

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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05-14-2025

DECEMBER 17, 2025
FEDERAL AID PROJECT NO. 0044(166)
STATE PROJECT NO. 0115-0122

REPLACEMENT OF RETAINING WALL ALONG ROUTE 44

Town of Putnam

The State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges, Facilities and Incidental Construction, Form 819, dated 2024, as revised by the Supplemental Specifications dated January 2025 (otherwise referred to collectively as "ConnDOT Form 819") is hereby made part of this contract, as modified by the Special Provisions contained herein. 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 Special Provisions relate in particular to the replacement of the retaining wall along Route 44 in the Town of Putnam.

CONTRACT TIME AND LIQUIDATED DAMAGES

Four hundred and forty six (446) calendar days will be allowed for completion of the work on this Contract and the liquidated damages charge to apply will be Two Thousand One Hundred Dollars (\$2,100) per calendar day.

NOTICE TO CONTRACTOR - PRE-BID QUESTIONS AND ANSWERS

Questions pertaining to DOT advertised construction projects must be presented through the CTDOT Pre-Bid Q and A Website. The Department cannot guarantee that all questions will be answered prior to the bid date. **PLEASE NOTE - at 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 – CDMS 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 Construction Document Management System (CDMS). The CDMS that the Department is currently using is COMPASS.

Contractor submittals including Shop Drawings, Working Drawings, Product Data, RFIs, and RFCs shall be generated and delivered by the Contractor in accordance with the Department's [Contractor's User Manual](#). The administering District office will inform the Contractor of other deliverables required to be similarly submitted.

Access credentials 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 Contractor's User Manual.

NOTICE TO CONTRACTOR – MANDATED USE OF AASHTOWARE PROJECT CONSTRUCTION MANAGEMENT SOFTWARE (CONSTRUCTION)

The Contractor shall use *AASHTOWare Project*® software as outlined in the specifications noted below. This will require that the Contractor and all subcontractor(s) designate and dedicate staff within 10 days after the execution of the Contract or approval to sublet as appropriate. It will also require the Contractor and all subcontractors to provide internet access, computing devices suitable for this work, training, and other related work as outlined in the specifications noted below.

All costs for these requirements shall be included in the general cost of the work.

The following special provisions are pertinent to, and detail the requirements for, this work:

SECTION 1.05 – CONTROL OF THE WORK

Article 1.05.12 – Payrolls

This Article outlines the requirements for submission of payrolls.

Article 1.05.25 –Use of AASHTOWare Project® Software

This Article outlines the overall requirements for the use of the AASHTOWare Project® Software.

SECTION 1.08 – PROSECUTION AND PROGRESS

Article 1.08.01—Transfer of Work or Contract

This Article outlines the requirements for subcontractor payment and payment verifications.

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 – 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 one of the MicroStation versions, consisting of native and converted formats:

MicroStation V8i (InRoads)

- 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)

MicroStation CONNECT (OpenRoads)

- Native Format
 - Bentley CONNECT MicroStation CAD files (dgn – contains CAD graphics, OpenRoads alignments and terrain models)
- Converted Format (for use in GPS/RTS Site equipment)
 - AutoCAD CAD files (dxf)
 - Alignment files (xml – exported from CONNECT MicroStation CAD file)
 - Surface Models (xml – exported from CONNECT MicroStation CAD file)

For a complete list of EED files, see the EED file manifest (PDF) located in the EED_0115-0122.zip file (0115-0122 is the project number) which is posted with the contract PS&Es on the State Contracting portal. The EED zip file can also be found in the project COMPASS page in the *Contract Documents/100_Contract_Plans (PDF)* folder.

NOTICE TO CONTRACTOR – EMERGENCY SERVICES COORDINATION

Given the close proximity of the project site to Day Kimball Hospital, the Contractor shall coordinate with Town of Putnam Emergency Services, Day Kimball Hospital, and the ambulance companies which provide service to the hospital to provide advanced notification of the construction activities on Route 44 which will affect emergency service routes to Day Kimball Hospital. The Contractor shall notify the following contacts a minimum of 30 days prior to the implementation of alternating one-way traffic patterns and/or closure of Route 44. The Contractor shall also notify the following contacts when the Roadway will be reopened.

Putnam Emergency Management:

Scott Belleville, Emerg. Mgmt. Director, Fire Marshall
200 School Street
Putnam, Connecticut 06260
Phone: (860) 963-6800, Ext. 112

Putnam Police:

Chris Ferace, Police Chief
189 Church Street
Putnam, CT 06260
Phone: (860) 928-6565

Day Kimball Hospital:

Robert Viens
Executive Director, Government Affairs
320 Pomfret Street
Putnam, CT 06260
Email: RViens@DayKimball.org

In addition to the above, the following ambulance companies transport to Day Kimball Hospital:

Agency	Administrator	Administrator Contact	Dispatch Center	Dispatch Center Contact
<u>Connecticut-Based</u>				
Putnam EMS	Tammy Szpyrka	(860) 377-5783	QVEC	(860) 774-7555
Woodstock EMS	Jose Ramos	(860) 912-0382	QVEC	(860) 774-7555
KB Ambulance	Stephen Varga	(860) 334-5954	QVEC	(860) 774-7555
Mortlake Ambulance	Raymond Wood	(860) 933-0677	QVEC	(860) 774-7555
American Legion Ambulance Fund	William Jeffs	(860) 230-8985	QVEC	(860) 774-7555
Canterbury Ambulance			QVEC	(860) 774-7555
American Ambulance (Griswold)			QVEC	(860) 774-7555
American Ambulance			AASI	(860) 886-1463
<u>Massachusetts-Based</u>				
Webster EMS	Chief Gary Milliard	(508) 943-2218	SWCCC	(508) 943-1212
Dudley Fire	Chief Dean Kochanowski	(508) 949-8040	SWCCC	(508) 943-1212
Douglas Fire	Chief John Furno	(508) 476-3333	Douglas PD	(508) 476-3333
Southbridge Fire	Chief Paul Normandin	(508) 764-5430	Southbridge PD	(508) 764-5420
Sturbridge Fire	Chief John Grasso	(508) 764-5430	Sturbridge PD	(508) 764-5420
<u>Rhode Island-Based</u>				
Glocester Ambulance			Glocester PD	(401) 568-2533
Foster Ambulance			Foster PD	(401) 397-3317
Burriville Ambulance			Burriville PD	(401) 568-6255
Harrisville Ambulance			Burriville PD	(401) 568-6255
Pascoag Ambulance			Burriville PD	(401) 568-6255
Oakland/Mapleville Ambulance			Burriville PD	(401) 568-6255

NOTICE TO CONTRACTOR - RIGHTS OF WAY RESTRICTIONS

The Contractor is hereby advised that at the time of advertising for bids not all the property may be acquired by the State. A complete listing of the affected properties and the anticipated dates that they will become available is hereinafter provided. The Contractor is further advised that limitations, as enumerated 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, schools, 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.

The following is a complete listing of properties which have not been acquired, vacated as of 01/07/2026. The anticipated dates for acquisition of these properties 05/01/2026.

Type	Name	Location
Partial Take / Const. Easement	Phaythoun T. Southavong	Between Stations 19+67 and 20+35 Right of Baseline.
Partial Take / Easement / Const. Easement	Historic Cargill Falls Mill, LLC	Between Stations 16+90 and 26+21 Right of Baseline
Const. Easement	PSA Education, Inc.	Between Stations 20+30 and 21+50 Left of Baseline
Const. Easement	IGMAK, LLC	Between Stations 21+45 and 22+66 Left of Baseline
Const. Easement	Raymond Champagne et al	Between Stations 22+66 and 23+10 Left of Baseline
Const. Easement	Sidnei Silveira	Between Stations 23+10 and 23+65 Left of Baseline
Const. Easement	Pomfret Place Association, Inc.	Between Stations 23+65 and 24+23 Left of Baseline
Const. Easement	Sidnei Silveira	Between Stations 24+23 and 24+83 Left of baseline
Const. Easement	Tina Kerouack	Between Stations 24+83 and 25+38 Left of baseline.

NOTICE TO CONTRACTOR – UTILITY GENERATED SCHEDULE

The attached project specific utility work schedules were 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 Article 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 Article 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 Article 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.

The following is a summary of the contacts for the affected utilities:

Atlantic Broadband (CT), LLC

(dba Breezelne)

Mr. Richard DeCava, Supervisor of Construction
221 Norwich Road
Plainfield, CT 06374
Phone: 860-377-8770
Email: RDeCava@Breezelne.com

The Connecticut Light & Power Company (dba Eversource Energy – Electric Distribution)

Mr. Mark Bonjuklian, Manager – Distribution Projects and Programs
9 Tindall Avenue
Norwalk, CT 06851
Phone: 860-845-3456
Email: mark.bonjuklian@eversource.com

Project Contact: Richard Arremony
Email: richard.arremony@eversource.com

Crown Castle Fiber, LLC

Mr. Mark Bonanno, Manager – Network Construction
1800 West Park Dr., Suite 250
Westborough, MA 01581
Phone: 617-828-1415
Email: mark.bonanno@crowncastle.com

Project Contact: Terence Shea

Email: terence.shea@crowncastle.com

Southern New England Telephone Company (dba Frontier Communications of Connecticut)

Ms. Lynne DeLucia, Manager – Engineering & Construction
1441 North Colony Road
Meriden, CT 06450-4101
Phone: 203-238-5000
Email: lynne.m.delucia@ftr.com

Project Contact: John Plikus

Phone: 860-455-6030
Email: john.m.plikus@ftr.com

Town of Putnam Water Pollution Control Authority

Mr. Brian Lynch, Superintendent
126 Church Street
Putnam, CT 06260
Phone: 860-963-6800
Email: brian.lynch@putnamct.us

Yankee Gas Service Company (dba Eversource Energy – Gas)

Mr. Kenneth Cook, Lead Engineer – Gas Project Engineering
107 Selden Street, Mail Stop NUE2
Berlin, CT 06037
Phone: 860-978-5465
Email: Kenneth.cookiii@eversource.com

Project Contact: Joe Meredith

Phone: 860-218-8822
Email: joseph.meredith@eversource.com

Mr. Chap Hanley
VP and General Manager
Atlantic Broadband (CT), LLC
61 Myrock Avenue
Waterford, Connecticut 06385
Project contact: Bill Danna
(860) 625-5725
w.danna@breezelinc.com

Mr. Mark Bonanno
Manager – Network Construction
Crown Castle Fiber, LLC fka
Light Tower Fiber Networks I, LLC
1800 West Park Drive, Suite 250
Westborough, Massachusetts 01581
Project contact: Woody Savage
(860) 594-2862
elwyn.savage@crowncastle.com

Ms. Lynne DeLucia
Manager – Engineering & Construction
The Southern New England Telephone Co.
(d.b.a. Frontier Communications of Conn.)
1441 North Colony Road
Meriden, Connecticut 06450-4101
Project contact: John Plikus
(860) 455-6030
John.m.plikus@ftr.com

Mr. Kenneth Ruel
Area Supervisor
Algonquin Gas Transmission Co.
(d.b.a. Enbridge)
252 Shunpike Road
Cromwell, Connecticut 06416

Ms. Robin Lyons
Lead Engineer–Distribution Proj. and Programs
Connecticut Light and Power Co.
(d.b.a. Eversource Energy–Electric Distribution)
107 Selden Street
Berlin, Connecticut 06037

Mr. Brian Lynch, Superintendent
Town of Putnam
Water Pollution Control Authority
126 Church Street
Putnam, Connecticut 06260

Mr. Kenneth Cook
Lead Engineer, Gas Project Engineering
Yankee Gas Services Company
(d.b.a. Eversource Energy – Gas Distribution)
107 Selden Street, Mail Stop NUE2
Berlin, Connecticut 06037
(860) 978-5465
Project contact: Joseph Merideth
(860) 218-8822
Joseph.meredith@eversource.com

UTILITY WORK SCHEDULE

CTDOT Project Number:	115-122	Town:	PUTNAM
Project Description:	RECONSTRUCTION OF ROUTE 44 WEST OF CHURCH STREET		
CTDOT Utilities Engineer:	Shelley Plude		
Phone:	203-271-1773	Email:	splude@slrconsulting.com

Utility Company:	FRONTIER COMMUNICATIONS
Prepared By:	JOHN PLIKUS
Phone:	860.455.6030

Scope of Work

The following is a description of all utility work planned to be completed in conjunction with the CTDOT project. The narrative describes all work to be carried out by the utility or its contractor, including temporary and permanent work required by the project as well as any additional utility infrastructure work the utility intends on performing within the project limits during the construction of the project.

