of the specified test pressure. The volume of water used by the test pump to maintain pressure shall be measured, and is the equivalent leakage. Leakage shall not exceed the number of gallons per hour as indicated in Table 6 of the above specified AWWA Section. There shall be no visible leakage allowed. If leakage is either visible or exceeds the calculated allowable, the Contractor shall do whatever is necessary to locate and repair the leak(s) at his own expense. Upon completion of the repair the pipeline shall be retested to the satisfaction of the WPCA.

No section of the sanitary forcemain shall be put into service without the approval of the WPCA.

Upon acceptance of all tests, the WPCA and contractor will clear their respective LOTO tags from the sanitary forcemain main line isolation valves, and the WPCA will open the main line isolation valves and close and LOTO the branch valves, placing the permanent sanitary forcemain across Benson Road bridge, into service. The contractor will provide assistance to the WPCA as requested for this operation.

Removal of Temporary Relocated Sanitary Forcemain:

Following removal of the temporary relocated sanitary forcemain from service and branch isolation valve LOTO, the contractor will drain the line into a tanker truck or other suitable transport container, and dispose of the sewage at a nearby location designated by the WPCA. The temporary relocated sanitary forcemain piping shall be removed from the valve vault branch connection valves. The branch connection pipe projecting from the valve vaults shall be turned up and converted into emergency pumpout connections with reinforced concrete thrust blocks, as detailed on the drawings.

All remaining temporary relocated sanitary forcemain shall be removed and legally disposed of off site, including pipe, supports, insulation, accessories and appurtenances.

Method of Measurement:

Ductile Iron sanitary forcemain pipe, both underground mechanical joint and exposed, pre-insulated pipe attached to the Benson Road bridge, will be measured on a linear foot basis of actual installed new pipe, from centerline of terminal joint, coupling, valve or stop collar, to centerline of joint, coupling, valve or stop collar, on the main north-south run between the new destination manhole at approximate Station 54+27 and the new valve at approximate Station 58+65, and includes all pipe, fittings, field and factory applied insulation, thrust restraints, polyethylene encasement, testing, coordination and documentation and all applicable work described herein. Retrofit of existing joints for thrust restraint as described above, will be counted as 2 linear feet per joint. Retrofit of existing pipe for a 5 foot length behind each bridge end wall, including installation of end wall caulk/sealant for the existing pipe sleeve penetration seal, will be counted as 5 linear feet each. Re-laying or replacement of a segment of existing PVC gravity sewer piping to accommodate new sanitary forcemain termination manhole installation or to achieve specified separation of piping joint from water main joint at the temporary water main crossing, or to accommodate reinforced concrete encasement of gravity sewer at the water main crossing, shall be measured per linear foot of actual new PVC pipe installed, and counted under this line item.

Trench excavation supporting the work of this item shall be measured in cubic yards as defined in Item #1400004A-Rock in Trench Excavation 0-10' Deep (Sanitary Sewer).

Pipe bedding will be measured and the total computed in cubic yards (CY) as follows:

1. For new pipe of any type covered by this item, placed in trench, actual volume in cubic yards installed within pay limits defined as width being nominal inside pipe diameter plus 2 feet, depth being nominal inside pipe diameter plus 1.5 feet, and length being actual trench length for which bedding is placed.
2. For inspection and retrofit of existing pipe joints with restraint, actual volume in cubic yards installed, summed over affected number of joints, within pay limits defined as width being nominal inside pipe diameter plus 2 feet, depth being nominal inside pipe diameter plus 2 feet, and length not to exceed 7 feet per joint.

Any trench dewatering necessary to support the work of this item will not be measured for payment and will be included in the lump sum (LS) Item #1400051-DEWATERING (SANITARY SEWER) as a part of the overall scope of that item.

Basis of Payment:

This work will be paid for at the Contract unit price bid per linear foot for **ITEM #1401237A-6" DUCTILE IRON PIPE FORCEMAIN (SANITARY SEWER)** which price shall include the costs for maintenance of uninterrupted sanitary forcemain service, coordination among parties and related work items, coordination with the WPCA and parties having jurisdiction, and the costs of all labor, tools, materials, accessories, appurtenances, equipment, hauling, transport, incidentals, shop drawing submissions, testing, documentation, As-Builts, disposal of any components replaced as a part of this work, and any incidental work not covered in related items

or specifically mentioned, but necessary to result in a complete, acceptable, and operational system, all included in the unit cost.

Payment for trenching and backfill will be paid for on a cubic yard (CY) basis under Item #1400004A-ROCK IN TRENCH EXCAVATION 0-10' DEEP (SANITARY SEWER).

Pipe bedding material will be paid on a cubic yard (CY) basis under Item #**1405103A BEDDING MATERIAL (SANITARY SEWER)**.

Dewatering will be paid for on a lump sum (LS) basis under Item #1400051A DEWATERING (SANITARY SEWER).

ITEM #1401947A - REMOVE EXISTING PIPE (SANITARY SEWER)

Description:

The existing Benson Road bridge over I-84 in Middlebury supports an active 6" sanitary forcemain, and an inactive, spare 6" sanitary forcemain. Both are insulated ductile iron pipe, owned and operated by the Town of Middlebury WPCA (WPCA). Work performed under this item consists of removal of both sanitary forcemains and support elements from the existing Benson Road bridge superstructure to permit removal and reconstruction. In advance of the work of this item, the contractor will install precast concrete valve vaults with branch sanitary connections on the active sanitary forcemain, at both ends of the bridge, to permit temporary relocation of the sanitary forcemain from the branch valves, around the bridge, per related Item #1403615A-Relocate Sanitary Sewer. Once the temporary relocated sanitary forcemain is accepted and in service, the work of this item may proceed as authorized by the WPCA.

Work includes lockout/tagout (LOTO) of the main line valves in the valve vault that if open, would permit flow through this portion of sanitary sewer. Included is coordination with the WPCA for each phase of the work. The contractor shall submit a plan for approval by the Engineer and the WPCA, outlining steps for the safe draining of the active and spare sanitary forcemains, and to prevent damage to the portions of the active sanitary sewer that will remain projecting through the bridge end walls, initial breach of the sanitary forcemains, joint disassembly, removal of sanitary forcemain pipe sections and support elements, stripping of insulation and disposal of metals and non-metal components of the former sanitary forcemains. The plan shall include provisions for capture of residual sewage spillage as joint disassembly progresses.

The existing sanitary forcemain insulation is believed to be an ordinary closed cell thermoplastic foam product, to be handled via standard disposal procedures. The contractor is cautioned that if any non-thermoplastic foam insulation is found, to notify the Engineer immediately.

Included in this work shall be all labor, tools, materials, accessories, appurtenances, equipment, lifting and hoisting apparatus, hauling, transport, disposal, incidentals, coordination, shop drawing submissions, documentation, temporary supports, venting and draining provisions, and any incidental work not specifically mentioned but necessary to result in a complete and acceptable, demolition and disposal, all included in the lump sum cost.

Materials:

Provide tools, equipment, temporary supports, debris shields, working platforms, falsework, incidentals, consumables, containers, covers, wraps and all such items to support the safe draining, disassembly, demolition, temporary storage as approved, and disposal of the sanitary forcemains and related support elements.

Construction Methods:

The contractor shall prepare and submit written procedures and working drawings in accordance with Section 1.05.02 of Form 818. The submittal shall include the following:

- Proposed equipment and removal method
- Operating and storage locations(s) of equipment and materials
- Containment and disposal of debris, including insulation and outer jacket, and lead paint where required
- Installation and removal of any required debris shields, working platforms, and falsework

Pressure release and draining of the sanitary sewers shall be done in a manner acceptable to the Engineer and the WPCA, and that prevents release of residual pressure and/or high volumes of sewage that would otherwise endanger personnel or property, or cause erosion and sedimentation. Means and methods shall be approved by the Engineer and the WPCA.

Flame cutting of pipe or pipe support elements shall not be done without Engineer and WPCA approval. Abrasive saw cutting, grinding, and any other methods for severing pipe support elements from bridge connection plates, shall be approved by the Engineer.

The contractor shall employ a temporary staged or cabling and support system to prevent sanitary forcemain sections from falling during disassembly due to the failure of lifting or hoisting equipment, or jointing or support materials that can become overloaded by cantilevered weight from partially disassembled sections. Measures shall be taken for the temporary safe support of remaining lengths of pipe. The contractor is cautioned that the existing bridge deflection may decrease and the bridge move up as the weight of lengths of sanitary forcemain is removed, increasing load on remaining pipe supports that may pull up on restrained pipe joints, requiring temporary adjustment and/or supplemental supports to safely mitigate sudden or unintended failure.

Demolition of sanitary forcemain shall not proceed when personnel, equipment, or traffic is passing beneath or within a safe length beyond the closest remaining pipe support to the work area, as submitted and approved by the Engineer.

Insulation, jacket, and non-metallic components shall be stripped off the pipe and segregated for disposal. Once sanitary forcemain piping sections have been stripped of insulation and jacket and cleaned as necessary for the receiving location, they shall be loaded and removed from the site for disposal. If sanitary forcemain piping sections are temporarily stockpiled prior to stripping of insulation, they shall be covered to prevent blowing off of loose insulation or jacket damaged in the removal. Insulation and jacket stripped from pipe sections shall be immediately placed in covered containers, to prevent wind from disbursing them. The work area shall be maintained free of demolition debris.

Pipe, aluminum insulation jacket, steel support elements and any other metals shall be recycled to the maximum extent possible.\

Any damage to remaining elements of the bridge, or to public or private property resulting from the contractor's work in removal and disposal of the sanitary forcemain, shall be repaired by the contractor to the satisfaction of the owner at no additional cost.

Method of Measurement:

This work, being lump sum, will not be measured for payment.

Basis of Payment;

Payment for removal of sanitary sewer will be made at the Contract lump sum price for removal of sanitary forcemain from the bridge, and off-site legal disposal.

Pay Item	Pay Unit
Remove Existing Pipe (Sanitary Sewer)	LS

ITEM #1401970 - PRECAST CONCRETE VALVE VAULT (SANITARY FORCEMAIN)

ITEM #1401054A - HANDLING SANITARY SEWAGE (SANITARY SEWER)

Description: The work under this Section shall consist of furnishing, preparing, and installing precast concrete valve vaults, complete with internal piping, valves, fittings, supports, risers, frames and covers, accessories and appurtenances as shown, matching existing pipe line and elevation and proposed roadway grade. This work also includes handling sanitary sewage influent to the pump station feeding the sanitary forcemain on Benson Road, during installation of the valve vaults.

This item includes test pitting to confirm existing location, line and grade of connecting sanitary force main piping in the designated structure locations, to determine riser height and to optimize structure joint location and size of pipe penetration boxouts to suit pitch of pipe run, and internal piping and supports.

This item includes connection to the existing piping as shown, coordination with the Town of Middlebury WPCA for brief cessation and resumption of pumping through the force main from the connecting sewage pump station, and temporary hauling and disposal of sewage during the required pumping outage. The contractor will request and review sewage flow records and prepare his plan for temporarily handling sewage flows during the tie-in of new structure piping, and present his plan for this work item to the Engineer and to the Town of Middlebury WPCA (WPCA) for approval. The contractor will revise the plan until satisfactory to the Engineer and the WPCA and coordinate with WPCA operators for making the connections. The contractor is responsible for coordinating and executing his approved plan in a manner that permits safe operation of the associated pump station, and is responsible for the cleanup and regulatory costs of any spills caused by his work, or his failure to coordinate.

Design of the Precast Concrete valve vaults is by the manufacturer. The work includes submission of supporting calculations sealed by a professional engineer licensed in the State of Connecticut, with the shop drawings.

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

Precast Concrete Valve Vaults:

The Precast Concrete Valve Vaults shall meet the requirements of M.08.02 and shall utilize concrete with a 28-day minimum compressive strength of 5000 psi. The vaults shall conform to ASTM C858, applicable portions of AASHTO M199 and be designed for AASHTO HS-20 live load. Vaults shall be designed to resist thrust and seismic loads imposed by piping/pipe supports. Vaults shall be furnished complete, with internal components shown, and as outlined below. Vault exterior surfaces shall receive a coating of protective compound material shall be of a type appearing on the Department's Qualified Products List as specified in M.03.09, and be

acceptable to the Engineer and the WPCA. Frames and covers shall be as per WPCA standards. Butyl rubber joint sealant shall conform to ASTM C990.

Approved Manufacturers for Precast Concrete Valve Vaults

United Concrete
Arrow Concrete
Oldcastle
Approved equal

Ductile Iron Sanitary Forcemain Piping

Sanitary forcemain piping within the valve vaults and extending to designated connection points shall be ductile iron, Thickness Class 54, with a minimum pressure rating of 350 PSI. manufactured and finished in The United States of America and in accordance with ANSI/AWWA C151/A21.51-02 or the latest revisions thereof. All ductile iron pipe shall be double cement mortar-lined and double bituminous seal coated inside and bituminous seal coated on the exterior per ANSI/AWWA C104/A21.4-03.

All fittings shall be ductile iron in accordance with ANSI/AWWA C153/A21.53, rated for 350 PSI working pressure, double cement lined and double seal coated inside and bituminous seal coated on the exterior per ANSI/AWWA C104/A21.4-03.

Pipe, fittings, and valves within the valve vaults shall be flanged per AWWA C115, faced and dripped to ANSI B16.1, Class 150.

Approved Manufacturers of Mechanical Joint Ductile Iron Pipe / Fittings

McWane Ductile
American Cast Iron Pipe Company
United States Pipe & Foundry Company

Valves:

Sanitary forcemain valves shall be of the eccentric plug type. Plug valves shall be non-lubricated, elastomer faced eccentric plug and shall be furnished with flanged ends faced and drilled to ANSI B 16.1 Class 125/150. Valve bodies shall be full round port configuration, manufactured from ASTM A 126, Class B cast-iron. Plugs shall be ductile iron ASTM A536. Pressure rating shall be minimum 175 PSI, drip tight. All exposed nuts, bolts, springs, washers, etc., shall be Type 316 stainless steel. Resilient plug facings shall be neoprene or Buna-N, suitable for use with sewage. Valves shall be furnished with corrosion resistant nickel, stainless steel, or approved seats which comply with AWWA Standard C507 and with AWWA Standard C504. Valve shaft seals shall comply with AWWA Standard C507 and with AWWA C504 and shall be self-adjusting and replaceable without valve disassembly. Valves shall be provided with geared operator and handwheel. Valves shall be coated interior and exterior with manufacturer's standard high solids epoxy suitable for sewage service. Valves shall be hydrostatically tested per AWWA C17 to 300 psi.