TEMPORARY RELOCATION

Loc.6 P1135, Sta.20+30', Place 1-45ft Class 2 Pole, 1-ANC & 1-10M DWN Guy.
 Loc.8 P1134, Sta.22+90', Place 1-45ft Class 2 Pole, Install 1-ANC & 1-10M DWN Guy.
 Loc.9 P1133, Sta.23+10', Place 1-45ft Class 2 Pole.
 Loc.10 P1132, Sta.23+65', Place 1-45ft Class 2 Pole.
 Loc.11 P1131, Sta.24+20', Place 1-45ft Class 2 Pole.
 Loc.1 MH37, Sta.25+65', Place & Splice Copper Cable Stubs.
 Loc.11 MH57to P1135, Sta.21+15', Place & Splice 200ft of ANMW-400.
 Loc.8 P1134S, Sta.21+45', Remove 1-35ft Class 4 Pole, 1-ANC & 1-10M DWN Guy. Loc.9
 P1135, Sta.20+30', Remove 1-45ft Class 2, Install 1-ANC & 1-10M DWN Guy.
 Loc.10 P1134, Sta.21+45', Remove 1-45ft Class 2.
 Loc.9 P1133, Sta.22+95', Remove 1-45ft Class 2 Pole & 1-ANC & 1-10M DWN Guy.
 Loc.9 P1131, Sta.24+40', Remove 1-45ft Class 2, Install 1-ANC & 1-10M DWN Guy.
 Loc.1 P1482 to Loc.6 P1135, Cut Out & Remove All Aerial Copper Cable.

Special Considerations and Constraints

The following describes the limiting factors that must be planned for in the scheduling and performance of the utility work. For example, restrictions on cut-overs, outages, limitations on customer service interruptions (e.g. nights, weekends, holidays), seasonal and environmental shutdown periods, long lead material procurements, etc..

1. Prior to any temporary/permanent relocation work CT. Dept. of Transportation to secure Temporary ROW as submitted for guying of temporary relocated poles in order to proceed.
2. Frontier Communications will schedule its construction as it's workload permits, the DOT will schedule other utilities attached to the pole line (Power Co., CATV, etc... and all State or Municipal owned cables and fixtures). This UWS has been completed using only Semi-Final Design Plans. No mark out of edge of road, or construction limits provided and may be subject to change.

UTILITY WORK SCHEDULE

CTDOT Project Number:	115-122	Town:	PUTNAM
Project Description:	RECONSTRUCTION OF ROUTE 44 WEST OF CHURCH STREET		
CTDOT Utilities Engineer:	Shelley Plude		
Phone:	203-271-1773	Email:	splude@slrconsulting.com

Utility Company:	FRONTIER COMMUNICATIONS
Prepared By:	JOHN PLIKUS
Phone:	860.455.6030

Scope of Work

The following is a description of all utility work planned to be completed in conjunction with the CTDOT project. The narrative describes all work to be carried out by the utility or its contractor, including temporary and permanent work required by the project as well as any additional utility infrastructure work the utility intends on performing within the project limits during the construction of the project.

PERMANENT RELOCATION

Loc.8 P1134s, Sta.21+95', Place 1-35ft Class 2 Pole, Install 1-ANC & 1-10M DWN Guy.
 Loc.10 P1134, Sta.21+95', Place 1-45ft Class 2 Pole, Install 1-ANC & 1-10M DWN Guy.
 Loc.9 P1133, Sta.22+95', Place 1-45ft Class 2 Pole.
 Loc.10 P1132, Sta.23+65', Place 1-45ft Class 2 Pole.
 Loc.9 P1131, Sta.24+40', Place 1-45ft Class 2 Pole, Install 1-ANC & 1-10M DWN Guy.
 Loc.6 P1134S, Sta.22+90', Remove 1-45ft Class 2 Pole, 1-ANC & 1-10M DWN Guy.
 Loc.8 P1134, Sta.22+90', Remove 1-45ft Class 2 Pole.
 Loc.9 P1133, Sta.23+10', Remove 1-45ft Class 2 Pole.
 Loc.10 P1132, Sta.23+65', Remove 1-45ft Class 2 Pole.
 Loc.11 P1131, Sta.24+20', Remove 1-45ft Class 2 Pole.

Special Considerations and Constraints

The following describes the limiting factors that must be planned for in the scheduling and performance of the utility work. For example, restrictions on cut-overs, outages, limitations on customer service interruptions (e.g. nights, weekends, holidays), seasonal and environmental shutdown periods, long lead material procurements, etc..

1. Prior to any temporary/permanent relocation work CT. Dept. of Transportation to secure Temporary ROW as submitted for guying of temporary relocated poles in order to proceed.
2. Frontier Communications will schedule its construction as it's workload permits, the DOT will schedule other utilities attached to the pole line (Power Co., CATV, etc... and all State or Municipal owned cables and fixtures). This UWS has been completed using only Semi-Final Design Plans. No mark out of edge of road, or construction limits provided and may be subject to change.

UTILITY WORK SCHEDULE

CTDOT Project Number: CTDOT # 115-122

Utility Company: Frontier Communications

Prepared By: John Plikus

Total Calendar Days: 18

Schedule

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

Location (Station to Station)	Description of Utility Work Activity	Predecessor Activity	Duration (calendar days)
	TEMPORARY RELOCATION		
Sta.20 to Sta.26	Place 5-45ft Class 2, with Required Guying.	Mark Out of EOR, ROW and Tree Clearing Construction of Shoulder Completed.	3
Sta.25+70	Place & Splice Copper Cable Stubs in Manhole	All Other Utilities work complete.	2
Sta.21+45	Place 200FT of Conduit from MH57 to Pole No.1135	All Other Utilities work complete.	5
Sta.21+45	Place & Splice 200FT of ANMW-400 from MH57 to Pole No.1135	All Other Utilities work complete.	2
Sta.20 to Sta.26	Shift Aerial Fiber to the Temporary Pole Line.	All Other Utilities work complete.	2
Sta.20 to Sta.26	Remove Existing Aerial Copper Cables, Poles and Guying.	All Other Utilities work complete.	4

UTILITY WORK SCHEDULE

CTDOT Project Number: CTDOT # 115-122

Utility Company: Frontier Communications

Prepared By: John Plikus

Total Calendar Days: 7

Schedule

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

Location (Station to Station)	Description of Utility Work Activity	Predecessor Activity	Duration (calendar days)
	PERMANENT RELOCATION		
Sta.20 to Sta.26	Place 5-45ft Class 2, with Required Guying.	Mark Out of EOR, ROW and Tree Clearing Construction of Shoulder Completed.	3
Sta.20 to Sta.26	Shift Aerial Fiber to the Permanent Pole Line.	All Other Utilities work complete.	2
Sta.20 to Sta.26	Remove Temporary Poles and Guying.	All Other Utilities work complete.	2

UTILITY WORK SCHEDULE Rev 3/2015			
CTDOT Project Number:	0115-0122	Town:	PUTNAM
Project Description: REPLACEMENT OF RETAINING WALL-RT 44			
CTDOT Utilities Engineer:	SHELLEY PLUDE		
Phone:	(475)244-2306	Email:	splude@slrconsulting.com
Utility Company:	CROWN CASTLE FIBER		
Prepared By:	TERENCE J SHEA	Date Prepared:	6/11/2025
Phone:	(203)649-3905	Email:	terence.shea@crowncastle.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>Crown Castle's work will consist of placing strand on temporary poles, delashing cables, moving slack, shifting cables, relashing and removing old strand in phase 1. In phase 2, place strand on permanent poles, delash cables, shift cables to permanent poles, relash cables and remove temporary strand.</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>PLEASE NOTE THAT ANY TIME FRAME GIVEN AS A START TIME OR DURATION OF WORK CAN BE AFFECTED BY MANY FACTORS INCLUDING, BUT NOT LIMITED TO, MAKE READY WORK, OTHER UTILITIES, PERMIT APPLICATIONS, CHANGES IN SCOPE, INCLEMENT WEATHER, HOLIDAYS AND EMERGENCY SITUATIONS.</p>			

UTILITY WORK SCHEDULE Rev 3/2015

CTDOT Project Number: 0115-0122

Utility Company: CROWN CASTLE

Prepared By: TERENCE J SHEA

Total Working Days: 5

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)
LIMITS	PLACE STRAND, DELASH, MOVE SLACK, SHIFT CABLES, RELASH, REMOVE STRAND. PHASE 1.	POLES IN, POWER AND CATV OVER	3
LIMITS	PLACE STRAND, DELASH, MOVE SLACK, SHIFT CABLES, RELASH, REMOVE STRAND. PHASE 2.	POLES IN, POWER AND CATV OVER	2

UTILITY WORK SCHEDULE Rev 08 02 2016			
CTDOT Project Number:	115-122	Town:	Putnam
Project Description: Replacement of Retaining Wall Along RT 44			
CTDOT Utilities Engineer:	Shelley Plude, SLR		
Phone:	(203) 271-1773	Email:	splude@slrconsulting.com
Utility Company:	Eversource Energy		
Prepared By:	Rick Arremony	Date Prepared:	6/10/2025
Phone:	860-779-4628	Email:	richard.arremony@eversource.com
<p style="text-align: center;">Scope of Work</p> <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>Stage 1: Relocate overhead Electric lines to North side of Pomfret St / RT 44 to allow State's contractor to replace retaining wall. State Contractor to provide all required easements and tree. Eversource will relocate overhead lines to North side of road on new pole set by Frontier between poles 1135 to 2014. Eversource will remove existing overhead lines on south side of road between pole 1135 to 2014. Stage 2: Once contractor completes retaining wall Eversource will install relocate overhead primary and secd/neutral to south side of road on poles installed by Eversource.</p>			
<p style="text-align: center;">Special Considerations and Constraints</p> <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>1. Prior to any temporary/permanent relocation work, the State and/or assigned contractor to secure all required ROW and Tree Trimming in order to proceed.</p> <p>2. Eversource will schedule its construction as it's workload permits, the State and/or assigned contractor will schedule other utilities attached to the pole line (Frontier, CATV, etc... and all State or Municipal owned cables and fixtures). This UWS has been completed using only Preliminary Design Plans. No mark out of edge of road, or construction limits provided and may be subject to change.</p>			

UTILITY WORK SCHEDULE Rev 3/2015

CTDOT Project Number: 115-122

Utility Company: Eversource Energy

Prepared By: Rick Arremony

Total Working Days: 6

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)
		State written notification to proceed 8 weeks notice required	
20+00-26+00	Frontier & Eversource to stake pole & anchor locations	notice to proceed from State	1
20+00-26+00	Eversource to frame poles, install guying, install/shift/remove overhead conductors	Frontier set poles, State's contractor completed tree trimming	5

UTILITY WORK SCHEDULE Rev 3/2015

CTDOT Project Number: 115-122

Utility Company: Eversource Energy

Prepared By: Rick Arremony

Total Working Days: 9

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)
		State written permit to proceed 8 weeks noticed required	
20+00-26+00	Eversource to review locations of caissons installed by State Contractor for 3 poles on S side of RT 44	notice to proceed from State	1
20+00-26+00	Eversource to order poles for site delivery	Pole Locations & caisson installation approved by Eversource	1
20+00-26+00	Eversource to install poles and anchors	Poles delivered. CBUD is completed	2
20+00-26+00	Eversource to frame poles, install guying, install/shift/remove overhead conductors	Pole and Anchors installed	5

UTILITY WORK SCHEDULE Rev 08 02 2016		
CTDOT Project Number:	0115-0122	Town: Putnam
Project Description: Move coax and fiber from temporary poles to new permanent poles		
CTDOT Utilities Engineer:	Shelley Plude	
Phone:	475-244-2306	Email: splude@slrconsulting.com
Utility Company:	Breezeline	
Prepared By:	Jonathan Ramsdell	Date Prepared: 12/5/2025
Phone:	603-507-9896	Email: jrams dell@breezeline.com
Scope of Work The following is a description of all utility work planned to be completed in conjunction with the CTDOT project. The narrative describes all work to be carried out by the utility or its contractor, including temporary and permanent work required by the project as well as any additional utility infrastructure work the utility intends on performing within the project limits during the construction of the project.		
Breezeline will transfer our existing strand, coaxial cable and fiber. Potentially splicing in new coaxial splice points and fiber splice points in accordance with our cable standards. We will have to also move over several pieces of equipment in the process. Due to the location of this project a police detail and flaggers will be added to this cost as well. The estimated breakdown of our costs is as follows: Material Cost \$5,949.71 Labor Cost \$8,012.00 Total \$13,961.71		
Special Considerations and Constraints The following describes the limiting factors that must be planned for in the scheduling and performance of the utility work. For example, restrictions on cut-overs, outages, limitations on customer service interruptions (e.g. nights, weekends, holidays), seasonal and environmental shutdown periods, long lead material procurements, etc..		

UTILITY WORK SCHEDULE Rev 3/2015

CTDOT Project Number: 0115-0122

Utility Company: Breezelne

Prepared By: Jonathan Ramsdell

Total Working Days: 14

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)
1131-1134	Transfer all cables and strand. Off of old poles. Wreck out any drops. Disconnect old equipment.		7
1128-1135	Transfer all Cables. Hang new strand. Put up new equipment. Rehang new drops.		7

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.

NOTICE TO CONTRACTOR – CONSTRUCTION SIGNS

The Contractor shall furnish, install, and maintain Bipartisan Infrastructure Law project signs for the duration of the Contract. The Contractor shall also remove the signs upon completion of the work under the project. A special provision for these signs has been added to the Contract for Item No. 1220027A - Construction Signs.

NOTICE TO CONTRACTOR – SALVAGE

The Contractor shall salvage the following items, including but not limited to:

- Concrete block support system including appurtenances

The Contractor shall notify Eric Gunter, District 2 Maintenance, by phone (860-256-7329) or email (Eric.Gunter@ct.gov) to coordinate delivery of the salvaged items.

The items shall be delivered to the following address:

CTDOT Pomfret Maintenance Facility
31 Killingly Road
Pomfret Center, CT 06259

Removal of the existing concrete block support system and delivery of the salvaged items shall be paid under the item “Removal of Existing Masonry.”