Approved Manufacturers of Plug Valves

Milliken
Pratt Ballcentric
Clow/Kennedy

Strap Service Saddles:

Service saddles for vents and drains or where directed, shall be double strap type, and shall have epoxy or nylon coated body and stainless steel nuts, bolts and double straps. Taps shall be IPS thread unless otherwise noted.

Approved Manufacturers

Smith-Blair #313 or #317 or #239
Romac #202N
Ford FCD 202
Mueller #DE2S
U.S. Pipe #DR2S

Trim:

Small bore valves and fittings shall be as follows:

- Strap service saddles (permitted only where shown)
- Nipples, fittings, caps/plugs shall be threaded, Type 316 stainless steel
- Vent and drain valves shall be two-piece construction, fully ported ball valves, Type 316 stainless steel body and trim, Type 316 ball and blowout proof stem, and with PTFE gasket, seats and thrust washer. Valves shall be provided with locking lever operating handle. Valves shall conform to MSS-SP-110. Minimum working pressure shall be 1000 psi, cold, non-shock, in WOG service. Valves shall be as manufactured by Watts, Nibco, or approved equal.

Supports and Restraints:

Pipe supports, and strut braces shall be prefabricated assemblies of the type shown on the drawing details, constructed from hot dip galvanized or Type 316 stainless steel components. Supports shall be screw adjustable. Slip-joint construction is not acceptable. Anchor hardware shall be Type 316 stainless steel. Prefabricated pipe supports shall be based upon the products of Carpenter & Patterson, Anvil International, or approved equal.

Designated thrust restraints shall be fabricated from ASTM A572 Grade 50, Type 2, hot dip galvanized, or alternately, from Type 316 stainless steel shapes as shown on the drawings, and designed for bolt-up installation after the structure top and bottom halves are set in place.

Ladders

Access ladder shall be FRP or hot dip galvanized, with slip resistant treads and pop-up locking safety post. Anchorage shall be Type 316 stainless steel. Ladder shall project through structure grade extension to underside of manhole frame, with stand-offs/wall and floor support brackets coordinated accordingly.

Interior Finishes:

Valve vaults shall include fill concrete, formed and placed so as to provide a pitched floor, draining to a sump area under the branch connection/emergency pumpout connection.

Piping and non-galvanized, non-stainless steel metallic components shall be cleaned, prepared and primed as per manufacturer's recommendations, and coated with a minimum of two finish coats of epoxy polyamide paint, Tnemec Series 66, Sherwin Williams Macropoxy 646, or approved equal, color by the WPCA.

Restrained Couplings:

Restrained couplings shall consist of a coupling sleeve of ductile iron per ASTM A536, with end restraint rings of ductile iron per ASTM A536, with gaskets and corrosion resistant, low alloy high strength, double ended threaded rods with nuts per AWWA C111/A21.11. Steel sleeves or steel restraint rings shall not be used. Wetted parts shall be lined with a minimum 15 mil fusion bonded epoxy coating per ANSI/AWWA C213, conforming to ANSI/NSF-61. Restraint rings shall have a heat cured protective coating and shall employ heat cured epoxy coated serrated wedges with torque limiting nuts to grip the connecting pipe. Set screw types shall not be used. The restrained coupling assembly shall be rated for 350 PSI.

Approved Manufacturers

Restrained coupling shall be Series 3800 by EBAA Iron, Eastland, TX,
Alpha restrained Joint Coupling by Romac Industries

Construction Methods:

Valve Vaults:

Test pits and excavations for the structure shall be performed in accordance with Item #1400004A-Trench Excavation 0-10' Deep (Sanitary Sewer) and the requirements of the plans. Dewatering, as necessary, shall be performed in accordance with Item #1400051A-Dewatering (Sanitary Sewer)

For placement of the precast concrete vaults, a drainage trench shall be excavated to the required depth, the bottom of which shall be brought to subgrade elevation, then processed material placed and compacted for the bottom of the structure as shown, to ensure a uniform foundation.

The existing forcemain shall be supported during excavation and joints braced to prevent lateral movement and joint disengagement by strapping pipe to wide flange, channel, or other suitable means

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

While the contractor may proceed with installation of valve vaults per his submitted and approved plan, the general sequence is anticipated to be cutting out and removing the affected portion of the existing forcemain, placement of the lower vault section, installation and connection of vault internal piping to existing, with temporary or permanent supports, installation of the upper half of the vault, followed by backfill, building the extension top to final grade, and completing any remaining internal work per the drawings. The sanitary forcemain may be placed into service as soon as the internal vault piping is temporarily supported and braced.

The vaults and exterior piping connections shall not be backfilled until the sanitary forcemain is in service and the joints visually examined via In-Service Leak Test, and found to be acceptable to the Engineer and the WPCA.

Vault piping penetrations shall be sealed in coordination with installation of the thru-wall thrust supports, where shown. Sealing shall be accomplished by placing expanding "Waterplug" type grout so as to fill solid the annular space between pipe and concrete, to within an inch of the interior face, and the resultant pocket will be caulked with a single part polyurethane caulk, per manufacturer's instructions. Alternately, the contractor may employ the sealing system specified for pipe to bridge end wall sleeve.

Following installation of the vault, extension to grade shall be placed and sealed, and manhole frames and covers installed. Extension rings, frames, and like items shall be laid in a full bed of mortar. Ladder pop-up safety post shall be installed, and coordinated with ladder runs to as to be retrievable upon opening the manhole cover.

Installation of the southern valve vault will require removal of the existing adjacent sanitary manhole, and installation of the new manhole at the designated location, and temporary reconnection to the sanitary forcemain discharge, via a separate sanitary forcemain outage.

Following completion of valve vaults and related advance work, if the contractor's plan calls for re-opening Benson Road to traffic until closure for reconstruction of the bridge, pavement shall be sawcut as shown or directed by the Engineer, and compacted backfill shall be brought to subgrade. 8" of compacted process shall be placed and tack coat applied to exposed edges of sawcut, then 4" of HMA S0.375 temporary pavement shall be placed in two equal lifts.

Handling Sanitary Sewage

The contractor shall submit a written plan for sewage handling during proposed outages for installation of valve vaults and manhole. The plan shall include detailed information for the proposed sequence of events, anticipated dates, start times and durations, proposed pumping service providers, equipment, traffic control, communications protocol, and emergency backup provisions. The contractor shall coordinate with the WPCA to view the facilities at Pump Station No.4, located at 1180 Southford Road, to prepare the plan. The WPCA will permit the contractor to withdraw from the pump station wetwell to fill his tankers, and will designate a nearby location to receive tankered sewage.

The contractor shall provide a minimum 2 week notice to the WPCA for the installation of replacement sanitary manhole, and the valve vaults, or as otherwise specified in the contractor's plan, approved by the WPCA. The operation shall not proceed without WPCA final approval on the planned day(s).

The contractor shall anticipate sewage volume based upon time of day, day of week, weather, and historical station pumping data. The contractor's plan shall provide for staging of backup equipment, vehicles and personnel in advance of commencement of sewage handling activities. Any spillage from tanker loading and unloading, or overflow from the pump station, shall be immediately contained and cleaned up, and is subject to immediate report to the Connecticut Department of Energy and Environmental Protection. Resultant fines, penalties, and remedial action shall be the contractor's responsibility.

Method of Measurement:

Item #1401970A-Precast Concrete Valve Vault (Sanitary Sewer), being a unit price per each item, will not be measured for payment.

Item #1401054A-Handling Sanitary Sewage (Sanitary Sewer), being a lump sum item, will not be measured for payment.

Item #1400004A-Rock in Trench Excavation 0-10'Deep (Sanitary Sewer) will not be measured for payment and all costs shall be included in the Contract unit price for each of the vaults, manhole and related work installed under this item.

Item #1400051A-Dewatering (Sanitary Sewer) for dewatering, control and diversion of water as necessary to maintain excavations for installation of valve vaults and manhole removal and replacement will not be measured for payment as this item, being lump sum, is performed as required for all sanitary system work.

Item #1405067A-Bituminous Concrete for Patching (Sanitary Sewer) for temporary restoration of Benson Road after advance work of installation of valve vaults, will be performed as shown or directed by the Engineer, and measured for payment on a Square Yard basis.

Basis of Payment:

Installation of Precast Concrete Valve Vaults will be paid for at the Contract unit price bid for each (EA) for **ITEM #1401970A-PRECAST CONCRETE VALVE VAULTS (SANITARY SEWER)**, which price shall include the costs of all labor, tools, materials, accessories, appurtenances, equipment, hauling, transport, trenching, backfill, incidentals, shop drawing submissions, documentation, As-Builts, disposal of any components replaced as a part of this work, and any incidental work not covered in related items or specifically mentioned, but necessary to result in a complete and acceptable structure, in service and operational system, all included in the unit cost for each vault.

Handling Sanitary Sewage will be paid for at the Contract lump sum (LS) bid price for that work under **Item #1401054A-HANDLING SANITARY SEWAGE (SANITARY SEWER)** which price shall include all labor, materials, tools, pumping, hauling, transport and disposal of sewage, tanker trucks, support vehicles, pumps, equipment, coordination, shop drawing submissions, meetings, documentation, cleanup, incidentals, and all related work necessary to handle sewage as necessary and as defined herein to accomplish installation of valve vaults and manhole, each performed separately or simultaneously.

Temporary patching pf pavement will be paid for at the Contract price per square yard (SY) for that work under **Item #1405067A-Bituminous Concrete for Patching (Sanitary Sewer)**, which price for temporary pavement patching shall include saw cutting, and all labor, materials, equipment, tools, transport, disposal, coordination, incidentals and all work as necessary to complete installation of temporary pavement as shown or directed by the Engineer.

ITEM #1403001A - MANHOLE (SANITARY SEWER)

Description:

This item shall consist of constructing sanitary sewer manholes with manhole frames and covers to final grade as required, including construction of inverts, as shown on the plans. This shall also include vacuum testing of the concrete sanitary sewer manholes (if necessary) as determined by the Engineer.

Materials:

The Contractor shall furnish all materials required, including precast concrete manholes, mortar, concrete, bricks, grade rings, new frames and grates, and other necessary materials as specified herein and in accordance with the Town of Middlebury WPCA (WPCA), and DOT Form 818 as amended.

All additional materials, including any resurfacing materials and any additional fill required shall be furnished and placed by the Contractor.

Precast Concrete Manholes shall conform with DOT Form 818 as amended, Section M.08.02. Precast units shall have a minimum curing time of seven (7) days prior to shipment. The date of pour shall be stenciled on each precast unit.

Damp proofing shall conform with DOT Form 818, M 12.05, as amended.

Mortar shall conform to DOT Form 818, M.11.04, as amended.

Concrete shall be 5000 PSI, in conformance with Form 818, M.03, as amended.

All testing equipment shall be furnished by the contractor, such as temporary valves, plugs, bulkheads, and other air pressure testing and water control equipment and materials. No materials shall be used which would be injurious to piping systems and future function. Air test gages shall be laboratory-calibrated prior to the leakage test. The Contractor shall use manufactured vacuum test equipment meeting Engineer's approval.

Construction Methods:

All work under this item will conform to the DOT Standard Specification Form 818 as amended and WPCA Regulations.

Construction of the sanitary sewer manholes shall conform to DOT Form 818 as amended, Section 5.86. All pipes shall be cut flush to meet the inside surface of the manhole or as shown on the plans or directed by the Engineer. Walls shall be constructed around the pipe to produce a tight smooth connection and to prevent leakage around the outer surface.

Dampproofing shall conform to DOT Form 818 as amended, Section 7.08. All outside surfaces of the manhole will be dampproofed with asphalt as shown on the detail plans and specified herein.

Pipes shall be installed in the manhole using an elastomeric coupling and flexible manhole sleeve.

The Contractor will form an invert in the bottom of the sewer manhole using sewer brick masonry as shown on the detail plans.

Any damage done to existing sanitary sewer facilities by the Contractor shall be repaired or replaced by the Contractor at no extra cost.

Construction shall conform to all applicable WPCA standard drawings.

Testing:

Contractor shall follow equipment manufacturer's recommended procedures throughout, this specification and as directed by the Town Engineer.

The Vacuum Test shall be in accordance with ASTM C1244.

Each manhole in high groundwater shall be tested after manhole construction is complete, all repairs and connections have been made and invert has been installed.

Use extreme care and follow safety precautions during testing operations. Keep personnel clear of manholes during testing.

All openings, except manhole top access, are to be plugged and sealed. Install plugs according to test equipment manufacturer's recommendation. Pneumatic plugs are to be rated for test pressures.

A vacuum will be drawn and the vacuum drop over a specified time period is used to determine the acceptability of the manhole.

This is not a routine test. The values recorded are applicable only to the manhole being tested at the time of testing.

Preparation of the Manhole:

1. Care shall be taken to effect a seal between the vacuum base and the manhole rim. Pipe plugs shall be secured to prevent movement while the vacuum is drawn.
2. All lift holes shall be plugged.
3. All pipes entering the manhole shall be temporarily plugged, taking care to securely brace the pipes and plugs to prevent them from being drawn into the manhole.

Typical Field Test Procedure:

1. The test head gage shall be placed at the top of the manhole or in accordance with the manufacturer's recommendations.
2. A vacuum of 10 in. of mercury shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9 in. of mercury.
3. The manhole shall pass if the time for the vacuum reading to drop from 10 in. of mercury to 9 in. of mercury meets or exceeds the values indicated in the table below.
4. If the manhole fails the initial test, necessary repairs shall be made by a submitted approved method to the Engineer. The manhole shall then be retested until a satisfactory test is obtained.

Minimum Test Times for Various Manhole Diameters (8 ft or Deeper)					
Depth (feet)	Diameter (inches)				
	48	54	60	66	72
	Time (seconds)				
8	20	23	26	29	33
10	25	29	33	36	41
12	30	35	39	43	49
14	35	41	46	51	57
16	40	46	52	58	67
18	45	52	59	65	73
20	50	53	65	72	81
22	55	64	72	79	89
24	59	64	78	87	97
26	64	75	85	94	105
28	69	81	91	101	113
30	74	87	98	108	121

Note: For manholes less than eight feet in depth the minimum value listed shall be used.

If the test fails, the Contractor shall determine the location of the leak and make all necessary repairs. Once the repairs are complete, the manhole can then be re-tested. This process shall continue until the manhole passes the vacuum test.

If preformed plastic gaskets are pulled out during the vacuum test, the manhole shall be disassembled and the gaskets replaced. The supplier of the manhole shall be notified of any defects incurred during testing.

For other manhole diameters or greater depths, refer to ASTM C1244.

Method of Measurement:

This work will be measured for payment by the number of Sanitary Sewer Manholes installed and accepted in place, including all materials, equipment, tools and labor incidental thereto.

Basis of Payment:

This work will be paid for at the contact unit price per each “Manhole - Sanitary Sewer” complete in place. This price shall include the cost of the material for the item and all labor and equipment necessary to complete this work. It shall also include the excavating, refilling, grading and compacting of the area around the manhole. Any material deemed unsuitable for refilling by the Engineer and any excess material shall be removed and disposed of by the Contractor at no additional cost. The cost of replacement bank run gravel and processed aggregate needed to reset the manhole is also included in this item. The cost shall include all necessary vacuum testing as detailed above.

<u>Pay Item</u>	<u>Pay Unit</u>
Manhole (Sanitary Sewer)	EA

ITEM #1403615A - RELOCATE SANITARY SEWER LINE

Description:

The existing 6" sanitary sewer forcemain (sanitary forcemain) on Benson Road is owned and operated by the Town of Middlebury Water Pollution Control Authority (WPCA). The pipeline spans I-84 via attachment to the Benson Road bridge. That portion of the sanitary forcemain main shall be temporarily relocated to permit rehabilitation of the bridge, in accordance with the plans. In preparation for the work of this item, a precast concrete valve vault shall be installed at each end of the bridge under Item #1401970A, which will provide for valved branch connections to permit temporary relocation of the sanitary forcemain. Valves on branch connections shall be tagged closed via Lockout/Tagout (LOTO) procedures. The work of this item is to attach to the branch valve connection point at or in each vault, and extend temporary 6" ductile iron sanitary forcemain through the eastern embankments of Benson Road, transitioning to temporary 6" HDPE spanning I-84 via a temporary utility bridge, thus completing a loop around the existing bridge. Exposed ductile iron pipe and portions of underground ductile iron pipe will be field insulated. HDPE pipe will be factory pre-insulated. Thrust restraint and supports are included in the work.

Included in this work shall be all labor, tools, materials, accessories, appurtenances, equipment, hauling, transport, incidentals, coordination, shop drawing submissions, documentation, trenching and backfill, bedding, supports, vent/drain and testing provisions, thrust restraint, testing, and any incidental work not specifically mentioned but necessary to result in a complete, acceptable, and operational system, all included in the lump sum cost for the temporarily relocated sanitary sewer forcemain.

Also included in this work is maintenance of uninterrupted sanitary forcemain service, coordination among related work items, and coordination with the WPCA and parties having - jurisdiction. The contractor shall permit the WPCA, their agent or inspector, to inspect the work at any time. Additionally, upon restoration of sanitary forcemain service through the new sanitary forcemain attached to the bridge, removal and off-site legal disposal of all temporary pipe, valves, fittings, supports, insulation, temporary thrust restraint and thrust blocks, and temporary accessories and appurtenances, is also included, as well as conversion of the valve vault branch lines to emergency pump out connections, as detailed on the drawings. Existing sanitary forcemain that will remain, shall be maintained safe during removal of the temporary relocated sanitary forcemain. Main and branch sanitary forcemain valves shall only be operated by WPCA, and contractor coordination and advance notice is required.

The temporary utility bridge is furnished and installed via a separate contract item. The temporary utility bridge will carry temporarily relocated water main, sanitary sewer force main, Eversource gas main, and potentially other utilities. The temporary utility bridge line and grade is to accommodate the temporary sanitary force main, without introducing high or low pockets. The work of this item shall be coordinated with the temporary utility bridge item, so as to

maintain sanitary forcemain line and grade from valve vault to valve vault, without high and low pockets from elevation offsets when transitioning on and off the temporary utility bridge.

Certain related work depicted on the plans will be performed by others, or paid for under another item. If not otherwise addressed in this specification or called out on the plans, all work shall be done by the contractor performing the sanitary forcemain temporary relocation, on a lump sum basis.

Materials:

The Contractor shall submit to the Engineer manufacturer's specifications, data, catalog cuts, etc., for all sanitary forcemain system materials and products incorporated into the work. All materials proposed for use shall be acceptable to the WPCA. The WPCA reserves the right to inspect and approve all materials furnished by the Contractor at the manufacturer's plant. All pipe and appurtenances shall be subject to inspection by the WPCA at the point of delivery. Material found to be defective due to manufacture or damage in shipment shall be rejected, recorded on the bill of lading and removed from the job site.

Ductile Iron Sanitary Forcemain:

Pipe shall be Thickness Class 54, with a minimum pressure rating of 350 PSI, manufactured and finished in The United States of America and in accordance with ANSI/AWWA C151/A21.51-02 or the latest revisions thereof. All ductile iron pipe shall be double cement mortar-lined and double bituminous seal coated inside and bituminous seal coated on the exterior per ANSI/AWWA C104/A21.4-03.

All fittings shall be ductile iron manufactured in the US in accordance with ANSI/AWWA C153/A21.53, rated for 350 PSI working pressure, double cement lined and double seal coated inside and bituminous seal coated on the exterior per ANSI/AWWA C104/A21.4-03.

Pipe and fitting joints shall be push-on type with mechanical or restrained flexible jointing (TR Flex) configuration matching connecting pipe, and/or as identified on the drawings. All pipe and fitting joints shall employ a single, elongated grooved rubber gasket to affect the joint seal.

Approved Manufacturers of Mechanical Joint Ductile Iron Pipe / Fittings

Tyler Union
McWane Ductile
American Cast Iron Pipe Company
United States Pipe & Foundry Company

All ductile iron pipe, valves, fittings, and specialty items installed in the temporary portion of the system, in the underground portion of the permanent system, and where called out, shall have mechanical joints utilizing ductile iron restraints rated for 350 PSI pipeline pressure. Restraints shall consist of a ductile iron harness bolted to the flange of the adjacent pipe bell, and utilizing serrated wedge type anchors to grip the pipe barrel. The harness shall be constructed of ASTM A 536 ductile iron. The harness shall be a one-piece design. The anchors shall employ torque limiting twist-off nuts. Set screw type restraints shall not be used.

Approved manufacturers of joint restraints

Megalug Series 1100 or 1100SD, manufactured by EBAA Iron Inc.

Romagrip MJ Restraining gland, manufactured by Romac Industries, Inc.

Ductile iron valves and fittings may utilize bolt-through MJ adapters for temporary joint restraint (Foster Adapter). Adapters shall be manufactured for ASTM A536 ductile iron, with SBR MJ gaskets, Assembly bolts of weathering steel (Corten), and SAE Gr 5 nuts with black oxide coating. 12" Adaptor shall be rated for 350 psi. Adapter shall have NSF 61 asphaltic seal coating per ANSI/AWWAC104/A21.4.

Approved Foster Adapters:

Foster Adaptor by InFact Corporation

Foster Adaptor by Tyler Union

Gaskets shall be Styrene Butadiene Rubber (SBR) conforming to the requirements of ANSI A21.11/AWWA C111, supplied by the pipe or fitting manufacturer.

Restrained Couplings:

Restrained couplings shall consist of a coupling sleeve of ductile iron per ASTM A536, with end restraint rings of ductile iron per ASTM A536, with gaskets and corrosion resistant, low alloy high strength, double ended threaded rods with nuts per AWWA C111/A21.11. Steel sleeves or steel restraint rings shall not be used. Wetted parts shall be lined with a minimum 15 mil fusion bonded epoxy coating per ANSI/AWWA C213, conforming to ANSI/NSF-61. Restraint rings shall have a heat cured protective coating and shall employ heat cured epoxy coated serrated wedges with torque limiting nuts to grip the connecting pipe. Set screw types shall not be used. The restrained coupling assembly shall be rated for 350 PSI.

Approved Manufacturers

Restrained coupling shall be Series 3800 by EBAA Iron, Eastland, TX,

Alpha restrained Joint Coupling by Romac Industries

Warning Tape:

Warning tape shall be a minimum 3-inch wide, 4.0 mil polyethylene film suitable for buried service. The tape shall be green in color per the A.P.W.A. National Color Code and shall be permanently imprinted with a warning label indicating a "Sewer Line Buried Below."

Thrust Blocks:

Thrust blocks shall be provided at all tees, at all bends 45 degrees bends and greater, and where indicated on the plans. Reinforcement shall be as indicated on the plans. Concrete shall have a 28 day minimum compressive strength of 3,000 PSI.

Factory Insulated High Density Polyethylene (HDPE) Sanitary Forcemain

Service Pipe (sanitary):

Service pipe and fittings shall be made from the same resin meeting the requirements of the Plastic Pipe Institute (PPI) material designation PE 4710, conforming to ATSM D3350 with

a cell classification of 445574C/E, and listed in PPI Technical Report TR-4 with an expiration date current as of project installation. The pipe shall have a minimum Hydrostatic Design Basis (HDB) of 1,600 psi at 73 degrees F. The material shall be UV stabilized.

All pipe and fittings shall be manufactured in ductile iron pipe sizes (DIPS) only, in accordance with AWWA Standard C906.

The pipe shall contain no recycled compound except for rework material generated in the manufacturer's own plant that has the same cell classification as the material to which it is being added. The pipe shall be homogeneous throughout and free of visible cracks, holes, voids, foreign inclusions, or other defects that may affect the wall integrity. Permanent identification of sanitary piping service shall be provided by co-extruding longitudinal green stripes into the pipe outside surface. The striping material shall be the same material as the pipe material except for color. Stripes printed or painted on the outside surface shall not be acceptable.

The nominal pipe diameter is specified on the Contract Drawings. The DR (dimension ratio) and the pressure rating of the pipe shall be as noted on the plans. The minimum pressure rating will be 200 psi.

Piping shall be furnished in nominal 40 FT lengths, and fusion welded on site.

Compression fittings and retainer glands shall not be used for jointing. Only approved restraints specifically designed for joining HDPE to ductile iron pipe or fittings, are permitted where indicated on the drawings.

Insulation for factory-insulated HDPE:

The insulation shall be a foamed in place closed cell polyurethane which completely fills the annular space between the carrier pipe and the exterior casing. The insulation shall have the following physical properties:

Minimum Density (lb./cu. ft.) 2.0 ASTM D-1621

"K" Factor BTU/Hr. sq. ft. °F/in. .147 ASTM C-177

90-95 % Closed Cell ASTM D-2856

Exterior Casing (jacket): *

The exterior casing shall be

(1) Seamless, extruded white PVC Type 1, Grade 1, Class 12454-B per ASTM D-1784 **or**

(2) Seamless, High Density Polyethylene (H.D.P.E.) ASTM D-1248 with the following physical properties:

ASTM D-638.....Ultimate Elongation 850%

ASTM D-638.....Tensile Yield Strength 3300 psi

ASTM D-3350.....Resin Type III, Grade P34

ASTM D-790.....Tangent Flexural Modules 175,000 psi

***No tape casings will be allowed.**

Jacket shall be held on with Type 316 stainless steel bands or screws, or other approved methods.

The manufacturer shall provide joint kits for field installation of insulation and casing at joints.

HDPE Fittings:

HDPE temporary piping system fittings shall be fusion welded, of the type and configuration indicated on the drawings. Adaptor flanges shall be full face, fusion welded ASME/ANSI B16.1 Class 125 for joining as indicated on the drawings. Slip ring type flanges are not acceptable

Approved Manufacturers of Factory Insulated HDPE Piping:

Tricon Piping Systems, Inc.

Urecon Pre-insulated Pipe

Expansion/Contraction Joints:

Expansion/Contraction joints ("expansion joints" or "joints") shall be manufactured of ductile iron per ASTM A536, corresponding to the material properties of ANSI/AWWA C153/A21.53, and consist of single or multiple stationary and sliding sleeve segments with seal rings. Joint design shall accommodate field addition of additional sleeves, and shall require no maintenance. The joint shall be self-restrained at full extension, without the use of external tie rods. The joint shall be rated for 350 PSI, and factory tested at rated pressure. Seals shall conform to ANSI/AWWA C111/A21.11. Expansion joints outlets shall be configured for mechanical joint flanges with O-ring gaskets per ANSI/AWWA C110/A21.10. Joints shall be configured and coordinated for ductile iron x HDPE piping. Gasket and seal materials shall be NSF-61 approved. All wetted parts of the ductile iron joint shall be coated with an NSF-61 approved fusion bonded epoxy conforming to ANSI/AWWA C213, with a minimum of 6 mils thickness. Expansion joints shall be provided with restraints for connecting pipe rated for 350 PSI, as specified herein.

Additional sleeve segments shall be factory installed and tested to suit expansion/contraction needs from ambient temperature at installation to service temperature or other conditions corresponding to maximum temperature differential. The coefficient of thermal expansion shall be as per HDPE pipe manufacturer, and is generally taken as 8×10^{-5} inches/inch °F. Any field disassembly/assembly shall be done under the direction of the manufacturer's representative at no additional cost.

Expansion/contraction joints shall be Ex-Tend® as manufactured by EBAA Iron, Eastland, TX, or TR Flex®/HP Lok® telescoping sleeves with ductile iron adapters at each end to join to restrained MJ ductile iron and HDPE, or Engineer approved equal satisfying the above requirements.

Field-Applied Insulation:

Field applied insulation on all types of pipe, and whether temporary or permanent, shall be closed cell, rigid, cellular plastic foam of polyurethane or polyurethane modified polyisocyanurate, supplied in preformed sections free of voids, and conforming to outside pipe

diameter or outside diameter of inner insulation layer where insulation overlaps at fittings or special piping components, and with the following properties:

Property	Value
Thickness, inches	2
Minimum density, LB/FT ³ per ASTM D1622	2.05
Minimum Compressive Strength parallel / perpendicular to rise – thickness, in LB/IN ² per ASTM D1621	24 / 30
R-Value per inch, at 180 days, 75°F, in HR-FT ² -°F/BTU, per ASTM C518	5.3
Closed Cell Content, in % per ASTM D6226	90
Water Absorption, maximum, in % by volume, 24 hr absorption, per ASTM C272	0.7
Water Vapor Permeability, maximum, perm-inch, per ASTM E96	4
Service Temperature range °F	(-) 297 to (+) 300
Flame Spread Index per ASTM E84	≤ 25

Insulation shall be Trymer™ 2000XP by ITW Insulation Systems, Corafoam® by Duna-USA or approved equal.

Insulation jacket (exterior casing)* shall be UV inhibited, 50 mil, High Density Polyethylene (H.D.P.E.) ASTM D-1248 with the following physical properties:

- ASTM D-638.....Ultimate Elongation 850%
- ASTM D-638.....Tensile Yield Strength 3300 psi
- ASTM D-3350.....Resin Type III, Grade P34
- ASTM D-790.....Tangent Flexural Modules 175,000 psi

***No tape casings will be allowed.**

Jacket shall be held on with Type 316 stainless steel bands or screws, or other approved methods.