NOTICE TO CONTRACTOR - ENVIRONMENTAL INVESTIGATIONS

The following information provides guidance regarding the management of surplus soil generated during the project. An estimated 4,160 cubic yards (CY) of soil have been designated as surplus for the project, and the surplus soil volume is designated as Controlled Materials.

In general, historical investigations associated with roadway construction projects have shown consistency with finding low levels of semi-volatile organic compounds (SVOCs), extractable petroleum hydrocarbons (ETPH), pesticides, and metals within project limit soils. Furthermore, a recent soil investigation performed within the project limits found low-level concentrations of SVOCs and ETPH in addition to some elevated pH values present at select locations. Therefore, soil within the construction limits of Project 0115-0122 should be considered similar to the general conditions stated above for surplus soil management purposes. Contaminants are expected to be at concentrations above the RCS-1 Acceptance Criteria for approved facilities under Policy #COMM-15-01 (Massachusetts Department of Environmental Protection (MassDEP) Interim Policy on the Re-Use of Soil for Large Reclamation Projects) or similar state policy. Actual contaminants and concentration levels found during construction may vary and such variations will not be considered a change in condition provided the material can still be disposed of as non-hazardous.

All excavated soils shall be reused within the project limits to the maximum extent possible unless deemed unsuitable by the Engineer due to physical indications of contamination or the geotechnical characteristics of the material.

Excavated material that is suitable for reuse shall be managed at the point of origin for use as backfill. In instances where such soil cannot be reused directly at the point of origin or within several days of excavation, the surplus material, excluding existing pavement structure (asphalt and subbase), rock, ledge, and concrete, shall be brought to the WSA. It is noted that the WSA's location will be provided by the District prior to Project commencement.

Material that has not been reused within the project limits by the end of the project or is deemed unsuitable for reuse due to physical indications of contamination shall be disposed of at a State-approved treatment, recycling, or disposal facility. The Contractor shall effectively manage the soil to reuse as much as possible, to minimize the need for off-site disposal.

Material sampling will be performed by a State representative and the analytical data will be provided to the Contractor to secure appropriate disposal arrangements. A State representative will aid in the Contractor's waste profile paperwork preparation and will sign disposal paperwork (e.g., waste profile, shipping papers, etc.) as Generator.

Worker health and safety protocols that address potential risks of exposure to site-specific contaminant hazards shall be incorporated in a site-specific Environmental Health and Safety Plan. This plan shall be updated to include project worker protocols that protect against the referenced compounds anticipated to be found in soils.

In the event groundwater is encountered during construction, any dewatering associated with the construction shall be performed in accordance with the CTDEEP's "*General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities*" unless evidence of contamination (oily sheen, etc.) is observed by the Engineer.

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

- Item No. 0101000A - Environmental Health and Safety
- Item No. 0101128A - Securing, Construction and Dismantling of a Waste Stockpile and Treatment Area
- Item No. 0202315A - Disposal of Controlled Materials

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 (SAM.gov | Wage Determinations) 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.

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. 7A - Major Reconstruction of Non-Freeway State Routes, 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

Add the following to the beginning of the first paragraph of Article 1.05.12:

1.05.12—Payrolls: The Contractor and all subcontractors shall use *AASHTOWare Project®* software in accordance with Article 1.05.25, with a Department-provided template, or by other means previously accepted by the Department, to electronically upload all Project payrolls, as directed herein.

Add the following to the end of Article 1.05.12:

These requirements shall be included in all subcontracts for this Project.

All costs for these requirements shall be included in the general cost of the work.

Add the following new Article 1.05.25:

1.05.25—Use of *AASHTOWare Project®* Software: The Contractor and all subcontractor(s) shall use the *AASHTOWare Project®* software for electronic submittal of all payrolls as outlined in the Department's *AASHTOWare* Contractor's User Manual, found at the Department's [AASHTOWare Training](#) webpage, and as stated in the specifications.

The Contractor and all subcontractor(s) shall use the *AASHTOWare Project®* software for monthly verification of project payments at all tiers, as outlined in the Department's *AASHTOWare* Contractor's User Manual, found at the Department's [AASHTOWare Training](#) webpage, and as stated in the specifications. The Department will inform the Contractor of other deliverables to be similarly submitted, as required.

Within 10 days of execution of the Contract, the Contractor shall submit the name(s) of the *AASHTOWare Software Project Liaison* and required staff that will be using the Department's software for this work. Similarly, within 10 days after the Contractor (or a subcontractor) enters into a subcontractor agreement to sublet any work, they shall submit the name(s) of their *AASHTOWare Software Project Liaison* and required staff that will be using the Department's software for this work. The Contractor and subcontractors shall immediately notify the Department of any change in Project staff authorized to access the *AASHTOWare* system or of a need to revise the Project Liaison.

Training materials, such as videos and written guides are available on the Department website for Contractor use. The Contractor and all subcontractors shall be responsible to train their staff.

This *AASHTOWare Project*® software will require that the Contractor and all subcontractor(s) provide their staff with access to the internet, using devices suitable for this work, at their own expense, throughout the duration of the Project. The Department has obtained licensing that allows the Contractor and subcontractors to access (from the internet) and use of the *AASHTOWare Project*® software. The Department will provide the Contractor and subcontractors with usernames and passwords to access the *AASHTOWare Project*® software, at no cost.

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 Department's AASHTOWare Contractor's User Manual, found at the Department's [AASHTOWare Training](#) webpage.

These requirements shall be included in all subcontracts for this Project.

All costs for these requirements shall be included in the general cost of the work.

SECTION 1.07 – LEGAL RELATIONS AND RESPONSIBILITIES

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

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

Atlantic Broadband (CT), LLC

(dba Breezelne)

Mr. Richard DeCava, Supervisor of Construction

221 Norwich Road

Plainfield, CT 06374

Phone: 860-377-8770

Email: RDeCava@Breezelne.com

The Connecticut Light & Power Company (dba Eversource Energy – Electric Distribution)

Mr. Mark Bonjuklian, Manager – Distribution Projects and Programs

9 Tindall Avenue

Norwalk, CT 06851

Phone: 860-845-3456

Email: mark.bonjuklian@eversource.com

Project Contact: Richard Arremony

Email: richard.arremony@eversource.com

Crown Castle Fiber, LLC

Mr. Mark Bonanno, Manager – Network Construction

1800 West Park Dr., Suite 250

Westborough, MA 01581

Phone: 617-828-1415

Email: mark.bonanno@crowncastle.com

Project Contact: Terence Shea

Email: terence.shea@crowncastle.com

Southern New England Telephone Company (dba Frontier Communications of Connecticut)

Ms. Lynne DeLucia, Manager – Engineering & Construction

1441 North Colony Road

Meriden, CT 06450-4101

Phone: 203-238-5000

Email: lynne.m.delucia@ftr.com

Project Contact: John Plikus
Phone: 860-455-6030
Email: john.m.plikus@ftr.com

Town of Putnam Water Pollution Control Authority
Mr. Brian Lynch, Superintendent
126 Church Street
Putnam, CT 06260
Phone: 860-963-6800
Email: brian.lynch@putnamct.us

Yankee Gas Service Company (dba Eversource Energy – Gas)
Mr. Kenneth Cook, Lead Engineer – Gas Project Engineering
107 Selden Street, Mail Stop NUE2
Berlin, CT 06037
Phone: 860-978-5465
Email: Kenneth.cookiii@eversource.com

Project Contact: Joe Meredith
Phone: 860-218-8822
Email: joseph.meredith@eversource.com

The following Department representative shall be contacted by the Inspector or Field Engineer to coordinate an inspection of the service entrance into the controller/flasher cabinet for controllers within the State right-of-way. When ready for inspection, the Contractor should be present for the release of the connection of electrical service. The local Building Department shall be contacted for electrical service inspections for controllers located on Town roads located within the respective municipality.

Property & Facilities
Department of Transportation
Newington, CT 06111
DOT.BUILDINGCODEINSP@CT.GOV

Please provide the electrical service request number provided by the power company. This is a Work Request (WR) Number provided by Eversource (formerly Northeast Utilities [CL&P]) or a Work Order Number provided by United Illuminating (UI). For State-owned traffic signals in Eversource territory, contact the Department's Traffic Electrical Unit to obtain the WR Number. For State-owned traffic signals in UI territory, contact the Department's Traffic Electrical Unit to obtain a Request for Metered Service to provide to UI to obtain the Work Order Number. The street address is required for release to local power companies (Groton Utilities or Wallingford Electric).

Mr. Kenneth Ruel
Area Supervisor
Algonquin Gas Transmission Co.
(d.b.a. Enbridge)
252 Shunpike Road
Cromwell, Connecticut 06416

Mr. Chap Hanley
VP and General Manager
Atlantic Broadband (CT), LLC
61 Myrock Avenue
Waterford, Connecticut 06385
Project contact: Bill Danna
(860) 625-5725
w.danna@breezelinc.com

Mr. Mark Bonanno
Manager – Network Construction
Crown Castle Fiber, LLC fka
Light Tower Fiber Networks I, LLC
1800 West Park Drive, Suite 250
Westborough, Massachusetts 01581
Project contact: Woody Savage
(860) 594-2862
elwyn.savage@crowncastle.com

Ms. Lynne DeLucia
Manager – Engineering & Construction
The Southern New England Telephone Co.
(d.b.a. Frontier Communications of Conn.)
1441 North Colony Road
Meriden, Connecticut 06450-4101
Project contact: John Plikus
(860) 455-6030
John.m.plikus@ftr.com

Mr. Michael Cooley
District 2 Electrical Supervisor
Department of Transportation
Colchester, Connecticut
(860) 537-8942/8943

Ms. Robin Lyons
Lead Engineer–Distribution Proj. and Programs
Connecticut Light and Power Co.
(d.b.a. Eversource Energy–Electric Distribution)
107 Selden Street
Berlin, Connecticut 06037

Mr. Brian Lynch, Superintendent
Town of Putnam
Water Pollution Control Authority
126 Church Street
Putnam, Connecticut 06260

Mr. Kenneth Cook
Lead Engineer, Gas Project Engineering
Yankee Gas Services Company
(d.b.a. Eversource Energy – Gas Distribution)
107 Selden Street, Mail Stop NUE2
Berlin, Connecticut 06037
(860) 978-5465
Project contact: Joseph Merideth
(860) 218-8822
Joseph.meredith@eversource.com

SECTION 1.08 - PROSECUTION AND PROGRESS

1.08.01—Transfer of Work or Contract:

The first sentence of the first paragraph is hereby changed to read as follows:

The Contractor shall perform with its own organization Contract work with a value under the Contract of at least 50% of the original total Contract value.

SECTION 1.08 – PROSECUTION AND PROGRESS

Article 1.08.03 - Prosecution of Work:

The project will be constructed in phases as described herein.

Stage Construction

Construction activities for this contract shall be performed in stages and shall be sequenced as specified below and in accordance with the Maintenance and Protection of Traffic plans and Staged Construction Plans contained in the project plans and the Construction Traffic Control Plans contained in Item No. 0971001A unless approved otherwise by the Engineer. Phases within each construction stage shall not be initiated until the completion of work in a prior phase, as noted below, unless approved otherwise by the Engineer. Also, where stage construction plans are provided, the Contractor shall not begin work on a new stage until the previous stage is completed and accepted by the Engineer unless approved otherwise by the Engineer.

The contract time was developed based on this construction staging and in recognition of utility relocation work. The Contractor shall coordinate the construction schedule and all construction activities with the affected utility companies to minimize delays and conflicts.

Construction Staging – Utility Relocations

The Contractor shall coordinate all work activities with the various utility companies to accommodate the contractor's work schedules with all utility company schedules.

Utilities shall relocate all facilities as required and install in conjunction with the roadway construction and in consultation and coordination with the Contractor to ensure proper utility pole, subsurface structure and pipe locations to avoid conflicts with proposed drainage and other underground structures.

The Contractor shall also coordinate clearing and grubbing activities concurrently with utility relocations to avoid conflicts and minimize interruptions of utility services.

These plan sheets are intended to show proposed work and utility installations to be done by the various utility companies or municipal authorities or both before, during, or after the life of this contract but may not depict all work to be done. In addition to the work indicated on these plans, the utility companies and authorities may make adjustments to or remove their installations other than those indicated on the plans or may install facilities not indicated. It is the Contractor's responsibility to be aware of the proposed utility work, anticipated utility schedule, effect the work will have on the construction schedule and coordinate with the various utility company schedules.

Sequence of Construction

The Contractor shall perform the work on this project in accordance with the following and as outlined in the Special Provision "Maintenance and Protection of Traffic" and the Maintenance and Protection of Traffic and Staged Construction plans contained in the project plans. The Contractor is responsible during construction for maintaining appropriate sight lines at all access points. The general sequence of work to be performed is outlined as follows:

- Stage 1: Mobilization and Utility Relocations
- Stage 2A: Retaining Wall Replacement
- Stage 2B: Sidewalk Reconstruction (Sta.20+00 to Sta. 26+44)
- Stage 2C: Removal of Flashing Beacon and Paving (Sta.20+00 to Sta. 26+44)
- Stage 3 (3A,3B,3C): Sidewalk Reconstruction (Sta. 12+25 to Sta. 20+00)

The Contractor shall implement closure of Route 44 and detour traffic as shown on the Detour Plans during Construction Stages 2A, 2B and 2C. The contractor shall notify the Engineer at least 30 days prior to the Route 44 closure. The duration of the closure of Route 44 shall be 295 days. Upon initiation of the closure, the closure shall be continuous for the duration of the Stage 2A, 2B, and 2C work.