Pipe Supports:

Structural shapes for temporary pipe support elements shall be fabricated from supplemental steel matching bridge steel specifications, AASHTO M270 Grade 50T2, except that metalizing or hot dip galvanizing is not required. Temporary structural steel for pipe supports may be cleaned after fabrication and primed with cold galvanizing spray.

Structural bolting material for temporary supports shall be as follows: Bolts shall be as per ASTM F315 Grade A325; nuts shall be ASTM A563, D.H.; washers shall be ASTM F436; all structural bolting material shall be hot dip galvanized per ASTM F2329.

Pipe rolls and other prefabricated hardware shall be sized for the nominal outside diameter of the insulated pipe, except where otherwise shown on the plans. Prefabricated hardware material for temporary support components shall be as shown on the drawings, custom dimensioned as required; certain components (e.g. U Bolts) shall be fabricated with larger than standard diameters, and/or longer legs than standard, to attach to the host surface/frame. Minimum factor of safety to be employed in component selection is 1.7. Prefabricated hardware is based on the pipe support products of Anvil International, National Pipe Hanger Corporation, or Engineer approved equal.

Strap Service Saddles:

Service saddles for temporary vents and drains or where directed, shall be double strap type, and shall have epoxy or nylon coated body and stainless steel nuts, bolts and double straps. Taps shall be CC (Mueller) Thread unless otherwise noted.

Approved Manufacturers

- Smith-Blair #313 or #317 or #239
- Romac #202N
- Ford FCD 202
- Mueller #DE2S
- U.S. Pipe #DR2S

Pipe Bedding:

Sanitary forcemain and gravity sewer pipe bedding shall be select fine gravel material obtained from approved natural deposits and unprocessed except for the removal of unacceptable material and stones larger than the maximum size permitted. It shall not contain vegetation. It shall be free from loam and other organic matter, clay, and other fine or harmful substances, and have a gradation within the following limits:

<u>Sieve Size</u>	<u>Percentage by Weight Passing</u>
3 in.	100
1/2 in.	80-100
No. 4	60-80
No. 40	10-30
No. 200	0-10

Construction Methods:

Inspection During Construction

The WPCA will appoint or provide an Agent or “Inspector” to inspect all materials and workmanship and to see that the work conforms with the specifications and drawings.

The failure of the Inspector to reject or condemn improper materials and workmanship shall not prevent the WPCA from rejecting materials and workmanship found defective at any time prior to the final acceptance of the completed work, nor shall it be considered as a waiver of any defects which may be discovered later, or as preventing the WPCA at any time subsequently from recovering damages for work actually defective.

The Contractor shall provide sufficient, safe and proper facilities at all times for inspection.

The Inspector shall be furnished by the Contractor with every reasonable facility for examining and inspecting the work and for ascertaining that the Work is being performed in accordance with the requirements and intent of the Contract, even to the extent of requiring the uncovering of portions of finished work by the Contractor.

Should the work thus uncovered prove satisfactory, the cost of uncovering and the replacement thereof shall be considered as extra work unless the original work was done in violation of the Contract or in the absence of the Inspector and without his written authorization, in which case said cost shall be borne by the Contractor. Should the work uncovered prove unsatisfactory, said cost shall be borne by the Contractor.

Material Storage and Handling

All pipe, fittings, valves, appurtenances and accessories shall be loaded and unloaded by lifting with hoists or skid/pallet handling equipment in order to avoid shock or damage. Under no circumstances shall such material be dropped. Pipe handled on pallets or skidways shall not be rolled or skidded against pipe on the ground. Lifting and handling equipment shall be padded and used in such a manner as to prevent damage to the exterior surface or internal lining of the pipe. Pipe and fittings shall not be handled by insertion of forks or tongs or any device designed for insertion, in order to prevent damage to the lining. All Materials shall be protected from damage. The interior of all pipes, fittings and other appurtenances shall be kept free from dirt or foreign matter at all times. Valves shall be drained and stored in such a manner to protect them from damage by freezing or accumulation of water or snow melt. Pipe shall not be stacked higher than the limits shown in Table 1. The bottom tier shall be kept off the ground on timbers, rails or concrete. Pipe in tiers shall be alternated: bell, plain end; bell, plain end. At least two rows of timbers shall be placed between tiers and chocks, affixed to each in order to prevent movement. The timbers shall be large enough to prevent contact between the pipes in adjacent tiers.

All gaskets for mechanical and push-on joints shall be stored in a cool location protected from direct sunlight. Gaskets shall NOT come in contact with petroleum products. Gaskets shall be used on a first-in, first out basis. Mechanical-joint nuts and bolts shall be handled and stored in such a manner to ensure proper use with respect to types and sizes.

TABLE 1 - Maximum Stacking Heights for Ductile Iron Pipe*

Nominal Pipe Size (in)	Number of Tiers
6 & 8	11
10	10
12	9

* For 18 or 20 foot (5.5 or 6.1m) lengths.

For factory insulated HDPE, follow manufacturer’s instructions for handling, storage and stacking lengths of pipe.

Construction Sequencing:

Construction sequencing shall generally follow the progression outlined in the Notes on the plans. Specific attention shall be paid to maintaining sanitary system flowpath at all times. Note

that main line and branch valves may only be operated by the WPCA. Lockout/Tagout (LOTO) procedures shall be employed.

Installation of the north-south portion of temporary relocated sanitary forcemain shall proceed in the high to low, (south to north) direction. Ductile iron portions of the south end shall be anchored prior to assembly of the factory insulated HDPE portion from the south end downhill towards the mid-point expansion/contraction joint. The expansion/contraction joint shall be installed with extension set per the manufacturer's instructions for ambient temperature at the time of installation, then mid-point anchor installed and secured to the temporary utility bridge. Following completion of the mid-point anchor installation, the factory insulated HDPE shall be installed from mid-point anchor downhill to the north, and the expansion/contraction joint installed with extension set per the manufacturer's instructions for ambient temperature at time of installation, and the continuing ductile iron pipe segment anchored as shown on the drawings.

Installation of insulation on ductile iron or HDPE joints applied in advance of obtaining acceptable leak and pressure testing, is entirely at the contractor's risk.

Trenching, Bedding, Backfill, and Restoration:

The contractor shall lay out his trench according to pipe alignment, and for encasing sanitary force main and gravity sewer, as shown on the drawings. If the contractor's construction sequence provides for laying temporary relocated sanitary forcemain across Benson Road from the valve vaults and re-opening Benson Road to traffic prior to commencement of reconstruction of the Benson Road bridge and associated road closure, the contractor shall saw cut the pavement in accordance with drawing details. Temporary restoration of the trench for this instance shall be completed with 8" of compacted processed aggregate base, and 4" of HMA S0.375 applied in two equal lifts as per drawing details, included in this lump sum for temporary relocation of the sanitary forcemain.

Trench excavation and rock in trench excavation shall include sand, gravel, ashes, loam, clay, organics, swamp muck, soft or disintegrated rock, hardpan, solid rock in place, detached rocks, boulders, masonry structures and concrete. Trench excavation and rock in trench excavation shall be performed in accordance with Section 2.86 of Form 818, and as detailed on the drawings, with all costs including removal and disposal of pavement, rock and excess material, unsuitable material, and provision of pipe bedding and backfill, is included this lump sum item for temporary relocation of sanitary forcemain main. Trench excavation and rock in trench excavation shall include refilling trenches under pipelines.

Excavation shall be made in open cut. No tunneling or blasting will be permitted. Any necessary sheeting or shoring, dewatering and related work, is included. Trench repairs for any reason, and maintenance of trenches for the duration of the work, is included.

Sanitary forcemain piping shall be bedded on all sides as shown on the drawing/details. Where crushed stone is approved, it shall be wrapped in filter fabric on all sides, with the ends of the fabric overlapped a minimum of 2 feet.

Existing material not suitable for trench backfill shall be disposed of and replaced with bank run gravel. Bank run gravel shall have a gradation within the limits given below. It shall be

obtained from approved natural deposits and unprocessed except for the removal of unacceptable material and stones larger than the maximum size permitted. It shall not contain vegetation, masses of roots, or individual roots. It shall be substantially free from loam and other organic matter, clay, and other fine or harmful substances.

<u>Sieve Size</u>	<u>Percentage by Weight Passing</u>
6 in.	100
3-1/2 in.	90-100
1-1/2 in.	55-95
1/4 in.	25-60
No. 10	15-45
No. 40	5-25
No. 100	0-10
No. 200	0-5

Dewatering, Control and Diversion of Water:

Dewatering required for maintaining trenches in firm condition for supporting pipe, shall be performed as the work progresses, in accordance with Item #1400051A – DEWATERING (SANITARY SEWER)

Alignment and Grade:

The sanitary forcemain shall be laid and maintained to the lines and grades established by the plans and specifications as coordinated, with fittings, valves, tapped or bossed outlets at the required locations unless otherwise directed or necessary to allow proper operation.

When sanitary force main and water main cross, alignment and grade shall be anticipated prior to laying pipe, and adjusted as necessary, and as approved by the Engineer, to provide clearance as required by federal, state and local regulations or as deemed necessary by the Engineer to prevent future damage or contamination. A clearance of 18” shall be maintained at any water over sewer crossing except where reinforced concrete encasement is employed and specific dimensions are shown on the drawings. A 12” minimum clearance is required for other utilities. Jointing of both water and sewer shall be staggered so as to permit minimum 10’ separation of joint centerlines.

Coverage requirement on all sanitary forcemains is nominally 5’-6”, except where shown otherwise on the drawings, in which case insulation is applied as shown or specified.

The contractor shall follow AWWA, WPCA, and CT DOT construction guidelines, and in the event of a discrepancy, follow WPCA standards.

General Sanitary Forcemain Installation:

Proper implements, tools and facilities shall be provided and used for the safe and convenient performance of the work. All pipe and fittings shall be lowered carefully into the trench or onto

the utility bridge by means of a crane, excavator, slings or other suitable tools or equipment in such a manner as to prevent damage to sanitary forcemain materials and protective coatings and linings. Under no circumstances shall sanitary forcemain materials be dropped or dumped into the trench.

All pipes, fittings, valves, and other appurtenances shall be examined carefully for damage and other defects immediately before installation. Defective materials shall be marked and held for inspection by the Engineer, who may prescribe corrective repairs or reject the materials.

Foreign material shall be prevented from entering the pipe while it is being placed in the trench. No debris, tools, clothing or other materials shall be placed in the pipe at any time.

As each length of the pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with approved backfill material.

At times when pipe laying is not in progress, the open ends of pipe shall be closed by a water-tight plug or other means approved by the Engineer. The plug shall be fitted with a means for venting. When practical, the plug shall remain in place until the trench is pumped completely dry. Care must be taken to prevent pipe flotation should the trench fill with water. Prior to removal of the plug from extending the line or any other reason, air and/or water pressure in the line shall be released.

Where coverage over temporary relocated sanitary forcemain is shallow, place road plate over the compacted piping trench as detailed, to protect the insulated pipe from construction loads. Place pavement around the perimeter and across the top of the road plate, to hold it in place during construction traffic.

Mechanical Joint Ductile Iron Sanitary Forcemain Installation:

All ductile iron piping for the temporary relocated sanitary forcemain main shall be restrained mechanical joint type. All lumps, blisters and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end and the inside of the bell shall be wiped clean and dry and be free from dirt, sand, grit or any foreign materials before the pipe is laid.

The Contractor shall ensure that the plain end is beveled; square or sharp edges may damage or dislodge the gasket and cause a leak. Field cutting of ductile iron pipe shall only be done on "gauged" pipe, that is, pipe so marked at the factory as to be within proper O.D. diameter and out of round tolerance for proper jointing at any position along the length.

Place the gland rings of the restraint assembly on the bell and plain ends respectively, and use joint gasket lubricant. Assemble the pipe joint and restraint per manufacturer's instructions, seating the pipe before making any necessary deflection. Deflection shall not exceed 75% of manufacturer's published limits. When pulling the pipe into the bell of fitting, do not use chain hooks directly on the pipe ends, where damage and/or chipping of the cement lining can occur. When pushing, use timbers against the pipe so as to prevent damage to bell or cement lining. Complete assembly of the restrained joint by uniformly taking up the gap between wedge bolts

and pipe wall, then tightening in sequential order repetitively in steps recommended by the manufacturer before final torque twist-off of the wedge bolt heads. Set screw type restraints shall not be used.

Coordinate with the temporary utility bridge configuration. Provide rigid blocking support under anchorage points, with placement and thickness coordinated to permit transition to insulated restrained coupling and/or insulated expansion/contraction joints, such that the follow-on transition to HDPE factory insulated piping continues smoothly to rest on continuous blocking as shown on the drawings. Note where supports such as U-bolts are required to be tight against ductile iron pipe wall for anchorage, or where a gap is shown for U-bolts installed over the outside diameter of insulated portions, and thermal expansion and contraction movement is permitted. Anchorage shall be in place to the satisfaction of the Engineer and the WPCA, prior to pressure testing.

HDPE Sanitary Forcemain Installation:

Factory insulated HDPE piping across the temporary utility bridge shall be continuously supported by smooth blocking constructed from finished lumber or primed steel, to permit axial movement due to thermal expansion and contraction. U-Bolts shall be installed over the insulation jacket and secured with a small gap at the top, so as to permit axial movement without “snaking” in the horizontal plane.

HDPE piping joints shall be fusion welded. Flanges for connecting to the center span anchor shall be full face, with ANSI B16.1 Class 150 bolt pattern, and assembled with SBR gasket of the 3 ring bulb type. Slip ring flanges shall not be used.

Field Installed Pipe Insulation:

Rigid closed cell foam insulation shall be placed around the sanitary forcemain to protect against freezing where exposed, and continuing underground for a length of 5 feet beyond face of embankment and 5 feet depth of ground cover, and where shown on the drawings. Insulation shall be applied as per manufacturer’s instructions. Use pre-formed pipe insulation for pipe and fittings, butting joints tightly and securing with stainless steel wire or other recommended means until jacket is installed. Jacket shall be secured with screws, stainless steel bands, or other approved methods. Jacket seams and larger diameter fitting cover jackets overlapping pipe barrel jackets, shall be caulked where pipe is anchored, but not caulked to allow a sliding fit where shown and where pipe expansion/contraction movement is permitted.

Tests After Installation:

Strap Service Saddles with fittings and branch valved connections for vent, drain, fill and pressure gage connections, shall be installed at approximate high and low points. After the pipe has been installed and backfilled, all newly installed pipe shall be subjected to a pressure and leakage test conducted in accordance with AWWA Standard C600 (latest revision), except as hereinafter specified.

A) Pressure Test:

All newly installed pipe shall be subjected to a hydrostatic pressure of 150 PSI at the lowest point, unless permitted otherwise by the WPCA. The test shall be maintained for a minimum of two hours with no more than a 5 psi variation during the test period.

B) Leakage Test:

The leakage test will be conducted at the same time as the pressure test. Leakage is the quantity of water required to maintain the pressure within 5 psi of the specified test pressure, it is not the measured drop in pressure. Leakage shall not exceed the number of gallons per hour as indicated in Table 6 of the above specified AWWA Section. There shall be no visible leakage allowed.

C) General.

Before applying the specified test pressure, all air shall be expelled from the pipe via the temporary high point vent. The section to be tested shall be closed by valves, temporary flanges, plugs or bulkheads as required.

Each valved section of pipe shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the inspector. The pipe connection, test gages, and all necessary apparatus including pump shall be furnished by the Contractor. The Contractor shall furnish all necessary labor and materials for conducting the tests.

If leakage is either visible or indicated by the above test procedure, the Contractor shall do whatever is necessary to locate and repair said leak at his own expense. Upon completion of the repair the pipeline shall be retested.

No section of the sanitary forcemain shall be put into service without the approval of the WPCA.

Upon acceptance of all tests, the WPCA and contractor will clear their respective LOTO tags from the valve vault branch connection valves, the WPCA will open the branch valves, placing the temporary relocated sanitary forcemain loop in service, and closing and implementing LOTO procedures on the main line valves controlling sewage flow through sanitary forcemain piping across the bridge. The contractor will provide assistance to the WPCA as requested for this operation.

Removal of Temporary Relocated Sanitary Forcemain:

Following removal of the temporary relocated sanitary forcemain from service and valve LOTO, the contractor will drain the line into a tanker truck or other suitable transport container, and dispose of the sewage at a nearby location designated by the WPCA. The temporary relocated sanitary forcemain piping shall be removed from the valve vault branch connection valves, and the branch connection piping turned up and converted into an emergency pumpout connection with reinforced concrete thrust block, as detailed on the drawings.

All remaining temporary relocated sanitary forcemain shall be removed and legally disposed of off site, including supports, insulation, accessories and appurtenances.

Method of Measurement:

Temporary Relocation of Sanitary Sewer Forcemain, being paid for on a lump sum basis, will not be measured for payment.

Dewatering (Sanitary Sewer), performed as required with the work of this item, being paid for on a lump sum basis for all such work, both this Item #1403615A-Relocate Sanitary Sewer, and Item #1401237A-6" Ductile Iron Pipe Force main (Sanitary Sewer) will not be measured for payment.

Basis of Payment:

This work will be paid for at the Contract Lump Sum price bid for **ITEM #1403615A-RELOCATE SANITARY SEWER** which price shall include the complete, tested, and accepted temporary relocated sanitary forcemain shown on the drawings, specified and as required, inclusive of all materials and labor needed to accomplish the temporary relocation, including but not limited to, trenching, pipe bedding, the furnishing and installing of sanitary forcemain pipe, fittings, valves, taps, supports, restraints, thrust blocks, removal and disposal of temporary sanitary forcemain upon placement of new sanitary forcemain in service, related and appurtenant work, as necessary and/or shown on the plans and in accordance with the specifications.

Dewatering will be paid on a lump sum basis under Item #1400051A-DEWATERING (SANITARY SEWER) which is applicable to and common for all sanitary forcemain installation items.

ITEM #1405067A - BITUMINIOUS CONCRETE FOR PATCHING
(SANITARY SEWER)

Description:

The work under this item shall consist of the installation of temporary bituminous concrete pavement as indicated on the plans and for sanitary forcemain and sanitary gravity sewer, and as directed by the Engineer. The work for this item includes sawcutting, removal of existing pavement and curbing, excavation, formation of subgrade, backfilling, disposal of surplus material, processed aggregate base, tack coat, bituminous concrete pavement and bituminous concrete lip curbing where existing or as shown on the plans.

This item is only applicable for portions of advance work done when Benson Road will be re-opened to traffic, prior to closure for replacement of bridge superstructure.

Materials:

Bituminous concrete shall conform to the provisions of Sections 4.06 and Article M.04 of the Standard Specifications.

Material for Tack Coat shall conform to the provisions of Sections 4.06 and Article M.04 of the Standard Specifications.

Processed Aggregate Base shall conform to the provisions of Section 3.04 and Article M.05.01 of the Standard Specifications.

Construction Methods:

Excavation and grading shall be performed in accordance with the provisions of Article 2.02.03 of the Standard Specifications.

Processed Aggregate Base shall be placed and compacted in accordance with Section 3.04.03 of the Standard Specifications, to a minimum 8" depth

Bituminous concrete courses shall be constructed in accordance with the provisions of Article 4.06.03 of the Standard Specifications. Bituminous concrete pavement for temporary pavement repairs shall be 4" of HMA S0.375 placed in two equal lifts.

Method of Measurement:

This work will be measured by the actual number of square yards of completed temporary bituminous concrete pavement, only to the limits shown on the plans or trench details, or as directed by the Engineer.

Basis of Payment:

This work will be paid for at the contract unit price per square yard for **ITEM #1405067A – BITUMINOUS CONCRETE FOR PATCHING (SANITARY SEWER)**, complete in place, which shall include sawcutting, removal of existing pavement and curbing, excavation, formation of subgrade, backfilling, disposal of pavement, curbing and surplus material, processed aggregate base, tack coat, bituminous concrete pavement and bituminous concrete lip curbing and all equipment, tools labor and materials incidental thereto.

<u>Description</u>	<u>Unit</u>
Bituminous Concrete for Patching (Sanitary Sewer)	SY

ITEM #1504010A - TEMPORARY SUPPORT OF UTILITIES

Specific to Project No. 0080-0131

Description: Work under this item shall consist of designing, furnishing and placing temporary supports and protection measures necessary to support and protect the relocated utilities listed below.

- 12-inch diameter insulated water-main, Connecticut Water Company
- (1) 8-inch diameter insulated sewer pipe, WPCA
- 8-inch diameter insulated gas pipe, Eversource

Work performed by the Contractor under this Item shall include fabricating, furnishing, installing and removing temporary supports and providing protection measures for the temporarily relocated utilities. After completion of the proposed bridge, utilities shall be permanently relocated and attached to the underside of the new bridge. Once the new utilities are operational, the temporary supports and protection measures and the existing utilities shall be removed by the Contractor and suitably disposed of offsite.

This section shall also consist of furnishing all labor, tools, materials and equipment necessary to perform the work of completely removing the temporary utilities support system, including all appurtenances and the supported existing pipes shown on the Drawings or as directed by the Engineer.

The work pertaining to temporary support and protection involves the temporary support and prevention of damages, during the removal of the existing bridge, excavation and construction of the proposed bridge, and roadway improvements under this contract. The work pertaining to the temporary support and protection will be required to be submitted for review and approval by the utility companies.

The Contractor is advised that no service interruption to the utility services resulting from the Contractor's operations will be allowed, except as otherwise approved by the utility companies. Extreme caution shall be exercised during all stages of construction in order to preserve the existing utilities.

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

It is the Contractor's responsibility to verify locations, conditions and field dimensions of all existing features, as actual conditions may differ from information indicated on the plans or contained elsewhere in these specifications.

Materials: The materials for this work shall conform to the requirements of the contract documents and be of satisfactory quality for the purpose intended and shall be approved by the Engineer. The material shall be intended for use in structures and shall be sound and capable of safely carrying the loads anticipated as part of the design of the temporary supports and protection measures.

Construction Methods:

Working Drawings: Submit Working Drawings for approval for the installation of the temporary support of utility (water/sewer/gas) as shown on the Drawings.

The Contractor shall design the temporary support system. Such system shall be designed by a Professional Engineer licensed in Connecticut and shall be required to meet the approval of the utility companies and the following requirements:

The Contractor shall prepare Working Drawings and computations showing his proposed method of support and protection for the utility to be supported and protected. Preparation of Working Drawings and computations shall conform to the requirements of 1.05.02. The support shall safely carry all dead loads and any imposed loadings under all possible construction conditions. The utility protection shields shall safely carry any imposed loadings under all possible construction conditions. Said supports and protections shall be constructed in a manner that will not interfere with the proposed construction.

The design shall be submitted to the utility companies' representatives for review and approval. Following approval, the design shall be submitted to the Engineer for final approval prior to the beginning of construction. No work will be allowed in the vicinity of any utility until the Contractor receives approval of his support method from the utility companies' representative and the Engineer.

The Contractor shall use every effort to protect all utilities from damage of any nature which might result from carelessness or negligence in his operations. He shall be held solely and strictly responsible for any damage resulting from such carelessness and negligence.

A periodic inspection of the temporary utility support and protection measures shall be performed by the Contractor (on a daily basis at a minimum, and after significant rain events), and as directed by the Engineer.

The Contractor shall support and maintain the utilities until the proposed bridge and roadway construction has been completed, and the service has been transferred to the new utilities. Once the existing utilities have been disassembled, the temporary utility supports, and protection measures shall be removed from the site by the Contractor. The existing temporary utility support system shall be removed from within the limits shown on the Contract Drawings. All material removed under this item shall become the property of the Contractor and shall be properly disposed of off the Project site at an approved facility.

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

Basis of Payment: The work will be paid for at the contract lump sum price for "Temporary Support of Utilities" which price shall include providing protection measures, submitting a design for approval, fabricating, furnishing, installing, periodic monitoring, maintaining, removing temporary supports and measures, coordinating work with the utility companies, and

all materials, equipment, tools and labor incidental thereto.

It shall also include the removal and proper disposal of all existing support components, sedimentation and erosion control, and the restoration of the disturbed area to existing grade, as directed by the Engineer.

Pay Item	Pay Unit
Temporary Support of Utilities	l.s.

ITEM #1806226A - PRE-WARNING VEHICLE

Description: Work under this item shall include furnishing, deploying and maintaining a Truck-Mounted Impact Attenuator equipped with a changeable message sign (CMS) for use as a Pre-Warning Vehicle (PWV) in a rolling road block operation on limited access highways. Impact attenuators shall only be truck-mounted. The message on the sign shall warn motorists of slow or stopped traffic conditions.

Materials: The Truck-Mounted Impact Attenuator shall meet the requirements of Article 18.06.02, except replace all instances of “flashing arrow,” “arrow sign,” and “arrow” with “CMS”. The CMS shall meet the requirements of Article 11.31.02, with the following amendments:

1. Physical Characteristics of the CMS

- a) Mounting – The CMS shall be truck mounted only
- b) Sign Display Dimensions – Width of 6 feet, height of 4 feet

2. Visual Characteristics of the CMS Display

- a) Sign Type – CMS shall have a LED display only
- b) Color – CMS shall have black background with orange, yellow, or amber legend
- c) Characters – Letter height shall be 13 inches; Single stroke
- d) Visibility– CMS brightness must provide for visibility at 1/2 mile
- e) Message – The message shall read as follows, or shall be as directed by the Engineer:

Frame 1: SLOWED TRAFFIC AHEAD

Frame 2: BE PREPARED TO STOP

Or

Frame 1: STOPPED TRAFFIC AHEAD

Frame 2: BE PREPARED TO STOP

Construction Methods: The PWV shall be initially positioned in the right shoulder ½ mile prior to the rolling road block operation.

If a traffic queue reaches the PWV’s initial location, the Contractor shall slowly reverse the PWV along the shoulder to position itself prior to the new back of queue.

The Contractor shall meet the requirements of Article 18.06.03.

Method of Measurement: This work will be measured for payment by the actual number of hours that the Pre-Warning Vehicle is used in a rolling road block operation.

Basis of Payment: This work will be paid for at the Contract unit price per hour for “Pre-Warning Vehicle,” which shall include the furnishing and use of the pre-warning vehicle and a driver, attenuator reflector, flashing lights, changeable message sign, and all equipment, materials, tools, labor, disposal of damaged Truck-Mounted Impact Attenuator components and work incidental thereto.

Pay Item	Pay Unit
Pre-warning Vehicle	hr

PERMITS AND/OR REQUIRED PROVISIONS

The following Permits and/or and Required Provisions follow this page are hereby made part of this Contract.

- **PERMITS AND/OR PERMIT APPLICATIONS**

No Permits are required for this contract

- **CONSTRUCTION CONTRACTS - REQUIRED CONTRACT PROVISIONS (FHWA FUNDED CONTRACTS)**

**Construction Contracts - Required Contract Provisions
(FHWA Funded Contracts)**

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- EXHIBIT F – Federal Wage Rates (Attached at the end)
- EXHIBIT G - State Wage Rates and Other Related Information (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, Participation by DBEs, as may be revised.

Pursuant to 49 CFR 26.13, the following paragraph is part of this Contract and shall be included in each subcontract the Contractor enters into with a subcontractor:

“The Contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26, Participation by DBEs, in the award and administration of U.S. DOT-assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this Contract, which may result in the termination of this contract or such other remedy as ConnDOT (recipient) deems appropriate, which may include, but is not limited to: (1) Withholding monthly progress payments, (2) Assessing sanctions, (3) Liquidated damages; and/or, (4) Disqualifying the contractor from future bidding as non-responsible.”

5. Contract Wage Rates

The Contractor shall comply with:

The Federal and State wage rate requirements indicated in Exhibits F and G hereof, as revised, are hereby made part of this Contract. The Federal wage rates (Davis-Bacon Act) applicable to this Contract shall be the Federal wage rates that are current on the US Department of Labor website (<http://www.wdol.gov/dba.aspx>) as may be revised 10 days prior to bid opening. These applicable Federal wage rates will be physically incorporated in the final contract document executed by both parties. The Department will no longer physically include revised Federal wage rates in the bid documents or as part of addenda documents, prior to the bid opening date. During the bid advertisement period, bidders are responsible for obtaining the appropriate Federal wage rates from the US Department of Labor website.

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

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

Prevailing Wages for Work on State Highways; Annual Adjustments. With respect to contracts for work on state highways and bridges on state highways, the Contractor shall comply with the provisions of Section 31-54 and 31-55a of the Connecticut General Statutes, as revised.

As required by Section 1.05.12 (Payrolls) of the State of Connecticut, Department of Transportation's Standard Specification for Roads, Bridges and Incidental Construction (FORM 817), as may be revised, every Contractor or subcontractor performing project work on a Federal aid project is required to post the relevant prevailing wage rates as determined by the United States Secretary of Labor. The wage rate determinations shall be posted in prominent and easily accessible places at the work site.

6. Americans with Disabilities Act of 1990, as Amended

This provision applies to those Contractors who are or will be responsible for compliance with the terms of the Americans with Disabilities Act of 1990, as amended (42 U.S.C. 12101 et seq.), (Act), during the term of the Contract. The Contractor represents that it is familiar with the terms of this Act and that it is in compliance with the Act. Failure of the Contractor to satisfy this standard as the same applies to performance under this Contract, either now or during the term of the Contract as it may be amended, will render the Contract voidable at the option of the State upon notice to the contractor. The Contractor warrants that it will hold the State harmless and indemnify the State from any liability which may be imposed upon the State as a result of any failure of the Contractor to be in compliance with this Act, as the same applies to performance under this Contract.