The Contractor shall close the intersection of Church Street and Route 44 during Construction Stage 2C as shown on the plan. The detour put in place for the closure of Route 44 shall remain in effect. The contractor shall notify the Engineer at least 30 days prior to the Church Street intersection closure. The duration of the closure of the Church Street intersection shall be 36 days and shall coincide with the closure of Route 44. Upon completion of the Stage 2C work, both Route 44 and Church Street shall be reopened to traffic.

The Contractor shall be allowed to close the sidewalk along the south side of Route 44 and implement pedestrian detour as shown on the Pedestrian Detour Plans for Construction Stages, 2A, 2B and 3.

Project Completion

When the installation of all the intermediate courses of bituminous concrete pavement is completed for all roadways, the Contractor shall install the final courses of bituminous concrete pavement and perform all remaining roadway improvements and restoration. Final pavement markings shall be installed on the final course of bituminous concrete pavement in accordance with Article 9.71.03 as contained in the Special Provision "Maintenance and Protection of Traffic."

1.08.04 – Limitation of Operations: Add the following:

Excepted therefrom the duration for which the Contractor is working within the allowable roadway closure period, 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 44 (Pomfret Street)

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

Saturday and Sunday between 10:00 a.m. and 6:00 p.m.

Additional Restrictions:

- A. The Contractor will be allowed to close Route 44 and detour traffic as shown on the plans for a duration of 295 days.
- B. The Contractor shall notify the Engineer, the Town of Putnam, Day Kimball Hospital, and the ambulance companies provided in the Notice to Contractor – Emergency Services Coordination at least 30 days in advance of implementing the detour or any alternating one-way traffic pattern.
- C. The Contractor will be allowed to halt Route 44 (Pomfret Street) traffic for a period not to exceed 10 minutes to perform necessary work, including installing transverse drainage runs and utility relocations, or for mobilizing equipment and/or materials for retaining wall construction, as approved by the Engineer, on all non-Holidays.

All Other Roadways

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

Saturday and Sunday between 10:00 a.m. and 6:00 p.m.

The Contractor will not be allowed to perform any work between 9:00 p.m. and 7:00 a.m. on all days.

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 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.

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 1.09—MEASUREMENT AND PAYMENT

Article 1.09.06—Partial Payments

Subarticle B. Payment for Stored Materials *is amended as follows:*

B. Payment for Stored Materials: Non-perishable materials that are required for Project construction and that the Contractor has produced or purchased specifically for incorporation into the Project, but which have not yet been so incorporated, may be included in a payment estimate if

- (i) the materials meet all applicable Contract specifications,
- (ii) the materials have been delivered to the Project site or to another location approved by the Engineer, and
- (iii) the Contractor has submitted to the Engineer, as evidence of the Contractor's purchase of the materials, copies of notarized receipted bills and a notarized Certificate of Title, lien waiver, and right of entry to the materials, in the form approved by the Department, duly executed by the Contractor, the Vendor and any other parties deemed necessary by the Engineer to satisfy proof of unencumbered ownership.

The Engineer will decide at what fair and appropriate fraction of the applicable Contract price such materials may be included in a payment estimate.

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

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

Generic materials having a use on many projects will be considered for payment prior to their incorporation into the Project only if stored in unopened packaging or in large lots stored at the project site.

Stock and raw materials will not be considered for such advance payment without the Engineer's prior written consent thereto.

In no case shall material payments exceed the Contract unit price or lump sum price less the actual value of the remaining work under the item, including but not limited to delivery and

installation of the materials. If the proposed material costs do exceed such a price, the Engineer reserves the right to reduce any related payment accordingly. In such an instance the Contractor shall provide documentation of ownership and written acceptance of the amount to be paid in a form acceptable to the Engineer prior to any payments being made by the Engineer. Such reductions in payment shall in no way affect the Department's ownership interest in the stored materials or release the Contractor from any other requirements of the Contract.

SECTION 1.10-ENVIRONMENTAL COMPLIANCE

In Article 1.10.03-Water Pollution Control: REQUIRED BEST MANAGEMENT PRACTICES

Add the following after Required Best Management Practices Number 13:

14. The Contractor is hereby notified that one or more State and/or federally listed species of bat has been documented within the Project limits. In Connecticut, the Eastern small-footed bat (*Myotis leibii*), tri-colored bat (*Perimyotis subflavus*), little brown bat (*Myotis lucifugus*), Northern long-eared bat (*Myotis septentrionalis*) and the Indiana bat (*Myotis sodalis*) are listed as State endangered; while the silver-haired bat (*Lasionycteris noctivagans*), hoary bat (*Lasiurus cinereus*) and the red bat (*Lasiurus borealis*) are listed as State species of special concern. The Northern long-eared bat, tri-colored bat, and the Indiana bat are also federally listed endangered species. Bats are the only mammals capable of actual flight and are primarily nocturnal. During the daylight, bats roost in trees and caves, but many have now adapted to roost in or on buildings including barns, houses, tunnels, and bridges. Within the Project limits, bats will use the snags, cavities, and underside of bark to roost and raise young. **This Project will have a Time of Year restriction for tree clearing, trimming and removal to protect the bat species listed.**

The Contractor shall, through the Engineer and at least 10 days prior to the commencement of any construction activities, arrange a meeting with the District Environmental Coordinator (DEC) and Office of Environmental Planning (OEP) (or their authorized delegate) to discuss proper protocol for maintaining environmental commitments made for the protection of these bat species and their habitat. OEP will provide oversight through the DEC and Engineer to ensure that the following protocols are followed and maintained during the Project:

- a. The Contractor, through the Engineer, shall arrange a pre-construction tree-clearing Site walk to review all trees proposed to be removed for the Project.
- b. Clearing, trimming or removal of any tree three (3) inches diameter at breast height (DBH) or greater will be prohibited between April 15 and October 31.
- c. This restriction shall also apply to invasive species removal work and shall be reflected in the Contractor's Invasive Vegetation Removal Plan, if applicable.

These practices will be applied to the entire Project unless a specified location is identified within the Project plans, which denotes specific areas of concern.

If any bats are observed in or around the Project area, the Engineer will notify the DEC to facilitate further coordination with OEP's Environmental Resource Compliance Unit. If the DEC is unable to be reached, notify OEP at Andrew.Piraneo@ct.gov or at Marilyn.Gould@ct.gov.

The OEP will be responsible for completing and submitting the Natural Diversity Data Base (NDDB) Vertebrate Sheet ([Contribute Data to the NDDB](#)). This completed document allows CTDEEP to update their database.

All listed bat species are protected by federal and/or State laws which prohibit killing, harming, taking, harassing, or keeping them in your possession. A CTDEEP fact sheet(s) for the listed bats noted above shall be posted in the Contractor's and Inspection field offices and can be downloaded at the link below.

CTDEEP's Fact Sheet for Bats:

[Bat Fact Sheet](#)

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.

Field Number	Type	size	Description
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.

ITEM #0101000A - ENVIRONMENTAL HEALTH AND SAFETY

Description:

Under this item, the Contractor shall establish protocols and provide procedures to protect the health and safety of its employees and subcontractors as related to the proposed construction activities performed within the project limits. Work under this Item consists of the development and implementation of a written HASP that addresses the relative risk of exposure to documented hazards present within the project limits. The HASP shall establish health and safety protocols that address the relative risk of exposure to regulated substances in accordance with 29 CFR 1910.120 and 29 CFR 1926.65. Such protocols shall only address those concerns directly related to site conditions.

Note: The Engineer will prepare a site-specific health and safety plan which is compatible with the Contractor's plan and will be responsible for the health and safety of all project Inspectors, Municipality employees, and consulting engineers.

Materials:

The Contractor must provide chemical protective clothing (CPC) and personal protective equipment (PPE) as stipulated in the Contractor's HASP during the performance of work in areas identified as potentially posing a risk to worker health and safety for workers employed by the Contractor and all subcontractors.

Construction Methods:

1-Existing Information: In general, historical investigations associated with roadway construction projects have shown consistency with finding low levels of semi-volatile organic compounds (SVOCs), extractable petroleum hydrocarbons (ETPH), pesticides, and metals within project limit soils. Furthermore, a recent soil investigation performed within the project limits found low-level concentrations of SVOCs and ETPH in addition to some elevated pH values present at select locations. Therefore, soils within the project limits of Project 0115-0122 should be considered similar to the general conditions stated above for health and safety purposes. Additionally, it is hereby noted that the above-referenced contaminant list should neither be considered exhaustive nor meant to imply encountered soil contaminant concentrations will fall within a specific range. The Contractor shall utilize all available information and existing records and data pertaining to chemical and physical hazards associated with any of the regulated substances identified to develop the HASP.

2-General: The requirements set forth herein pertain to the provision of workers' health and safety as it relates to proposed project activities when performed in the presence of hazardous or regulated materials or otherwise environmentally sensitive conditions. THE PROVISION OF WORKER HEALTH AND SAFETY PROTOCOLS WHICH ADDRESS POTENTIAL

AND/OR ACTUAL RISK OF EXPOSURE TO SITE SPECIFIC HAZARDS POSED TO CONTRACTOR EMPLOYEES IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.

The Contractor shall be responsible for the development, implementation and oversight of the HASP throughout the performance of work within the project limits, as identified in the Contract Documents, and in other areas identified by the Engineer or by the HASP where site conditions may pose a risk to worker health and safety and/or the environment. **No physical aspects of the work within the project limits shall begin until the HASP is reviewed by the Engineer and is determined to meet the requirements of the specifications. However, the Contract time, in accordance with Article 1.03.08, will begin on the date stipulated in the Notice to Proceed.**

3-Regulatory Requirements: All construction related activities performed by the Contractor within the project limits where site conditions may pose a risk to worker health and safety and/or the environment shall be performed in conformance with 29 CFR 1926, Safety and Health Regulations for Construction and 29 CFR 1910, Safety and Health Regulations for General Industry. Conformance to 29 CFR 1910.120, Hazardous Waste Site Operations and Emergency Response (HAZWOPER) may also be required, where appropriate.

4-Submittals: Three copies of the HASP shall be submitted to the Engineer within four (4) weeks after the Award of Contract or four (4) weeks prior to the start of any work in the project limits, whichever is first, but not before the Award of the Contract.

The HASP shall be developed by a qualified person designated by the Contractor. This qualified person shall be a Certified Industrial Hygienist (CIH), Certified Hazardous Material Manager (CHMM), or a Certified Safety Professional (CSP). He/she shall have review and approval authority over the HASP and be identified as the Health and Safety Manager (HSM). The HASP shall bear the signature of said HSM indicating that the HASP meets the minimum requirements of 29 CFR 1910.120 and 29 CFR 1926.65.

The Engineer will review the HASP within four (4) weeks of submittal and provide written comments as to deficiencies in and/or exceptions to the plan(s), if any, to assure consistency with the specifications, applicable standards, policies and practices and appropriateness given potential or known site conditions. Items identified in the HASP which do not conform to the specifications will be brought to the attention of the Contractor, and the Contractor shall revise the HASP to correct the deficiencies and resubmit it to the Engineer for determination of compliance with this item. The Contractor shall not be allowed to commence work activities within the project limits, or where site conditions exist which may pose a risk to worker health and safety and/or the environment, until the HASP has been reviewed and accepted by the Engineer. No claim for delay in the progress of work will be considered for the Contractor's failure to submit a HASP that conforms to the requirements of the Contract.

5-HASP Provisions:

(a) General Requirements: The Contractor shall prepare a HASP covering all project site work regulated by 29 CFR 1910.120(b)/ 1926.65(b) to be performed by the Contractor and all subcontractors under this Contract. The HASP shall establish in detail, the protocols necessary for the recognition, evaluation, and control of all hazards associated with each task performed under this Contract. The HASP shall address site-specific safety and health hazards of each phase of site operation and include the requirements and procedures for employee protection. The level of detail provided in the HASP shall be tailored to the type of work, complexity of operations to be performed, and hazards anticipated. Details about some activities may not be available when the initial HASP is prepared and submitted. Therefore, the HASP shall address, in as much detail as possible, all anticipated tasks, their related hazards and anticipated control measures.

The HASP shall interface with the Contractor's Safety and Health Program. Any portions of the Safety and Health Program that are referenced in the HASP shall be included as appendices to the HASP. All topics regulated by the 29 CFR 1910.120(b)(4) and those listed below shall be addressed in the HASP. Where the use of a specific topic is not applicable to the project, the HASP shall include a statement to justify its omission or reduced level of detail and establish that adequate consideration was given the topic.

(b) Elements:

(i) Site Description and Contamination Characterization: The Contractor shall provide a site description and contaminant characterization in the HASP that meets the requirements of 29 CFR 1910.120/1926.65.