7. Connecticut Statutory Labor Requirements

(a) Construction, Alteration or Repair of Public Works Projects; Wage Rates. The Contractor shall comply with Section 31-53 of the Connecticut General Statutes, as revised. The wages paid on an hourly basis to any person performing the work of any mechanic, laborer or

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

(b) Debarment List. Limitation on Awarding Contracts. The Contractor shall comply with Section 31-53a of the Connecticut General Statutes, as revised.

(c) Construction Safety and Health Course. The Contractor shall comply with section 31-53b of the Connecticut General Statutes, as revised. The contractor shall furnish proof to the Labor Commissioner with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 of the Connecticut General Statutes, as revised, on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

Any employee required to complete a construction safety and health course as required that has not completed the course, shall have a maximum of fourteen (14) days to complete the course. If the employee has not been brought into compliance, they shall be removed from the project until such time as they have completed the required training.

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

(d) Awarding of Contracts to Occupational Safety and Health Law Violators Prohibited. The Contract is subject to Section 31-57b of the Connecticut General Statutes, as revised.

(e) Residents Preference in Work on Other Public Facilities. NOT APPLICABLE TO FEDERAL AID CONTRACTS. Pursuant to Section 31-52a of the Connecticut General Statutes, as revised, in the employment of mechanics, laborers or workmen to perform the work specified herein, preference shall be given to residents of the state who are, and continuously for at least six months prior to the date hereof have been, residents of this state, and if no such person is available, then to residents of other states

8. Tax Liability - Contractor's Exempt Purchase Certificate (CERT – 141)

The Contractor shall comply with Chapter 219 of the Connecticut General Statutes pertaining to tangible personal property or services rendered that is/are subject to sales tax. The Contractor is

responsible for determining its tax liability. If the Contractor purchases materials or supplies pursuant to the Connecticut Department of Revenue Services' "Contractor's Exempt Purchase Certificate (CERT-141)," as may be revised, the Contractor acknowledges and agrees that title to such materials and supplies installed or placed in the project will vest in the State simultaneously with passage of title from the retailers or vendors thereof, and the Contractor will have no property rights in the materials and supplies purchased.

Forms and instructions are available anytime by:

Internet: Visit the DRS website at www.ct.gov/DRS to download and print Connecticut tax forms; or Telephone: Call 1-800-382-9463 (Connecticut calls outside the Greater Hartford calling area only) and select Option 2 or call 860-297-4753 (from anywhere).

9. Executive Orders

This contract is subject to the provisions of Executive Order No. Three of Governor Thomas J. Meskill, promulgated June 16, 1971, concerning labor employment practices, Executive Order No. Seventeen of Governor Thomas J. Meskill, promulgated February 15, 1973, concerning the listing of employment openings and Executive Order No. Sixteen of Governor John G. Rowland promulgated August 4, 1999, concerning violence in the workplace, all of which are incorporated into and are made a part of the contract as if they had been fully set forth in it. The contract may also be subject to Executive Order No. 14 of Governor M. Jodi Rell, promulgated April 17, 2006, concerning procurement of cleaning products and services and to Executive Order No. 49 of Governor Dannel P. Malloy, promulgated May 22, 2015, mandating disclosure of certain gifts to public employees and contributions to certain candidates for office. If Executive Order No. 14 and/or Executive Order No. 49 are applicable, they are deemed to be incorporated into and are made a part of the contract as if they had been fully set forth in it. At the Contractor's request, the Department shall provide a copy of these orders to the Contractor.

10. Non Discrimination Requirement (pursuant to section 4a-60 and 4a-60a of the Connecticut General Statutes, as revised): References to "minority business enterprises" in this Section are not applicable to Federal-aid projects/contracts. Federal-aid projects/contracts are instead subject to the Federal Disadvantaged Business Enterprise Program.

(a) For purposes of this Section, the following terms are defined as follows:

- (1) "Commission" means the Commission on Human Rights and Opportunities;
- (2) "Contract" and "contract" include any extension or modification of the Contract or contract;
- (3) "Contractor" and "contractor" include any successors or assigns of the Contractor or contractor;
- (4) "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.
- (5) "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations;
- (6) "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;

- (7) "marital status" means being single, married as recognized by the state of Connecticut, widowed, separated or divorced;
- (8) "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;
- (9) "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
- (10) "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 of Connecticut, including, but not limited to municipalities, unless the contract is a municipal public works contract or quasi-public agency project contract, (2) any other state of the United States, including but not limited to, the District of Columbia, Puerto Rico, U.S. territories and possessions, and federally recognized Indian tribal governments, as defined in Connecticut General Statutes § 1-267, (3) the federal government, (4) a foreign government, or (5) an agency of a subdivision, state or government described in subdivision (1), (2), (3), or (4) of this subsection.

- (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, status as a veteran, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such Contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the State of Connecticut; and the Contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, status as a veteran, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by the Contractor that such disability prevents performance of the work involved; (2) the Contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the Commission; (3) the Contractor agrees to provide each labor union or representative of workers with which the Contractor has a collective bargaining agreement or other contract or understanding and each vendor with which the Contractor has a contract or understanding, a notice to be provided by the Commission, advising the labor union or workers' representative of the Contractor's commitments under this section and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) the Contractor

agrees to comply with each provision of this Section and Connecticut General Statutes §§ 46a-68e and 46a-68f and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes §§ 46a-56, 46a-68e and 46a-68f; and (5) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor as relate to the provisions of this Section and Connecticut General Statutes § 46a-56. If the contract is a public works contract, the Contractor agrees and warrants that he will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works projects.

- (c) Determination of the Contractor's good faith efforts shall include, but shall not be limited to, the following factors: The Contractor's employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the Commission may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.
- (d) The Contractor shall develop and maintain adequate documentation, in a manner prescribed by the Commission, of its good faith efforts.
- (e) The Contractor shall include the provisions of subsection (b) of this Section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes §46a-56; provided if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.
- (f) The Contractor agrees to comply with the regulations referred to in this Section as they exist on the date of this Contract and as they may be adopted or amended from time to time during the term of this Contract and any amendments thereto.
- (g) (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or the State of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) the Contractor agrees to provide each labor union or representative of workers with which such Contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such Contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the Contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (3) the Contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes § 46a-56; and (4) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor which relate to the provisions of this Section and Connecticut General Statutes § 46a-56.
- (h) The Contractor shall include the provisions of the foregoing paragraph in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by

regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes § 46a-56; provided, if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.

Please be aware the Nondiscrimination Certifications can be found at the Office of Policy and Management website:

<https://portal.ct.gov/OPM/Fin-PSA/Forms/Nondiscrimination-Certification>

11. Whistleblower Provision

The following clause is applicable if the Contract has a value of Five Million Dollars (\$5,000,000) or more.

Whistleblowing. This Contract may be subject to the provisions of Section 4-61dd of the Connecticut General Statutes. In accordance with this statute, if an officer, employee or appointing authority of the Contractor takes or threatens to take any personnel action against any employee of the Contractor in retaliation for such employee's disclosure of information to any employee of the contracting state or quasi-public agency or the Auditors of Public Accounts or the Attorney General under the provisions of subsection (a) of such statute, the Contractor shall be liable for a civil penalty of not more than five thousand dollars for each offense, up to a maximum of twenty per cent of the value of this Contract. Each violation shall be a separate and distinct offense and in the case of a continuing violation, each calendar day's continuance of the violation shall be deemed to be a separate and distinct offense. The State may request that the Attorney General bring a civil action in the Superior Court for the Judicial District of Hartford to seek imposition and recovery of such civil penalty. In accordance with subsection (f) of such statute, each large state contractor, as defined in the statute, shall post a notice of the provisions of the statute relating to large state contractors in a conspicuous place which is readily available for viewing by the employees of the Contractor.

12. Connecticut Freedom of Information Act

- (a) Disclosure of Records.** This Contract may be subject to the provisions of section 1-218 of the Connecticut General Statutes. In accordance with this statute, each contract in excess of two million five hundred thousand dollars between a public agency and a person for the performance of a governmental function shall (a) provide that the public agency is entitled to receive a copy of records and files related to the performance of the governmental function, and (b) indicate that such records and files are subject to FOIA and may be disclosed by the public agency pursuant to FOIA. No request to inspect or copy such records or files shall be valid unless the request is made to the public agency in accordance with FOIA. Any complaint by a person who is denied the right to inspect or copy such records or files shall be brought to the Freedom of Information Commission in accordance with the provisions of sections 1-205 and 1-206 of the Connecticut General Statutes.
- (b) Confidential Information.** The State will afford due regard to the Contractor's request for the protection of proprietary or confidential information which the State receives from the Contractor. However, all materials associated with the Contract are subject to the terms of the FOIA and all corresponding rules, regulations and interpretations. In making such a request, the Contractor may not merely state generally that the materials are proprietary or confidential in nature and not, therefore, subject to release to third parties. Those particular

sentences, paragraphs, pages or sections that the Contractor believes are exempt from disclosure under the FOIA must be specifically identified as such. Convincing explanation and rationale sufficient to justify each exemption consistent with the FOIA must accompany the request. The rationale and explanation must be stated in terms of the prospective harm to the competitive position of the Contractor that would result if the identified material were to be released and the reasons why the materials are legally exempt from release pursuant to the FOIA. To the extent that any other provision or part of the Contract conflicts or is in any way inconsistent with this section, this section controls and shall apply and the conflicting provision or part shall not be given effect. If the Contractor indicates that certain documentation is submitted in confidence, by specifically and clearly marking the documentation as “CONFIDENTIAL,” DOT will first review the Contractor’s claim for consistency with the FOIA (that is, review that the documentation is actually a trade secret or commercial or financial information and not required by statute), and if determined to be consistent, will endeavor to keep such information confidential to the extent permitted by law. See, *e.g.*, Conn. Gen. Stat. §1-210(b)(5)(A-B). The State, however, has no obligation to initiate, prosecute or defend any legal proceeding or to seek a protective order or other similar relief to prevent disclosure of any information that is sought pursuant to a FOIA request. Should the State withhold such documentation from a Freedom of Information requester and a complaint be brought to the Freedom of Information Commission, the Contractor shall have the burden of cooperating with DOT in defense of that action and in terms of establishing the availability of any FOIA exemption in any proceeding where it is an issue. In no event shall the State have any liability for the disclosure of any documents or information in its possession which the State believes are required to be disclosed pursuant to the FOIA or other law.

13. Service of Process

The Contractor, if not a resident of the State of Connecticut, or, in the case of a partnership, the partners, if not residents, hereby appoints the Secretary of State of the State of Connecticut, and his successors in office, as agent for service of process for any action arising out of or as a result of this Contract; such appointment to be in effect throughout the life of this Contract and six (6) years thereafter.

14. Substitution of Securities for Retainages on State Contracts and Subcontracts

This Contract is subject to the provisions of Section 3-112a of the General Statutes of the State of Connecticut, as revised.

15. Health Insurance Portability and Accountability Act of 1996 (HIPAA)

The Contractor shall comply, if applicable, with the Health Insurance Portability and Accountability Act of 1996 and, pursuant thereto, the provisions attached at Exhibit D, and hereby made part of this Contract.

16. Forum and Choice of Law

Forum and Choice of Law. The parties deem the Contract to have been made in the City of Hartford, State of Connecticut. Both parties agree that it is fair and reasonable for the validity and construction of the Contract to be, and it shall be, governed by the laws and court decisions of the State of

Connecticut, without giving effect to its principles of conflicts of laws. To the extent that any immunities provided by Federal law or the laws of the State of Connecticut do not bar an action against the State, and to the extent that these courts are courts of competent jurisdiction, for the purpose of venue, the complaint shall be made returnable to the Judicial District of Hartford only or shall be brought in the United States District Court for the District of Connecticut only, and shall not be transferred to any other court, provided, however, that nothing here constitutes a waiver or compromise of the sovereign immunity of the State of Connecticut. The Contractor waives any objection which it may now have or will have to the laying of venue of any Claims in any forum and further irrevocably submits to such jurisdiction in any suit, action or proceeding.

17. Summary of State Ethics Laws

Pursuant to the requirements of section 1-101qq of the Connecticut General Statutes, the summary of State ethics laws developed by the State Ethics Commission pursuant to section 1-81b of the Connecticut General Statutes is incorporated by reference into and made a part of the Contract as if the summary had been fully set forth in the Contract.

18. Audit and Inspection of Plants, Places of Business and Records

- (a) The State and its agents, including, but not limited to, the Connecticut Auditors of Public Accounts, Attorney General and State's Attorney and their respective agents, may, at reasonable hours, inspect and examine all of the parts of the Contractor's and Contractor Parties' plants and places of business which, in any way, are related to, or involved in, the performance of this Contract. For the purposes of this Section, "Contractor Parties" means the Contractor's members, directors, officers, shareholders, partners, managers, principal officers, representatives, agents, servants, consultants, employees or any one of them or any other person or entity with whom the Contractor is in privity of oral or written contract and the Contractor intends for such other person or entity to Perform under the Contract in any capacity.
- (b) The Contractor shall maintain, and shall require each of the Contractor Parties to maintain, accurate and complete Records. The Contractor shall make all of its and the Contractor Parties' Records available at all reasonable hours for audit and inspection by the State and its agents.
- (c) The State shall make all requests for any audit or inspection in writing and shall provide the Contractor with at least twenty-four (24) hours' notice prior to the requested audit and inspection date. If the State suspects fraud or other abuse, or in the event of an emergency, the State is not obligated to provide any prior notice.
- (d) The Contractor shall keep and preserve or cause to be kept and preserved all of its and Contractor Parties' Records until three (3) years after the latter of (i) final payment under this Agreement, or (ii) the expiration or earlier termination of this Agreement, as the same may be modified for any reason. The State may request an audit or inspection at any time during this period. If any Claim or audit is started before the expiration of this period, the Contractor shall retain or cause to be retained all Records until all Claims or audit findings have been resolved.
- (e) The Contractor shall cooperate fully with the State and its agents in connection with an audit or inspection. Following any audit or inspection, the State may conduct and the Contractor shall cooperate with an exit conference.
- (f) The Contractor shall incorporate this entire Section verbatim into any contract or other agreement that it enters into with any Contractor Party.

19. Campaign Contribution Restriction

For all State contracts, defined in Conn. Gen. Stat. §9-612(f)(1) as having a value in a calendar year of \$50,000 or more, or a combination or series of such agreements or contracts having a value of \$100,000 or more, the authorized signatory to this contract expressly acknowledges receipt of the State

Elections Enforcement Commission’s notice advising state contractors of state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice, as set forth in "Notice to Executive Branch State Contractors and Prospective State Contractors of Campaign Contribution and Solicitation Limitations," a copy of which is attached hereto and hereby made a part of this contract, attached as Exhibit E.

20. Tangible Personal Property

- (a) The Contractor on its behalf and on behalf of its Affiliates, as defined below, shall comply with the provisions of Conn. Gen. Stat. §12-411b, as follows:
 - (1) For the term of the Contract, the Contractor and its Affiliates shall collect and remit to the State of Connecticut, Department of Revenue Services, any Connecticut use tax due under the provisions of Chapter 219 of the Connecticut General Statutes for items of tangible personal property sold by the Contractor or by any of its Affiliates in the same manner as if the Contractor and such Affiliates were engaged in the business of selling tangible personal property for use in Connecticut and had sufficient nexus under the provisions of Chapter 219 to be required to collect Connecticut use tax;
 - (2) A customer’s payment of a use tax to the Contractor or its Affiliates relieves the customer of liability for the use tax;
 - (3) The Contractor and its Affiliates shall remit all use taxes they collect from customers on or before the due date specified in the Contract, which may not be later than the last day of the month next succeeding the end of a calendar quarter or other tax collection period during which the tax was collected;
 - (4) The Contractor and its Affiliates are not liable for use tax billed by them but not paid to them by a customer; and
 - (5) Any Contractor or Affiliate who fails to remit use taxes collected on behalf of its customers by the due date specified in the Contract shall be subject to the interest and penalties provided for persons required to collect sales tax under chapter 219 of the general statutes.
- (b) For purposes of this section of the Contract, the word “Affiliate” means any person, as defined in section 12-1 of the general statutes, that controls, is controlled by, or is under common control with another person. A person controls another person if the person owns, directly or indirectly, more than ten per cent of the voting securities of the other person. The word “voting security” means a security that confers upon the holder the right to vote for the election of members of the board of directors or similar governing body of the business, or that is convertible into, or entitles the holder to receive, upon its exercise, a security that confers such a right to vote. “Voting security” includes a general partnership interest.
- (c) The Contractor represents and warrants that each of its Affiliates has vested in the Contractor plenary authority to so bind the Affiliates in any agreement with the State of Connecticut. The Contractor on its own behalf and on behalf of its Affiliates shall also provide, no later than 30 days after receiving a request by the State’s contracting authority, such information as the State may require to ensure, in the State’s sole determination, compliance with the provisions of Chapter 219 of the Connecticut General Statutes, including, but not limited to, §12-411b.

21. Bid Rigging and/or Fraud – Notice to Contractor

The Connecticut Department of Transportation is cooperating with the U.S. Department of Transportation and the Justice Department in their investigation into highway construction contract bid rigging and/or fraud.

A toll-free “HOT LINE” telephone number 800-424-9071 has been established to receive information from contractors, subcontractors, manufacturers, suppliers or anyone with knowledge of bid rigging and/or fraud, either past or current. The “HOT LINE” telephone number will be available during

normal working hours (8:00 am – 5:00 pm EST). Information will be treated confidentially and anonymity respected.

22. Consulting Agreement Affidavit

The Contractor shall comply with Connecticut General Statutes Section 4a-81(a) and 4a-81(b), as revised. Pursuant to Public Act 11-229, after the initial submission of the form, if there is a change in the information contained in the form, a contractor shall submit the updated form, as applicable, either (i) not later than thirty (30) days after the effective date of such change or (ii) prior to execution of any new contract, whichever is earlier.

The Affidavit/Form may be submitted in written format or electronic format through the Department of Administrative Services (DAS) website.

23. Cargo Preference Act Requirements (46 CFR 381.7(a)-(b)) – Use of United States Flag Vessels

The Contractor agrees to comply with the following:

(a) Agreement Clauses.

- (1) Pursuant to Pub. L. 664 ([43 U.S.C. 1241\(b\)](#)) at least 50 percent of any equipment, materials or commodities procured, contracted for or otherwise obtained with funds granted, guaranteed, loaned, or advanced by the U.S. Government under this agreement, and which may be transported by ocean vessel, shall be transported on privately owned United States-flag commercial vessels, if available.
- (2) Within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, ‘on-board’ commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (a)(1) of this section shall be furnished to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

(b) Contractor and Subcontractor Clauses. The contractor agrees—

- (1) To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.
- (2) To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, ‘on-board’ commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b) (1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.
- (3) To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract.

EXHIBIT A

FHWA-1273 -- Revised May 1, 2012

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26, and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

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

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for

employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 “Contract provisions and related matters” with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same

prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the “Statement of Compliance” required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise

employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be

performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term “perform work with its own organization” refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;
- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.
2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).
3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers to any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and

1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

EXHIBIT B

**TITLE VI CONTRACTOR ASSURANCES
APPENDIX A**

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 (hereinafter includes consultants) will comply with the Regulations relative to Nondiscrimination in Federally-assisted programs of the United States Department of Transportation Federal Highway Administration and Federal Transit Administration, as they may be amended from time to time, 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, will not discriminate on the grounds of race, color, national origin, sex, age, disability, income or Limited English Proficiency in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In all solicitations, either by 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 will be notified by the contractor of the contractor's obligations under this contract and Acts and the Regulations relative to Non-discrimination on the grounds of race, color, or national origin.

4. **Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the Federal Highway Administration or Federal Transit Administration to be pertinent to ascertain compliance with such Acts, Regulations, 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 will so certify to the Recipient or the Federal Highway Administration or the Federal Transit Administration, as appropriate, and will set forth what efforts it has made to obtain the information.

5. **Sanctions for Non-compliance:** In the event of the contractor's non-compliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it or the Federal Highway Administration or the Federal Transit Administration may determine to be appropriate, including, but not limited to:

- a. withholding contract payments to the contractor under the contract until the contractor complies; and/or
- b. cancelling, terminating, or suspending a contract, in whole or in part.

6. **Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as the Recipient or the Federal Highway Administration or the Federal Transit Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with, litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

TITLE VI CONTRACTOR ASSURANCES APPENDIX E

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees to comply with the following nondiscrimination statutes and authorities; including but not limited to:

- Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. § 2000d et seq.), (prohibits discrimination on the basis of race, color, national origin), as implemented by 49 C.F.R. § 21.1 et seq. and 49 C.F.R. part 303;
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601) (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973 (23 U.S.C. § 324 et seq.) (prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. § 794 et seq.) (prohibits discrimination on the basis of disability); and 49 C.F.R. part 27;
- The Age Discrimination Act of 1975, as amended (42 U.S.C. § 6101 et seq.) (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982 (Pub. L. 97-248 (1982)), as amended (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987 (102 Stat. 28) ("*... which restore[d] the broad scope of coverage and to clarify the application of Title IX of the Education Amendments of 1972, section 504 of the Rehabilitation Act of 1973, the Age Discrimination Act of 1975, and Title VI of the Civil Rights Act of 1964.*");
- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 --12189), as implemented by Department of Justice regulations at 28 C.F.R. parts 35 and 36, and Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures non-discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;

- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. § 1681 et seq).

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 of 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 Contractors 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 work-force, 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%
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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
Killiglny	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 (1)(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 (f) (2) 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/sec. 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 fundraising 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, serving on the committee that is hosting a fundraising event, introducing the candidate or making other public remarks at a fundraising event, being honored or otherwise recognized at a fundraising event, or bundling contributions, (C) serving as chairperson, treasurer or deputy treasurer of any such committee, or (D) establishing a political committee for the sole purpose of soliciting or receiving contributions for any committee. Solicit does not include: (i) making a contribution that is otherwise permitted by Chapter 155 of the Connecticut General Statutes; (ii) informing any person of a position taken by a candidate for public office or a public official, (iii) notifying the person of any activities of, or contact information for, any candidate for public office; or (iv) serving as a member in any party committee or as an officer of such committee that is not otherwise prohibited in this section.

“Subcontractor” means any person, business entity or nonprofit organization that contracts to perform part or all of the obligations of a state contractor’s state contract. Such person, business entity or nonprofit organization shall be deemed to be a subcontractor until December thirty first of the year in which the subcontract terminates. “Subcontractor” does not include (i) a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or (ii) an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person’s capacity as a state or quasi-public agency employee.

“Principal of a subcontractor” means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a subcontractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization, (ii) an individual who is employed by a subcontractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a subcontractor, which is not a business entity, or if a subcontractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any subcontractor who has managerial or discretionary responsibilities with respect to a subcontract with a state contractor, (v) the spouse or a dependent child who is eighteen years of age

or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the subcontractor.

EXHIBIT F

(Federal wage rate package will be inserted here for final executed contract only. Refer to NTC – Federal Wage Determinations)

EXHIBIT G

State Wages and Other Related Information

Please refer to the Department of Labor website for the latest updates, annual adjusted wage rate increases, certified payroll forms and applicable statutes.

<http://www.ctdol.state.ct.us/wgwkstnd/prevailwage.htm>

Prevailing Wage Law Poster Language

**THIS IS A PUBLIC WORKS PROJECT Covered by the
PREVAILING WAGE LAW CT General Statutes Section 31-53**

If you have QUESTIONS regarding your wages CALL (860) 263-6790

Section 31-55 of the CT State Statutes requires every contractor or subcontractor performing work for the state to post in a prominent place the prevailing wages as determined by the Labor Commissioner.

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/wgmenu.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.

November 29, 2006

Notice

To All Mason Contractors and Interested Parties Regarding Construction Pursuant to Section 31-53 of the Connecticut General Statutes (Prevailing Wage)

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute. Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute. The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

Forklift Operator:

- **Laborers (Group 4) Mason Tenders** - operates forklift solely to assist a mason to a maximum height of nine feet only.
- **Power Equipment Operator (Group 9)** - operates forklift to assist any trade and to assist a mason to a height over nine feet.

The U.S. Labor Department conducted a survey of rates in Connecticut but it has not been published and the rate in effect remains as outlined in the above Occupational Bulletin.

Since this is a classification matter and not one of jurisdiction, effective January 1, 2007 the Connecticut Labor Department will enforce the rate on each schedule in accordance with our statutory authority.

Your cooperation in filing appropriate and accurate certified payrolls is appreciated.

**CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION**

**CONTRACTORS WAGE CERTIFICATION FORM
Construction Manager at Risk/General Contractor/Prime Contractor**

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 _____, _____.

Notary Public

Return to: Connecticut Department of Labor
Wage & Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

Rate Schedule Issued (Date): _____

Information Bulletin ***Occupational Classifications***

The Connecticut Department of Labor has the responsibility to properly determine "job classification" on prevailing wage projects covered under C.G.S. Section 31-53(d).

Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification. If unsure, the employer should seek guidelines for CTDOL.

Below are additional clarifications of specific job duties performed for certain classifications:

□ **ASBESTOS WORKERS**

Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.

□ **ASBESTOS INSULATOR**

Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.

□ **BOILERMAKERS**

Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.

□ **BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS**

Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.

□ **CARPENTERS, MILLWRIGHTS. PILEDRIVERMEN. LATHERS. RESILEINT FLOOR LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS**

Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular

furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.

□ **LABORER, CLEANING**

- The clean up of any construction debris and the general (heavy/light) cleaning, including sweeping, wash down, mopping, wiping of the construction facility and its furniture, washing, polishing, and dusting.

□ **DELIVERY PERSONNEL**

- If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages are not required. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.

- An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer or tradesman, and not a delivery personnel.

□ **ELECTRICIANS**

Install, erect, maintenance, alteration or repair of any wire, cable, conduit, etc., which generates, transforms, transmits or uses electrical energy for light, heat, power or other purposes, including the Installation or maintenance of telecommunication, LAN wiring or computer equipment, and low voltage wiring. *License required per Connecticut General Statutes: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9.

□ **ELEVATOR CONSTRUCTORS**

Install, erect, maintenance and repair of all types of elevators, escalators, dumb waiters and moving walks. *License required by Connecticut General Statutes: R-1, 2, 5, 6.

□ **FORK LIFT OPERATOR**

Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.

Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.

□ **GLAZIERS**

Glazing wood and metal sash, doors, partitions, and 2 story aluminum storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and

curtain walls is the "joint" work of glaziers and ironworkers, which require equal composite workforce.

□ **IRONWORKERS**

Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which require equal composite workforce.

□ **INSULATOR**

- Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings.

□ **LABORERS**

Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), decorative security fence (non-metal).

installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.

□ **PAINTERS**

Maintenance, preparation, cleaning, blasting (water and sand, etc.), painting or application of any protective coatings of every description on all bridges and appurtenances of highways, roadways, and railroads. Painting, decorating, hardwood finishing, paper hanging, sign writing, scenic art work and drywall hhg for any and all types of building and residential work.

□ **LEAD PAINT REMOVAL**

- Painter's Rate 1. Removal of lead paint from bridges. 2. Removal of lead paint as preparation of any surface to be repainted. 3. Where removal is on a Demolition project prior to reconstruction. • Laborer's Rate 1. Removal of lead paint from any surface NOT to be repainted. 2. Where removal is on a TOTAL Demolition project only.

□ **PLUMBERS AND PIPEFITTERS**

Installation, repair, replacement, alteration or maintenance of all plumbing, heating, cooling and piping. *License required per Connecticut General Statutes: P-1,2,6,7,8,9 J1,2,3,4 SP-1,2 S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4.

□ **POWER EQUIPMENT OPERATORS**

Operates several types of power construction equipment such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers or motor graders, etc. Repairs and maintains equipment. ***License required, crane operators only, per Connecticut General Statutes.**

□ **ROOFERS**

Covers roofs with composition shingles or sheets, wood shingles, slate or asphalt and gravel to waterproof roofs, including preparation of surface. (demolition or removal of any type of roofing and or clean-up of any and all areas where a roof is to be relaid.)

□ **SHEETMETAL WORKERS**

Fabricate, assembles, installs and repairs sheetmetal products and equipment in such areas as ventilation, air-conditioning, warm air heating, restaurant equipment, architectural sheet metal work, sheetmetal roofing, and aluminum gutters. Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, fascia, louvers, partitions, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc. The sheet metal classification also applies to the vast variety of coated metal material panels and composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal and composite lockers and shelving, kitchen equipment, and walk-in coolers. To include testing and air –balancing ancillary to installation and construction.

□ **SPRINKLER FITTERS**

Installation, alteration, maintenance and repair of fire protection sprinkler systems. ***License required per Connecticut General Statutes: F-1, 2, 3, 4.**

□ **TILE MARBLE AND TERRAZZO FINISHERS**

Assists and tends the tile setter, marble mason and terrazzo worker in the performance of their duties.