(ii) Safety and Health Risk Analysis/Activity Hazard Analysis: The HASP shall address the safety and health hazards on this site for every operation to be performed. The Contractor shall review existing records and data to identify potential chemical and physical hazards associated with the site and shall evaluate their impact on field operations. Sources, concentrations (if known), potential exposure pathways, and other factors as noted in CFR 1910.120/126.65, paragraph (c)(7) employed to assess risk shall be described. The Contractor shall develop and justify action levels for implementation of engineering controls and personal protective equipment upgrades and downgrades for controlling worker exposure to the identified hazards. If there is no permissible exposure limit (PEL) or published exposure level for an identified hazard, available information from other published studies may be used as guidance. Any modification of an established PEL must be fully documented.

The HASP shall include a comprehensive section that discusses the tasks and objectives of the site operations and logistics and resources required to complete each task. The hazards associated with each task shall be identified. Hazard prevention techniques, procedures and/or equipment shall be identified to mitigate each of the hazards identified.

(iii) Staff Organization, Qualifications and Responsibilities: The HASP shall include a list of personnel expected to be engaged in site activities and certify that said personnel have completed the educational requirements stipulated in 29 CFR 1910.120 and 29 CFR 1926.65, are currently monitored under a medical surveillance program in compliance with those regulations, and that they are fit for work under "level C" conditions.

The Contractor shall assign responsibilities for safety activities and procedures. An outline or flow chart of the safety chain of command shall be provided in the HASP. Qualifications, including education, experience, certifications, and training in safety and health for all personnel engaged in safety and health functions shall be documented in the HASP. Specific duties of each on-site team member should be identified. Typical team members include but are not limited to Team Leader, Scientific Advisor, Site Safety Officer, Public Information Officer, Security Officer, Record Keeper, Financial Officer, Field Team Leader, and Field Team members.

The HASP shall also include the name and qualifications of the individual proposed to serve as Health and Safety Officer (HSO). The HSO shall have full authority to carry out and ensure compliance with the HASP. The Contractor shall provide a competent HSO on-site who is capable of identifying existing and potential hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees and who has authorization to take prompt corrective measures to eliminate or control them. The qualifications of the HSO shall include completion of OSHA 40-hour HAZWOPER training and 8-hour HAZWOPER supervisory training; a minimum of one year of working experience with the regulated compounds that have been documented to exist within the project limits; a working knowledge of Federal and State safety regulations; specialized training or documented experience (one year minimum) in personal and respiratory protective equipment program implementation; the proper use of air monitoring instruments, air sampling methods and procedures; and certification training in first aid and CPR by a recognized, approved organization such as the American Red Cross.

The primary duties of the HSO shall be those associated with worker health and safety. The Contractor's HSO responsibilities shall be detailed in the written HASP and shall include, but not be limited to the following:

- (A) Directing and implementing the HASP.
- (B) Ensuring that all project personnel have been adequately trained in the recognition and avoidance of unsafe conditions and the regulations applicable to the work environment to control or eliminate any hazards or other exposure to illness or injury (29 CFR 1926.21). All personnel shall be adequately trained in procedures outlined in the Contractor's written HASP.
- (C) Authorizing Stop Work Orders, which shall be executed upon the determination of an imminent health and safety concern.

- (D) Contacting the Contractor's HSM and the Engineer immediately upon the issuance of a Stop Work order when the HSO has made the determination of an imminent health and safety concern.
- (E) Authorizing work to resume, upon approval from the Contractor's HSM.
- (F) Directing activities, as defined in the Contractor's written HASP, during emergency situations; and
- (G) Providing personal monitoring where applicable, and as identified in the HASP.

(iv) Employee Training Assignments: The Contractor shall develop a training program to inform employees, supplier's representatives, and official visitors of the special hazards and procedures (including PPE, its uses and inspections) to control these hazards during field operations. Official visitors include but are not limited to Federal Agency Representatives, State Agency Representatives, Municipal Agency Representatives, Contractors, subcontractors, etc. This program shall be consistent with the requirements of 29 CFR 1910.120 and 29 CFR 1926.65.

(v) Personal Protective Equipment: The plan shall include the requirements and procedures for employee protection and should include a detailed section on respiratory protection. The Contractor shall describe in detail and provide appropriate personal protective equipment (PPE) to insure that workers are not exposed to levels greater than the action level for identified hazards for each operation stated for each work zone. The level of protection shall be specific for each operation and shall be in compliance with all requirements of 29 CFR 1910 and 29 CFR 1926. The Contractor shall provide, maintain, and properly dispose of all PPE.

(vi) Medical Surveillance Program: All on-site Contractor personnel engaged in 29 CFR 1910.120/1926.65 operations shall have medical examinations meeting the requirements of 29 CFR 1910.120(f) prior to commencement of work.

The HASP shall include certification of medical evaluation and clearance by the physician for each employee engaged in 29 CFR 1910.120/1926.65 operations at the site.

(vii) Exposure Monitoring/Air Sampling Program: The Contractor shall submit an Air Monitoring Plan as part of the HASP which is consistent with 29 CFR 1910.120, paragraphs (b)(4)(ii)(E), (c)(6), and (h). The Contractor shall identify specific air sampling equipment, locations, and frequencies in the air-monitoring plan. Air and exposure monitoring requirements shall be specified in the Contractor's HASP. The Contractor's CIH shall specify exposure monitoring/air sampling requirements after a careful review of the contaminants of concern and planned site activities.

(viii) Site Layout and Control: The HASP shall include a map, work zone delineation (support, contamination, reduction and exclusion), on/off-site communications, site access controls, and security (physical and procedural).

(ix) Communications: Written procedures for routine and emergency communications procedures shall be included in the Contractor's HASP.

(x) Personal Hygiene, Personal Decontamination and Equipment Decontamination: Decontamination facilities and procedures for personnel protective equipment, sampling equipment, and heavy equipment shall be discussed in detail in the HASP.

(xi) Emergency Equipment and First Aid Requirements: The Contractor shall provide appropriate emergency first aid kits and equipment suitable to treat exposure to the hazards identified, including chemical agents. The Contractor will provide personnel that have certified first aid/CPR training on-site at all times during site operations.

(xii) Emergency Response Plan and Spill Containment Program: The Contractor shall establish procedures in order to take emergency action in the event of immediate hazards (i.e., a chemical agent leak or spill, fire or personal injury). Personnel and facilities supplying support in emergency procedures will be identified. The emergency equipment to be present on-site and the Emergency Response Plan procedures, as required 29 CFR 1910.120, paragraph (1)(1)(ii) shall be specified in the Emergency Response Plan. The Emergency Response Plan shall be included as part of the HASP. This Emergency Response Plan shall include written directions to the closest hospital as well as a map showing the route to the hospital.

(xiii) Logs, Reports and Record Keeping: The Contractor shall maintain safety inspections, logs, and reports, accident/incident reports, medical certifications, training logs, monitoring results, etc. All exposure and medical monitoring records are to be maintained according to 29 CFR 1910 and 29 CFR 1926. The format of these logs and reports shall be developed by the Contractor to include training logs, daily logs, weekly reports, safety meetings, medical surveillance records, and a phase-out report. These logs, records, and reports shall be maintained by the Contractor and be made available to the Engineer.

The Contractor shall immediately notify the Engineer of any accident/ incident. Within two working days of any reportable accident, the Contractor shall complete and submit to the Engineer an accident report.

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

(xv) Pre-entry briefings: The HASP shall provide for pre-entry briefings to be held prior to initiating any site activity and at such other times as necessary to ensure that employees are apprised of the HASP and that this plan is being followed.

(xvi) Inspections/audits: The HSM or HSO shall conduct Inspections or audits to determine the effectiveness of the HASP. The Contractor shall correct any deficiencies in the effectiveness of the HASP.

6-HASP Implementation: The Contractor shall implement and maintain the HASP throughout the performance of work. In areas identified as having a potential risk to worker health and safety, and in any other areas deemed appropriate by the HSO, the Contractor shall be prepared to immediately implement the appropriate health and safety measures, including but not limited to the use of personal protective equipment (PPE), and engineering and administrative controls.

If the Engineer observes deficiencies in the Contractor's operations with respect to the HASP, they shall be assembled in a written field directive and given to the Contractor. The Contractor shall immediately correct the deficiencies and respond, in writing, as to how each was corrected. Failure to bring the work area(s) and implementation procedures into compliance will result in a Stop Work Order and a written directive to discuss an appropriate resolution(s) to the matter. When the Contractor demonstrates compliance, the Engineer shall remove the Stop Work Order. If a Stop Work Order has been issued for cause, no delay claims on the part of the Contractor will be honored.

Disposable CPC/PPE, i.e. disposable coveralls, gloves, etc., which come in direct contact with hazardous or potentially hazardous material shall be placed into 55-gallon USDOT 17-H drums and disposed of in accordance with Federal, State, and local regulations. The drums shall be temporarily staged and secured within the WSA until the material is appropriately disposed.

7-HASP Revisions: The HASP shall be maintained on-site by the Contractor and shall be kept current with construction activities and site conditions under this Contract. The HASP shall be recognized as a flexible document which shall be subject to revisions and amendments, as required, in response to actual site conditions, changes in work methods and/or alterations in the relative risk present. All changes and modifications shall be signed by the Contractor's HSM and shall require the review and acceptance by the Engineer prior to the implementation of such changes.

Should any unforeseen hazard become evident during the performance of the work, the HSO shall bring such hazard to the attention of the Contractor and the Engineer as soon as possible. In the interim, the Contractor shall take action, including Stop Work Orders and/or upgrading PPE as necessary to re-establish and maintain safe working conditions and to safeguard on-site personnel, visitors, the public and the environment. The HASP shall then be revised/amended to reflect the changed condition.

Method of Measurement:

1-Within thirty (30) calendar days of the award of the Contract, the Contractor shall submit to the Engineer for acceptance a breakdown of its lump sum bid price for this item detailing:

- (a) The development costs associated with preparing the HASP in accordance with these Specifications.
- (b) The cost per month for the duration of the project to implement the HASP and provide the services of the HSM and the HSO.

2-If the lump sum bid price breakdown is unacceptable to the Engineer; substantiation showing that the submitted costs are reasonable shall be required.

3-Upon acceptance of the payment schedule by the Engineer, payments for work performed will be made as follows:

- (a) The lump sum development cost will be certified for payment.
- (b) The Contractor shall demonstrate to the Engineer monthly that the HASP has been kept current and is being implemented and the monthly cost will be certified for payment.
- (c) Any month where the HASP is found not to be current or is not being implemented, the monthly payment for the Environmental Health and Safety Item shall be deferred to the next monthly payment estimate. If the HASP is not current or being implemented for more than thirty calendar days, there will be no monthly payment.
- (d) Failure of the Contractor to implement the HASP in accordance with this Specification shall result in the withholding of all Contract payments.

Basis of Payment:

This work will be paid for at the Contract lump sum price for “Environmental Health and Safety” which price shall include all materials, tools, equipment and labor incidental to the completion of this item for the duration of the project to maintain, revise, monitor and implement the HASP. Such costs include providing the services of the HSM and HSO, Contractor employee training, chemical protective clothing (CPC), personal protective equipment (PPE), disposal of PPE and CPC, medical surveillance, decontamination facilities, engineering controls, monitoring and all other HASP protocols and procedures established to protect the Health and Safety for all on-site workers.

Pay Item	Pay Unit
Environmental Health and Safety	L.S.

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

Description:

Work under this Item shall consist of the securing, construction and dismantling of a temporary Waste Stockpile Area (WSA) at a location to be provided by the District prior to Project commencement. All surplus soils (Controlled Materials) excavated during construction activities shall be stockpiled in the WSA. The WSA is to be used exclusively for temporary stockpiling of surplus excavated soils from the Project limits for determination of disposal classification.

Materials:

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

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

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

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

Bedding sand shall conform to Article M.08.03 of the Specifications.

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

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

Bituminous Concrete shall conform to Section 4.06 of the Specifications.

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

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

Construction Methods:

Construction of the WSA shall be completed prior to the initiation of construction activities generating Controlled Materials. The Contractor is responsible for the maintenance and

protection of all utilities potentially affected during WSA construction. The Contractor shall locate and mark all existing utilities potentially affected prior to initiating WSA construction.

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

The Contractor shall follow Best Management Practices for contaminated soil and/or sediment management (staging and transfer) at the WSA. The Engineer will conduct all soil/sediment characterization and perform all record keeping. In particular, the Contractor shall:

1. Prevent unauthorized entry onto the stockpiles by the use of fences, gates, or other natural or artificial barriers.
2. Install anti-tracking measures at the WSA to ensure the vehicles do not track soil from the WSA onto a public roadway at any time.

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

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

Upon completion of the Project and following removal of all residual Controlled Materials, the Contractor shall dismantle the WSA and return the area to original condition. During dismantling, the Contractor shall remove all materials such as polyethylene sheeting and sand bags. Materials shall be disposed of by the Contractor as solid waste in accordance with the Contract and all Federal, State and local regulations.

Operation and maintenance of the WSA shall be included under Item 0202315A – Disposal of Controlled Materials.

Method of Measurement:

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

Basis of Payment:

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

Rev. Date 11/18/25

All materials, tool, labor and equipment associated with instituting and following Best Management Practices for contaminated soil and/or sediment management will not be measured separately and are considered incidental to the item "Securing, Construction and Dismantling of a Waste Stockpile and Treatment Area".

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

ITEM #0107093A - CTDOT BOUNDARY MARKER (CTDOT LEAD SURVEYOR)

Description: Work done under this item consists of setting survey boundary monuments along Right-of-Way lines at the locations indicated on the plans or as directed by the Engineer.

Materials: CTDOT concrete boundary monuments and disks will be provided by the Department; the Contractor is responsible for the transportation of CTDOT monuments from the District office to the project site. All other materials shall be the responsibility of the Contractor.

Construction Methods: The Contractor shall be responsible for setting of CTDOT Boundary Markers at all points indicated on the plans.

The standard Boundary Marker will be the CTDOT concrete boundary monument. If the Engineer determines that it is impractical to set a full-length concrete boundary monument, the Engineer will direct the Contractor either (a) to cut the boundary monument to a shorter length and then secure it in place by placing concrete around the base of the cut monument such that it has the equivalent stability of the full-length monument or (b) to set a boundary disk in ledge or other structure.

The setting of Boundary Markers shall not begin until all excavation, filling operations, grading and drainage has been completed and approval has been granted by the Engineer. All computations of precise locations will be completed by the CTDOT District Survey Office, which will oversee installation in the correct locations.

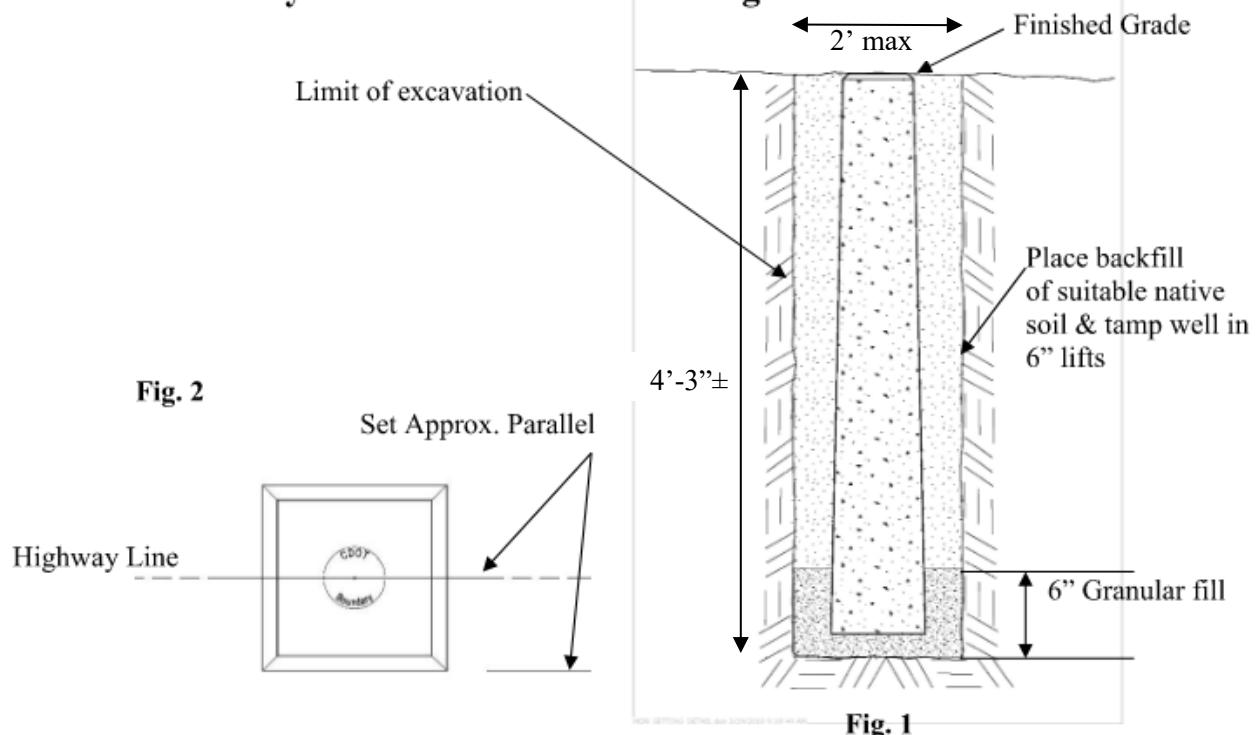
Excavation for the placement of the CTDOT Boundary Markers shall be by hand or with a power auger. The use of a backhoe or other heavy equipment for excavation purposes will not be allowed. The concrete monument shall be set plumb into the hole to the finished grade and backfilled and compacted in six inch (6") layers as detailed in the contract or as directed by the Engineer.

Monuments set in asphalt pavement (driveways, parking areas) shall be set a few inches below grade with a twelve inch (12") diameter (or similar size as approved by the Engineer) cast iron manhole cover (with a finger hole) set in place over the monument.

All disks set in ledge or concrete shall be secured with ROCKITE®, KWIXSET®, QUIKRETE®, or approved equal fast-setting hydraulic anchoring cement compound; cut monuments can be secured with any of those products or any commercial-grade concrete mix, such as SAKRETE® OR QUIKRETE® brands, as approved by the Engineer. Submittal required prior to using any other material than listed.

Once the Boundary Markers have been set and backfilled at the direction of the Engineer and found to meet the Contract standards, the Engineer shall notify the Contractor of the approval of the work.

CONNECTICUT DEPARTMENT OF TRANSPORTATION

Boundary/Control Monument Setting Procedures

Method of Measurement: This work will be measured for payment by the number of monuments complete and accepted in place.

Basis of Payment: Work will be paid for at the Contract unit price each for the Boundary Markers complete and accepted in place, which price shall include all equipment, tools, transportation of Department-supplied materials, non-Department supplied materials, and labor incidental to the setting of Boundary Markers, and shall include any disposal of excess excavated materials.

Pay Item

CTDOT Boundary Marker (CTDOT Lead Surveyor)

Pay Unit

ea

ITEM #0201902A – INTERPRETATIVE DISPLAY SIGN

Description: Under this item the Contractor shall furnish and install signage of the specified type, on concrete foundations, and in locations and to the dimensions and details shown on the plans.

Included under this item shall be all work associated with shop drawings and sign graphic legend detailing, manufacture and erection, and furnishing and installing concrete foundations.

Materials:

Signs

Sign(s) shall be as manufactured by:

Fossil Industries Inc.
44 Jeffry Boulevard
Deer Park, NJ 11729
(631) 254-9200

Sign Pro Inc
60 Westfield Drive
Plantsville, CT 06479
(860) 229-1812

iZone Imaging
2526 Charter Oak Drive, Suite 100
Temple, TX 76502
(888) 464-9663

or approved equal.

Foundations

Concrete and gravel fill shall conform to the requirements of M.03 of the Standard Specifications. Concrete shall be Class PCC03340.

Reinforcing shall be galvanized and conform to the requirements of Article M.06.01 of the Standard Specifications.

Anchoring Systems: The anchoring system for the sign supports shall consist of breakaway couplings and anchors meeting the criteria shown on the plans.

Sign Supports

Sign posts or supports shall meet the requirements of ASTM M270, Grade 36.

All support bases shall have two-piece base plate covers matching the sign supports to hide mounting hardware.

Factory-Applied Architectural Finish over Primer and Hot-dip Galvanizing – All steel shapes, plates, structural sections, and associated steel hardware shall be hot-dip galvanized, primed, and have a factory-applied architectural finish. This three-step process shall conform to the requirements below:

- A. Hot-Dip Galvanizing: Provide coating applied by the hot-dip process. The galvanizing bath shall contain high-grade zinc and other earthy materials. Immediately before galvanizing, the steel shall be immersed in a bath of zinc ammonium chloride. The use of the wet kettle process is prohibited. Comply with ASTM A 123 for fabricated products and ASTM A 153 for hardware. Provide thickness of galvanizing in referenced standards.
- B. Factory-Applied Primer Over Hot-Dip Galvanizing: Provide factory-applied polyamide primer over specially prepared galvanizing steel, 2.0 mils dry film thickness minimum. Apply primer within 12 hours after galvanizing at the galvanizer's plant in a controlled environment meeting applicable environmental regulations, and as recommended by coating manufacturer. Engage the services of a galvanizer who has demonstrated a minimum of five (5) years' experience in the successful performance of the processes outlined in this specification in the facility where the work is to be done and who will apply the galvanizing and coating within the same facility as outlined herein.
- C. Factory-Applied High-Performance Architectural Finish Over Primer and Hot-Dip Galvanizing: Provide factory-applied polyurethane color coating, 2.5 mils dry film thickness minimum, architectural coating over primed galvanized steel as previously referenced. Apply coating at the galvanizer's plant, immediately after application of the prime coat, in a controlled environment meeting applicable environmental regulations, and as recommended by coating manufacturer. Engage the services of a galvanizer who has demonstrated a minimum of five (5) years' experience in the successful performance of the processes outlined in this specification in the facility where the work is to be done and who will apply the galvanizing and coatings within the same facility as outlined herein and will assume single-source responsibility for galvanizing, priming and finish coating. The architectural finish coat of the steel shapes, plates, and structural sections (including associated steel hardware) shall be Black #23-AMS-17038 (gloss).

Sign Panels

Steel flat stock shall meet the standards of ASTM 36, AISI M1020 or 1015 as applicable. Panel facing shall be $\frac{1}{2}$ " thick high-pressure laminate with clear UV protection, vandal resistant with matte finish.

All hardware and fasteners shall be Stainless Steel Grade 316. All visible hardware shall have black caps or be painted black to match the sign support posts and brackets.

Sign mounting hardware shall be vandal resistant button-head screws.

Welding shall be in conformance with AWS codes. All connections shall be formed with “fish mouthed” joints full seam welded, ground smooth, and sanded.

All steel shall be galvanized in accordance with the requirements of Section M.06.03 of the Standard Specifications, after fabrication.

Shop prime and paint all steel with approved paint as detailed on the shop drawings, as appropriate.

Submittals

Shop or product drawings and product data shall be submitted for each item including foundation detail and anchoring method.

Final locations for all signs shall be as determined by the Engineer in the field.

Final sign graphics and legend for all signs shall be as determined by the Engineer in connection with the shop drawing and review process with detailing by the Contractor's selected manufacturer or vendor. The Engineer will furnish digital files for manufacturer's use in reproduction/detailing of the sign.

Note: A minimum of one (1) graphic sample at a size no smaller than 8.5" x 11" produced by the manufacturer demonstrating color, text, and panel finish shall be coordinated and provided to the Engineer for acceptance prior to final approval.

This submittal requires review and written approval from OEP and SHPO per the Memorandum of Agreement dated May 23, 2024 for SPN 0115-0122.

Construction Methods:

Installation shall conform to the manufacturer's instructions and the plan details.

Interpretative display signs shall be set plumb with alignment as shown on the plans or otherwise directed by the Engineer in the field.

All connections shall be drawn together tightly to the manufacturer's recommendations.

Surfaces shall be thoroughly cleaned and dry prior to installation. Signage shall be installed flush with sidewalk.

Following installation, all signs shall be thoroughly cleaned in strict accordance with manufacturer's recommendations.

Method of Measurement: This item will be paid for at the Contract unit price bid per each “Interpretative Display Sign” complete and accepted in place.

Basis of Payment: This item will be paid for at the contract unit price bid per each "Interpretative Display Sign" complete and accepted in place, which price which shall include final sign detailing and shop drawing preparation and all materials, equipment, labor and work incidental thereto.

Pay Item
Interpretative Display Sign

Pay Unit
ea.

ITEM #0202315A - DISPOSAL OF CONTROLLED MATERIALS

Description:

Work under this item shall include all materials, equipment, tools, and labor required to perform the following:

- (1) Loading and transportation of surplus soils (Controlled Materials) excavated from the Project limits to the designated temporary Waste Stockpile Area (WSA);
- (2) Stockpiling, covering, securing, and maintaining Controlled Materials transported to the WSA throughout the duration of the project;
- (3) Maintaining the WSA throughout the duration of the project; and
- (4) Loading, transportation, and disposal of Controlled Materials to a State-approved treatment, recycling, or disposal facility for final off-site disposal/ recycling/treatment.

An estimated 4,160 cubic yards (CY) of soil have been designated as surplus and are therefore considered Controlled Materials for the Project.

Project soils are assumed to be contaminated with regulated substances at non-hazardous levels. Further information regarding anticipated soil conditions is noted in the “Notice to Contractor – Environmental Investigations.” It is noted that actual levels found during construction may vary and such variations will not be considered a change in condition provided the Controlled Materials can still be disposed as non-hazardous at one or more of the disposal facilities listed herein. Worker health and safety protocols that address potential risks of exposure to site-specific hazards shall be incorporated in the site-specific Health and Safety Plan.