□ **TRUCK DRIVERS**

~How to pay truck drivers delivering asphalt is under REVISION~

Truck Drivers are requires to be paid prevailing wage for time spent "working" directly on the site. These drivers remain covered by the prevailing wage for any time spent transporting between the actual construction location and facilities (such as fabrication, plants, mobile factories, batch plant, borrow pits, job headquarters, tool yards, etc.) dedicated exclusively, or nearly so, to performance

of the contract or project, which are so located in proximity to the actual construction location that it is reasonable to include them. ***License required, drivers only, per Connecticut General Statutes.**

For example:

- Material men and deliverymen are not covered under prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.
- Hauling material off site is not covered provided they are not dumping it at a location outlined above.
- Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

Any questions regarding the proper classification should be directed to:

**Public Contract Compliance Unit
Wage and Workplace Standards Division
Connecticut Department of Labor
200 Folly Brook Blvd, Wethersfield, CT 06109
(860) 263-6543.**

**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.

Rev. 7/1/19

SEE BELOW FOR STATE WAGE RATES

INSERT STATE WAGES HERE

**Minimum Rates and Classifications for
Heavy/Highway Construction**

ID#: 20-14630

**Connecticut Department of Labor
Wage and Workplace Standards Division**

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: #80-131

Project Town: Middlebury

State#: #80-131

FAP#: #6080(007)

Project: Replacement of Bridge #01160 (Benson Road - Middlebury)

CLASSIFICATION	Hourly Rate	Benefits
1) Boilermaker	33.79	34% + 8.96
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	35.72	33.16
2) Carpenters, Piledrivermen	34.53	25.64
2a) Diver Tenders	34.53	25.64
3) Divers	42.99	25.64
03a) Millwrights	34.94	26.19
4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	52.25	22.55
4a) Painters: Brush and Roller	35.62	22.55
4b) Painters: Spray Only	38.62	22.55
4c) Painters: Steel Only	37.62	22.55
4d) Painters: Blast and Spray	38.62	22.55
4e) Painters: Tanks, Tower and Swing	37.62	22.55

Project: Replacement of Bridge #01160 (Benson Road - Middlebury)

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)	39.92	28.75+3% of gross wage
6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection	36.67	37.62 + 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)	44.63	32.95
----LABORERS-----		
8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	31.0	22.15
9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen	31.25	22.15
10) Group 3: Pipelayers	31.5	22.15
11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block paver, curb setter and forklift operators	31.5	22.15
12) Group 5: Toxic waste removal (non-mechanical systems)	33.0	22.15
13) Group 6: Blasters	32.75	22.15
Group 7: Asbestos/lead removal, non-mechanical systems (does not include leaded joint pipe)	32.0	22.15
Group 8: Traffic control signalmen	18.0	22.15
Group 9: Hydraulic Drills	29.3	18.90
----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.----		
13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	33.23	22.15 + a
13b) Brakemen, Trackmen	32.26	22.15 + a
----CLEANING, CONCRETE AND CAULKING TUNNEL----		

As of: August 11, 2020

Project: Replacement of Bridge #01160 (Benson Road - Middlebury)

14) Concrete Workers, Form Movers, and Strippers	32.26	22.15 + a
15) Form Erectors	32.59	22.15 + a
----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----		
16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	32.26	22.15 + a
17) Laborers Topside, Cage Tenders, Bellman	32.15	22.15 + a
18) Miners	33.23	22.15 + a
----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ----		
18a) Blaster	39.72	22.15 + a
19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	39.52	22.15 + a
20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	37.54	22.15 + a
21) Mucking Machine Operator	40.31	22.15 + a
----TRUCK DRIVERS----(*see note below)		
Two axle trucks	29.86	25.79 + a
Three axle trucks; two axle ready mix	29.97	25.79 + a
Three axle ready mix	30.03	25.79 + a
Four axle trucks, heavy duty trailer (up to 40 tons)	30.08	25.79 + a
Four axle ready-mix	30.13	25.79 + a
Heavy duty trailer (40 tons and over)	30.35	25.79 + a

As of: August 11, 2020

Project: Replacement of Bridge #01160 (Benson Road - Middlebury)

Specialized earth moving equipment other than conventional type on- 30.13 25.79 + a
the road trucks and semi-trailer (including Euclids)

----POWER EQUIPMENT OPERATORS----

Group 1: Crane handling or erecting structural steel or stone, 42.45 25.30 + a
hoisting engineer (2 drums or over), front end loader (7 cubic yards or
over), Work Boat 26 ft. & Over, Tunnel Boring Machines. (Trade
License Required)

Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 42.11 25.30 + a
cubic yards; Piledriver (\$3.00 premium when operator controls
hammer); Bauer Drill/Caisson. (Trade License Required)

Group 3: Excavator/Backhoe under 2 cubic yards; Cranes (under 100 41.32 25.30 + a
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)

Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing 40.91 25.30 + a
Machine; CMI Machine or Similar; Koehring Loader (Skooper)

Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt 40.28 25.30 + a
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

Group 5 continued: Side Boom; Combination Hoe and Loader; 40.28 25.30 + a
Directional Driller.

Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough 39.95 25.30 + a
grade dozer).

Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); 39.59 25.30 + a
Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder;
Milling Machine (24

Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier 39.17 25.30 + a
Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.;
Transfer Machine.

Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader 38.71 25.30 + a
regardless of attachments (Bobcat or Similar); Fork Lift, Power
Chipper; Landscape Equipment (including hydroseeder).

Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, 36.54 25.30 + a
etc.

Group 11: Conveyor, Earth Roller; Power Pavement Breaker 36.54 25.30 + a
(whiphammer), Robot Demolition Equipment.

Group 12: Wellpoint Operator. 36.48 25.30 + a

As of: August 11, 2020

Project: Replacement of Bridge #01160 (Benson Road - Middlebury)

Group 13: Compressor Battery Operator.	35.86	25.30 + a
Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	34.66	25.30 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	34.23	25.30 + a
Group 16: Maintenance Engineer/Oiler	33.54	25.30 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	38.11	25.30 + a
Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	35.53	25.30 + a
**NOTE: SEE BELOW		
----LINE CONSTRUCTION----(Railroad Construction and Maintenance)---		
-		
20) Lineman, Cable Splicer, Technician	48.19	6.5% + 22.00
21) Heavy Equipment Operator	42.26	6.5% + 19.88
22) Equipment Operator, Tractor Trailer Driver, Material Men	40.96	6.5% + 19.21
23) Driver Groundmen	26.5	6.5% + 9.00
23a) Truck Driver	40.96	6.5% + 17.76
----LINE CONSTRUCTION----		
24) Driver Groundmen	30.92	6.5% + 9.70
25) Groundmen	22.67	6.5% + 6.20
26) Heavy Equipment Operators	37.1	6.5% + 10.70
27) Linemen, Cable Splicers, Dynamite Men	41.22	6.5% + 12.20

As of: August 11, 2020

Project: Replacement of Bridge #01160 (Benson Road - Middlebury)

28) Material Men, Tractor Trailer Drivers, Equipment Operators

35.04

6.5% + 10.45

As of: August 11, 2020

Project: Replacement of Bridge #01160 (Benson Road - Middlebury)

Welders: Rate for craft to which welding is incidental.

*Note: Hazardous waste removal work receives additional \$1.25 per hour for truck drivers.

**Note: Hazardous waste premium \$3.00 per hour over classified rate

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra \$4.00 premium in addition to the hourly wage rate and benefit contributions:

- 1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)**
- 2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson**
- 3) Cranes (under 100 ton rated capacity)**

Crane with 150 ft. boom (including jib) - \$1.50 extra

Crane with 200 ft. boom (including jib) - \$2.50 extra

Crane with 250 ft. boom (including jib) - \$5.00 extra

Crane with 300 ft. boom (including jib) - \$7.00 extra

Crane with 400 ft. boom (including jib) - \$10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyman instructing and supervising the work of each apprentice in a specific trade.

--Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing

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. 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.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

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.

As of: August 11, 2020

Project: Replacement of Bridge #01160 (Benson Road - Middlebury)

~~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: August 11, 2020

**Minimum Rates and Classifications for
Heavy/Highway Construction**

ID#: 20-14642

**Connecticut Department of Labor
Wage and Workplace Standards Division**

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: #130-184

Project Town: Southbury

State#: #130-184

FAP#: #6130(012)

Project: Replacement of Bridge #01157 (Bucks Hill Road - Southbury)

CLASSIFICATION	Hourly Rate	Benefits
1) Boilermaker	33.79	34% + 8.96
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	35.72	33.16
2) Carpenters, Piledrivermen	34.53	25.64
2a) Diver Tenders	34.53	25.64
3) Divers	42.99	25.64
03a) Millwrights	34.94	26.19
4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	52.25	22.55
4a) Painters: Brush and Roller	35.62	22.55
4b) Painters: Spray Only	38.62	22.55
4c) Painters: Steel Only	37.62	22.55
4d) Painters: Blast and Spray	38.62	22.55
4e) Painters: Tanks, Tower and Swing	37.62	22.55

Project: Replacement of Bridge #01157 (Bucks Hill Road - Southbury)

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)	39.92	28.75+3% of gross wage
6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection	36.67	37.62 + 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)	44.63	32.95
----LABORERS-----		
8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	31.0	22.15
9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen	31.25	22.15
10) Group 3: Pipelayers	31.5	22.15
11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block paver, curb setter and forklift operators	31.5	22.15
12) Group 5: Toxic waste removal (non-mechanical systems)	33.0	22.15
13) Group 6: Blasters	32.75	22.15
Group 7: Asbestos/lead removal, non-mechanical systems (does not include leaded joint pipe)	32.0	22.15
Group 8: Traffic control signalmen	18.0	22.15
Group 9: Hydraulic Drills	29.3	18.90
----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.----		
13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	33.23	22.15 + a
13b) Brakemen, Trackmen	32.26	22.15 + a
----CLEANING, CONCRETE AND CAULKING TUNNEL----		

As of: August 11, 2020

Project: Replacement of Bridge #01157 (Bucks Hill Road - Southbury)

14) Concrete Workers, Form Movers, and Strippers	32.26	22.15 + a
15) Form Erectors	32.59	22.15 + a
----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----		
16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	32.26	22.15 + a
17) Laborers Topside, Cage Tenders, Bellman	32.15	22.15 + a
18) Miners	33.23	22.15 + a
----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ----		
18a) Blaster	39.72	22.15 + a
19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	39.52	22.15 + a
20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	37.54	22.15 + a
21) Mucking Machine Operator	40.31	22.15 + a
----TRUCK DRIVERS----(*see note below)		
Two axle trucks	29.86	25.79 + a
Three axle trucks; two axle ready mix	29.97	25.79 + a
Three axle ready mix	30.03	25.79 + a
Four axle trucks, heavy duty trailer (up to 40 tons)	30.08	25.79 + a
Four axle ready-mix	30.13	25.79 + a
Heavy duty trailer (40 tons and over)	30.35	25.79 + a

As of: August 11, 2020

Project: Replacement of Bridge #01157 (Bucks Hill Road - Southbury)

Specialized earth moving equipment other than conventional type on- 30.13 25.79 + a
the road trucks and semi-trailer (including Euclids)

----POWER EQUIPMENT OPERATORS----

Group 1: Crane handling or erecting structural steel or stone, 42.45 25.30 + a
hoisting engineer (2 drums or over), front end loader (7 cubic yards or
over), Work Boat 26 ft. & Over, Tunnel Boring Machines. (Trade
License Required)

Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 42.11 25.30 + a
cubic yards; Piledriver (\$3.00 premium when operator controls
hammer); Bauer Drill/Caisson. (Trade License Required)

Group 3: Excavator/Backhoe under 2 cubic yards; Cranes (under 100 41.32 25.30 + a
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)

Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing 40.91 25.30 + a
Machine; CMI Machine or Similar; Koehring Loader (Skooper)

Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt 40.28 25.30 + a
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

Group 5 continued: Side Boom; Combination Hoe and Loader; 40.28 25.30 + a
Directional Driller.

Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough 39.95 25.30 + a
grade dozer).

Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); 39.59 25.30 + a
Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder;
Milling Machine (24

Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier 39.17 25.30 + a
Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.;
Transfer Machine.

Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader 38.71 25.30 + a
regardless of attachments (Bobcat or Similar); Fork Lift, Power
Chipper; Landscape Equipment (including hydroseeder).

Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, 36.54 25.30 + a
etc.

Group 11: Conveyor, Earth Roller; Power Pavement Breaker 36.54 25.30 + a
(whiphammer), Robot Demolition Equipment.

Group 12: Wellpoint Operator. 36.48 25.30 + a

Project: Replacement of Bridge #01157 (Bucks Hill Road - Southbury)

Group 13: Compressor Battery Operator.	35.86	25.30 + a
Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	34.66	25.30 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	34.23	25.30 + a
Group 16: Maintenance Engineer/Oiler	33.54	25.30 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	38.11	25.30 + a
Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	35.53	25.30 + a
**NOTE: SEE BELOW		
----LINE CONSTRUCTION----(Railroad Construction and Maintenance)---		
-		
20) Lineman, Cable Splicer, Technician	48.19	6.5% + 22.00
21) Heavy Equipment Operator	42.26	6.5% + 19.88
22) Equipment Operator, Tractor Trailer Driver, Material Men	40.96	6.5% + 19.21
23) Driver Groundmen	26.5	6.5% + 9.00
23a) Truck Driver	40.96	6.5% + 17.76
----LINE CONSTRUCTION----		
24) Driver Groundmen	30.92	6.5% + 9.70
25) Groundmen	22.67	6.5% + 6.20
26) Heavy Equipment Operators	37.1	6.5% + 10.70
27) Linemen, Cable Splicers, Dynamite Men	41.22	6.5% + 12.20

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28) Material Men, Tractor Trailer Drivers, Equipment Operators

35.04

6.5% + 10.45

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Welders: Rate for craft to which welding is incidental.

*Note: Hazardous waste removal work receives additional \$1.25 per hour for truck drivers.

**Note: Hazardous waste premium \$3.00 per hour over classified rate

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra \$4.00 premium in addition to the hourly wage rate and benefit contributions:

- 1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)**
- 2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson**
- 3) Cranes (under 100 ton rated capacity)**

Crane with 150 ft. boom (including jib) - \$1.50 extra

Crane with 200 ft. boom (including jib) - \$2.50 extra

Crane with 250 ft. boom (including jib) - \$5.00 extra

Crane with 300 ft. boom (including jib) - \$7.00 extra

Crane with 400 ft. boom (including jib) - \$10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyman instructing and supervising the work of each apprentice in a specific trade.

--Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing

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. 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.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

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.

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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 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.

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