The Contractor must use one or more of the following State-approved treatment/recycle/disposal facilities for the disposal of non-hazardous materials:

Advanced Disposal Services Greentree Landfill 635 Toby Road Kersey, PA 15846 (814) 265-1744; Tony LaBenne	Allied Waste Niagara Falls Landfill, LLC 5600 Niagara Falls Boulevard Niagara, NY 14304 (716) 285-3344; David Hanson
Clean Earth of Carteret 24 Middlesex Avenue Carteret, NJ 07008 (732) 541-8909; Cheryl Coffee	Clean Earth of Connecticut (Formerly Phoenix Soil, LLC) 58 North Washington Street Plainville, CT 06062 (860) 747-8888; Dave Green

Clean Earth of Southeast Pennsylvania, Inc. 7 Steel Road Morrisville, PA 19067 (215) 428-1700; Joe Siravo	Clean Earth of Philadelphia, Inc. 3201 S. 61 Street Philadelphia, PA 19153 (215) 724-5520; Mike Kelly
Clinton Landfill 242 Church Street Clinton, MA 01510 (978) 365-4110; Chris McGown	Colonie Landfill Waste Connections, Inc. 1319 Louden Road Cohoes, NY 12047 (518) 786-7331; Eric Morales
Coplay Aggregates Regulated Fill Site 5101 Beekmantown Road Whitehall, PA 18052 (610) 262-3804; Brian Hilliard	ESMI of New York, LLC 304 Towpath Road Fort Edward, NY 12828 (518) 747-5500; Peter Hansen
ESMI of New Hampshire, LLC 67 International Drive Louden, NH 03307 (603) 783-0228; Steve Bennett	Hazleton Creek Properties, LLC* 280 South Church Street Hazleton, PA 18201 (570) 207-2000; Allen Swantek
Manchester Landfill 311 Olcott Street Manchester, CT 06040 (860) 647-3248; Brooks Parker	Ontario County Landfill 3555 Post Farm Road Stanley, NY 14561 (603) 235-3597; Scott Sampson
Red Technologies Soil 232 Airline Avenue Portland, CT 06980 (860) 342-1022; Christopher Wingdale	Republic Services Conestoga Landfill 420 Quarry Road Morgantown, PA 19543 (717) 246-4640; James Kuhn
Soil Safe, Inc. 378 Route 130 Logan Township Bridgeport, NJ 08085	Rhode Island Resource Recovery Corporation 65 Shun Pike Johnston, RI 02919
Ted Ondrick Company, LLC 58 Industrial Road Chicopee, MA 01020 (413) 592-2565; Alan Desrosiers	Turnkey Landfill - Waste Management of NH; TLR III Refuse Disposal Facility 90 Rochester Neck Road P.O. Box 7065 Rochester, NY 03839
The Southbridge Recycling and Disposal Park 165 Barefoot Road Southbridge, MA 01550 (508) 765-9723; Tracey Markham	Waste Management RCI Fitchburg Landfill Fitchburg Princeton Road Westminster, MA 01473 (974) 355-6821; Frank Sepiol

Tunnel Hill Reclamation 2500 Township Road 205 Route 2 New Lexington, OH 43764 (914) 713-0203; William Gay	
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* Note: each bin will require an additional 10 days (or more) for PADEP to review analytical data and approve material for disposal prior to facility acceptance of material. This is in addition to all other restrictions and wait periods defined below.

The above list contains treatment/recycle/disposal facilities which can accept the waste stream generated by the project in quantities that may be limited by their permits and their operations restrictions. It is the responsibility of the contractor to verify that a facility will be available and capable of handling the volume as well as the chemical and physical characteristics of material generated by the project.

Construction Methods:

A. Material Disposal

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

The Contractor shall obtain and complete all paperwork necessary to arrange for material disposal (such as disposal facility waste profile sheets). It is solely the Contractor's responsibility to co-ordinate the disposal of controlled 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 selected disposal facility(s) to meet the Contractor's production rate or for the Contractor's failure to select sufficient facilities to meet its production rate.**

Any material processing (including but not limited to the removal of woody debris, scrap metal, pressure-treated and untreated wood timber, large stone, concrete, polyethylene sheeting or similar material) required by the Contractor's selected facility will be completed by the Contractor prior to the material leaving the site. It is solely the Contractor's responsibility to meet any such requirements of its facility. Any materials removed shall be disposed of or recycled in a manner acceptable to the Engineer at no additional cost. If creosote treated timbers are removed, they will be disposed of under the item "Disposal of Contaminated Timber Piles", "Disposal of Contaminated Railroad Ties" or in accordance with Article 1.04.05 in the absence of such items.

All manifests or bills of lading utilized to accompany the transportation of the material shall be prepared by the Contractor and signed by an authorized State representative, as Generator, for each truck load of material that leaves the site. The Contractor shall forward the appropriate original copies of all manifests or bills of lading to the Engineer the same day the material leaves the Project.

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

B. Material Transportation

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

- Transported Controlled Materials are to be covered sufficiently to preclude the loss of material during transport prior to leaving the site and are to remain covered until the arrival at the selected treatment/recycling/disposal facility.
- 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.
- No materials shall leave the site unless a treatment/recycling/disposal facility willing to accept all of the material being transported has agreed to accept the type and quantity of waste.

C. Equipment Decontamination

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

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

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

Following the removal of all stockpiled Controlled Materials from the WSA, residuals shall be removed from surfaces as directed by the Engineer. This operation shall be accomplished using dry methods such as shovels, brooms, mechanical sweepers or a combination thereof. Residuals shall be disposed of as Controlled Materials. If the results from dry methods are unsatisfactory to the Engineer, the Contractor shall modify decontamination procedures as required.

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

Method of Measurement:

The work of "DISPOSAL OF CONTROLLED MATERIALS" will be measured for payment as the actual net weight in tons of material delivered to the treatment/recycling/disposal facility. Such determinations shall be made by measuring each hauling vehicle on the certified permanent scales at the treatment/recycling/disposal facility. Total weight will be the summation of weight bills issued by the facility specific to this Project. Excess excavations made by the Contractor beyond the payment limits specified in Specification Sections 2.02, 2.03, 2.06, and 2.86, or the Contract Special Provisions (as appropriate) will not be measured for payment and the Contractor assumes responsibility for all costs associated with the appropriate handling, management and disposal of this material.

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

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

Basis of Payment:

This work will be paid for at the Contract unit price, which shall include the loading and transportation of surplus soils (Controlled Materials) to the WSA; stockpiling, covering, securing, and maintaining Controlled Materials in the WSA; maintaining the WSA; loading and transportation of Controlled Materials from the WSA to the treatment/recycling/disposal facility; any fees paid to the facility for treatment/recycling/ disposal; preparation of all related paperwork; and all equipment, materials, tools, and labor incidental to this work. **This unit price will be applicable to all of the listed disposal facilities and will not change for the duration of the Project.**

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

Pay Item

Disposal of Controlled Materials

Pay Unit

Ton

ITEM #0210821A – WATER POLLUTION CONTROL

Description: This work shall consist of measures to control water pollution and soil erosion which become necessary for the completion of the work, but for which no item is provided in the Contract. Such measures include:

- temporary check dams, water bars, berms, dikes, dams
- temporary sediment traps
- pump settling basins
- silt fence
- inlet protection
- hay bales
- erosion control matting
- fiber rolls, coir rolls, wattles
- gravel, stone, riprap
- mulch
- permanent or temporary seeding
- slope drains, ditches, channels, temporary drainage measures
- dust control
- topsoil
- other erosion control materials, devices, or methods

If a situation arises that requires immediate deployment of water pollution control measures, the Engineer will direct the Contractor to use this item to prosecute the work.

If the Contractor proposes changes in construction methods or staging which would affect the as designed pollution controls, plans for revised pollution controls shall be submitted for the Engineer's approval prior to start of work.

Materials: The materials shall meet the pertinent articles of the Standard Specifications. The Contractor shall submit Product Data for the materials.

Construction Methods: The Engineer has the authority to control the surface area of earth material exposed by construction operations and to direct the Contractor to immediately provide permanent or temporary pollution control measures to protect watercourses, wetlands, or other natural resources. Every effort shall be made by the Contractor to prevent erosion on the Site and prevent runoff onto abutting property.

All disturbed areas shall be permanently or temporarily stabilized by mulching, seeding or other methods as the work progresses to comply with the intent of this specification.

All damaged slopes shall be repaired as soon as possible. The Engineer will limit the surface area of earth material exposed if the Contractor fails to sufficiently protect the slopes.

The Contractor shall always have on hand the necessary materials and equipment to provide for slope stabilization and corrective measures to damaged slopes.

Temporary channels, ditches, water bars and outfalls shall be protected prior to directing water into them.

The erosion control features installed by the Contractor shall be maintained by the Contractor, and such installations shall be removed if ordered by the Engineer. Maintenance of erosion control measures by the Contractor shall include the clean out of accumulated sediment.

Method of Measurement: The work and materials required for Water Pollution Control measures will be measured for payment as provided for under 1.09.04 - Extra and Cost-Plus Work.

The sum of money shown on the estimate and in the itemized proposal as "Estimated Cost" for this work 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: Work will be paid for as provided under 1.09.04 - Extra and Cost-Plus Work.

Control measures that are made necessary by the Contractor's failure to install and maintain controls as a part of the work as scheduled or ordered by the Engineer shall be performed by the Contractor at its own expense.

Control work at off-Site areas selected by the Contractor shall be the responsibility of the Contractor.

Pay Item
Water Pollution Control

Pay Unit
est.

ITEM #0219011A – SEDIMENT CONTROL SYSTEM AT CATCH BASIN

Description: Work under this item shall consist of furnishing, installing, maintaining, replacing, and removing sediment control system at catch basins, herein referred to as Silt Sack, at the locations as shown on plans or as directed by the Engineer. The work shall also include removal of accumulated sediment, and disposal of accumulated sediment,

Materials: The Silt Sack must be commercially produced and marketed for the specific application(s) on the Project. All Silt Sack must be manufactured from a specially designed woven polypropylene geotextile sewn material. The Silt Sack must be able to handle flows of at least 180 gallons per minute per square foot, fit any sized catch basin or drop inlet, and be UV resistant.

The Silt Sack product shall be one of the following or an approved equal:

1. Siltsack®
2. Dandy Sack®
3. FleXstorm Catch-It™
4. PIG®Sediment-Drain Filter
5. ACF Environmental Silt Sack

The Sediment Control System at Catch Basin must have the following features: two dump straps attached at the bottom to facilitate the emptying of the Silt Sack and lifting straps to be used to lift the Silt Sack from the catch basin or drop inlet. The Silt Sack shall have a restraint cord approximately halfway up to keep the sides away from the catch basin or drop inlet walls. When required, a curb deflector shall be installed as directed by the Engineer.

Product Data for the Silt Sack to be used by the Contractor must be submitted for review and acceptance by the Engineer or their authorized delegate prior to the installation on-Site.

Construction Methods: The Contractor shall install the Silk Sack per the manufacturer's instructions and recommendations at each catch basin or drop inlet as shown on the plans or as directed by the Engineer to provide inlet protection to prevent silt, sediment, or debris from entering the stormwater drainage system.

When the Silt Sack becomes 1/2 full of accumulated sediment, the Contractor shall empty, clean, and replace the Silt Sack back into the catch basin or drop inlet. Sediment emptied shall be considered unsuitable material and be disposed of at an off-Site approved upland facility per federal, State, and local environmental laws and regulations.

At the completion of the Project, the Contractor shall remove all Silt Sacks within the Project limits. Any spilled sediment material during removal operations shall be removed by the Contractor at no cost to the State.

Method of Measurement: Sediment Control System at Catch Basin will be measured as each installed, maintained, accepted, and removed. There will be no separate measurement for maintenance or replacement associated with this item.

Basis of Payment: The item “Sediment Control System at Catch Basin” will be paid at the Contract unit price for each completed system in place and accepted, which price shall include installing, maintaining, replacing, removal of material, off-Site disposal of accumulated material, materials, equipment, tools, and labor incidental thereto.

The cost of installing hay bales, geotextile, check dam, or fiber roll for inlet protection shall be paid for under their respective Contract item or special provision.

Pay Item	Pay Unit
Sediment Control System at Catch Basin	ea.

ITEM #0406002A – TEMPORARY PAVEMENT

Description: This work shall consist of the installation and removal of temporary pavement at the locations shown on the Plans or as directed by the Engineer. The work shall include the following:

1. Excavation, removal, and disposal of all existing materials within the limits of the temporary pavement including sawcutting of any existing pavement,
2. Grading and compacting remaining subbase or subgrade,
3. Furnishing, installation, and compaction of new subbase,
4. Application of tack coat as required on the vertical edges of any sawcut areas and between pavement lifts,
5. Placement and compaction of bituminous concrete pavement,
6. Removal of all materials associated with the temporary pavement work as shown in the Contract documents or determined by the Engineer.

This work does not include restoration of the area to a permanent condition after temporary pavement is removed, including turf establishment or final paving, which shall be performed under separate items.

Materials: Materials for this work shall consist of the following:

1. Subbase meeting the requirements of Article M.02.02.
2. Bituminous concrete meeting the requirements of Section M.04. The bituminous concrete mix used shall be HMA S0.5 Traffic Level 2 unless indicated otherwise on the Plans, or when an equivalent mix type is requested by the Contractor and approved by the Engineer at least 5 days in advance.
3. Tack coat meeting the requirements of Section M.04.

Construction Methods: Equipment for this work shall include pavement cutting as required, excavation, removal, handling, grading, placement, and compaction equipment for existing or new materials to perform all temporary pavement installation and removal operations. The Contractor shall also provide a 10-foot straightedge.

1. The limits of temporary pavement shall be identified as shown on the Plans or as directed by the Engineer.
2. Any existing pavement shall be sawcut as required. All existing materials within the temporary pavement limits (including but not limited to asphalt or concrete pavement, granular base, subbase, subgrade, fill, topsoil, and curbing) shall be excavated to the depth indicated on the Plans in accordance with Section 2.02. Excavated materials shall be removed and properly disposed of in accordance with Article 1.10.03.
3. Remaining subbase or subgrade shall be graded and compacted in accordance with Section 2.09. A minimum of four (4) passes, or coverages, shall be made by any one compaction device.
4. Subbase shall be installed and compacted in accordance with Section 2.12 to the depth shown on the Plans.

5. When applicable, the sawcut sides of any excavated areas shall be wiped or swept clean, and tack coat shall be applied covering the entire area of the vertical pavement faces and allowed to cure in accordance with Section 4.06.
6. HMA S0.5, or other approved mix type, shall be placed and compacted in accordance with Article 4.06.03 and as shown on the Plans.
7. The Contractor shall confirm that the surface elevation of the finished temporary pavement matches the elevation of the surrounding pavement surface to within $\frac{1}{4}$ inch using the 10-foot straightedge when applicable.
8. Each lift of the temporary pavement surface course shall not vary more than $\frac{1}{4}$ inch from a Contractor-supplied 10-foot straightedge. Any surface that exceeds this tolerance shall be corrected by the Contractor at their own expense.
9. All materials associated with the temporary pavement work shall be removed and properly disposed of in accordance with Article 1.10.03 at a time specified within the Contract documents or as directed by the Engineer.
10. All temporary pavement work shall be maintained in a safe and satisfactory condition until the temporary pavement area has been restored to its preexisting condition or replaced with the construction of permanent pavement or other surface type as shown in the Contract documents. All temporary pavement repairs shall be provided by the Contractor at no additional cost to the State.

Method of Measurement: This work will be measured by the number of square yards of temporary pavement installed and removed at the locations shown on the Plans or as directed by the Engineer.

Basis of Payment: This work will be paid for at the Contract unit price per square yard for "Temporary Pavement," completed and accepted. The price shall include all tools, materials, labor, and equipment including sawcutting, excavation, removal, and disposal of all materials, grading and compacting existing subbase or subgrade, placement, grading, and compacting new subbase, application of tack coat, and placement and compaction of bituminous concrete materials.

Restoration of the area to a permanent condition after temporary pavement is removed, including turf establishment or final paving, will be paid under separate items.

There will be no additional payment for correction of temporary pavements that do not meet the specified surface tolerance when measured with the 10-foot straightedge. There will be no additional payment for repair of temporary pavements.

Pay Item
Temporary Pavement

Pay Unit
s.y.

ITEM #0406125.10A – BITUMINOUS CONCRETE PATCHING – PARTIAL DEPTH ON PCC

Description:

This work shall consist of milling out deteriorated PCC pavement to a depth between 1.5 to 2.5 inches, disposing of pavement millings, chipping and removing loose and spalled concrete pavement, sweeping and cleaning, application of tack coat on all surfaces within the milled area, and placement of Hot-Mix Asphalt (HMA) or an equivalent Polymer Modified Asphalt (PMA) to match the elevation of the surrounding pavement.

For road sections being milled and paved, all patching operations must be completed after milling is complete and before paving begins. All patching operations shall be completed within one working day following milling and shall be completed before traffic is permitted to resume on the exposed roadway.

Materials:

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

1. HMA S0.375, 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, but is not limited to, the following:

1. Milling machine: A milling machine designed and built for milling PCC pavements. It shall be self-propelled with sufficient power, traction, and stability to maintain depth and slope and shall be capable of removing the existing pavement.

The rotary drum of the machine shall use carbide or diamond tip tools spaced not more than 15 mm apart. The forward speed of the milling machine shall be a maximum of 45 feet/minute. The tools on the revolving cutting drum must be continually maintained and shall be replaced as warranted to provide a uniform pavement texture.

The machine shall be equipped with an integral pickup and conveying device to immediately remove milled material from the surface of the roadway and discharge the millings into a truck in one operation. The machine shall also be equipped with a means of effectively limiting the amount of dust escaping from the milling and removal operation. When milling smaller areas or areas where it is impractical to use the above described equipment, the Contractor may be permitted to use a lesser equipped milling machine, if approved by the Engineer.

The minimum milling width shall be 20 inches, making the minimum achievable patch size 20 inches by 20 inches, or 0.30 square yards.

2. 10-foot straight edge.
3. Sweeper: A sweeper, equipped with a water tank, capable of remove millings and loose debris.
4. Air compressor: An air compressor capable of producing 100 psi oil free compressed air for cleaning the milled pavement surface.
5. Hot air lance: A hot air lance that can deliver 100 psi oil free heated air to clean and dry the pavement surface. The compressed air emitted from the tip of the lance shall achieve a temperature of at least 1500°F.
6. Paving and compaction equipment: Paving and compaction equipment meeting the requirements of Section 4.06. It is expected that placement of patch material will require hand work or a mixture of equipment and hand tools to achieve the required results. A vibratory roller must be used for compaction. Smaller equipment, including vibratory plate compactors, may be allowed for areas inaccessible by the roller when requested by the Contractor and approved by the Engineer.
7. Portable lighting equipment: If the work is performed at night a truck towed light tower and driver shall be provided for use by the Engineer for all marking, installation, and inspection of the patches.
8. Tack Coat Distributor: 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.
9. Jackhammer: A maximum 15-pound jackhammer capable of chipping away loose or spalled PCC that remains after milling.

The work shall include, but is not limited to, the following:

1. Demarcating: The Engineer will mark out areas for patching and will determine the appropriate milling depth between 1.5 inches and 2.5 inches. The minimum length and width dimensions of the patch shall be 20 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. Milling: Mill marked out areas to the specified depths.
3. Chipping and removing loose and spalled concrete pavement.
4. Sweeping, Cleaning, and Drying: Sweep the milled surface clean, and allow milled areas to dry. Any moisture in or on the milled areas must be allowed to evaporate or be removed with the assistance of the hot air lance. When the milled area is dry to the

satisfaction of the Engineer, it shall be blown clean of any residual dust or debris using compressed air.

5. Applying Tack Coat: Apply tack coat to the entire clean and dry milled area, including the sides/walls of the area to be patched, in accordance with the requirements of Section 4.06.
6. Placing/Compacting Patch Material: After the tack coat has had sufficient time to cure or break, HMA S0.375 (or equivalent PMA) shall be placed within the milled area. The patch material shall then be compacted by a minimum of 5 passes with a vibratory roller or other approved equipment to the satisfaction of the Engineer. A “pass” is defined as one coverage of a roller over any given pavement surface area in a single direction. At all times the Contractor is required to meet the placement, compaction, and other applicable requirements specified within Sections 4.06 and M.04, except that cores for field density measurements will not be taken or evaluated for patching work under this item.
7. Finished Patches: After placement and compaction, 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.

Method of Measurement:

This work will be measured by the number of square yards of patched pavement completed and accepted.

Basis of Payment:

This work will be paid for at the Contract unit price per square yard of “Bituminous Concrete Patching – Partial Depth on PCC.” The price shall include all tools, materials, labor and equipment; milling, chipping, removing, and disposing of pavement millings and loose or spalled PCC; sweeping and cleaning of the milled area; drying the milled area; applying tack coat to the milled area; and placement and compaction of HMA or PMA.

Pay Item	Pay Unit
Bituminous Concrete Patching – Partial Depth on PCC	s.y.

ITEM #0406314A – 80 MIL PAVEMENT MARKING GROOVE 5” WIDE
ITEM #0406315A – 80 MIL PAVEMENT MARKING GROOVE 7” WIDE

Description: Work under this item shall consist of grooving the pavement surface in continuous or intermittent intervals for the placement of recessed pavement markings. Unless otherwise noted, the groove shall be 1 inch wider than the anticipated pavement marking. The groove for double-yellow centerline markings shall consist of two grooves, each 5 inches wide.

Groove Width: 5 inches wide for 4-inch markings
7 inches wide for 6-inch markings

Groove Depth: 0.080 inches \pm 0.010 inches

The groove shall not be installed continuously for intermittent (Dotted Lines and Broken Lane Lines) pavement markings, but only where markings are to be applied.

The groove shall not be installed on metal bridge decks, on bridge joints, at drainage structures, at loop detector sawcut locations, or in other areas identified by the Engineer.

Construction Methods:

Equipment: The grooving equipment shall be equipped with a free-floating, depth-controlled head which provides a consistent groove depth over irregular pavement surfaces. The grooving head shall only be equipped with diamond saw blades. Any ridges in the bottom of the groove shall have a maximum height of 0.015 inches. The grooving equipment shall be capable of installing a groove 6 inches away from any vertical or horizontal obstruction.

Installation: The pavement marking groove shall be installed in accordance with the current CTDOT pavement marking standard drawings.

The Contractor shall establish control points for measuring offsets and pre-marks along the entire distance of pavement being grooved. Prior to installation of the groove, the Contractor shall verify that the equipment is capable of installing the correct width and spacing of the groove. The control points, pre-marks, and equipment will be reviewed by the Engineer prior to commencement of the work.

The groove will be considered defective if any edge of the groove varies more than 0.25 inch in a 10-foot length, or if the alignment of the groove visibly deviates from the normal alignment of the road.

Final Cleaning: The Contractor shall immediately collect all debris and dust resulting from the grooving operation by vacuuming the pavement groove and adjacent pavement surface. Collected debris and any waste material shall be properly disposed of by the Contractor.

The work area shall be returned to a debris-free state prior to re-opening to traffic.

Repair of Unacceptable Groove: The Contractor shall repair any defective groove(s) to the satisfaction of the Engineer. All work in conjunction with this repair shall be performed at no additional cost to the State.

Pavement Marking Requirements: The Contractor is required to install permanent pavement markings in the grooves before the lane or roadway is opened to live traffic. If the permanent pavement markings cannot be installed before the lane or roadway is opened to live traffic, the Contractor will need to obtain approval from the Engineer to open the lane or roadway. Liquidated Damages based on Limitation of Operations restrictions will be enforced. If approved by the Engineer, the Contractor will be allowed to open the lane or roadway to live traffic and the Contractor will be required to install temporary hot-applied waterborne pavement markings without glass beads, at their own expense, within 24 hours of opening the lane or roadway. Temporary hot-applied waterborne pavement markings shall be applied at a 5 mil thickness. Within 5 calendar days after the installation of the groove, permanent pavement markings shall be applied in the groove over the temporary hot-applied waterborne pavement markings.

Groove Depth Gauge: The Contractor shall supply the Engineer with two accurate, easily readable gauges with which to verify groove depth for the duration of the Project. The gauges shall be delivered at least one week prior to the anticipated beginning of grooving operations. Gauges shall be accompanied by the manufacturer's instructions for their use. The gauges will be returned to the Contractor at the conclusion of the Project.

Method of Measurement: This work will be measured for payment by the number of linear feet of grooves installed in the pavement as ordered and accepted by the Engineer.

Basis of Payment: This work will be paid for at the Contract unit price per linear foot of "Pavement Marking Groove" installed in the pavement and accepted. This price shall include cleaning of the pavement, all materials, equipment, tools, depth gauges, and labor incidental thereto, and disposal of any waste material resulting from the grooving operation.

Pay Item	Pay Unit
80 Mil Pavement Marking Groove 5" Wide	l.f.
80 Mil Pavement Marking Groove 7" Wide	l.f.

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 the following:

- I. Hot Mix Asphalt (HMA) and Polymer Modified Asphalt (PMA),
- II. Ultra-Thin Bonded HMA (UTB-HMA) and Ultra-Thin Bonded PMA (UTB-PMA),
- III. Thin Friction Wearing Course (TFWC),
- IV. Binder Rich Intermediate Courses (BRIC) and Stone Matrix Asphalt (SMA), and
- V. Asphalt Rubber Chip Seal (ARCS) treatments 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 the following conditions are met per mixture:

- I. For HMA, PMA, TFWC, BRIC, and SMA mixtures:
 - a. The HMA, PMA, TFWC, BRIC, or SMA 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, PMA, TFWC, BRIC, and SMA 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 UTB-HMA and UTB-PMA mixtures:
 - a. The UTB-HMA or UTB-PMA mixture for which the adjustment would be applied is listed as a Contract item.
 - b. ***The total quantity for the UTB-HMA or UTB-PMA mixture in the Contract exceeds:***
 - i. 800 tons if the UTB-HMA or UTB-PMA item has a pay unit of tons,***
 - ii. 30,000 square yards if the UTB-HMA or UTB-PMA item has a pay unit of square yards, or***
 - iii. the Project duration is greater than 6 months.***

Note: The quantity of UTB-HMA or UTB-PMA measured in tons shall be determined from the material documentation requirements set forth in the UTB-HMA or UTB-PMA item specification.

- 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 UTB-HMA or UTB-PMA mixture system.

III. For Asphalt Rubber Chip Seal (ARCS) treatments:

- a. The ARCS treatment for which the adjustment would be applied is listed as a Contract item.
- b. ***The total quantity for the ARCS treatment in the Contract exceeds 30,000 square yards or the Project duration is greater than 6 months.***

Note: The quantity of asphalt binder measured in tons used for the Asphalt Rubber Chip Seal treatment shall be determined from the material documentation requirements set forth in the ARCS item specification. The Asphalt Adjustment Cost will also be applied to the asphalt binder used to pre-coat the cover aggregate as part of the ARCS and will be considered as a portion of the total tons of binder for the treatment. The additional quantity of binder measured in tons will be determined based on a percentage of the cover aggregate weight per the requirements set forth in the ARCS item specification.

- c. The difference between the posted *Asphalt Base Price* and *Asphalt Period Price* varies by more than \$5.00 per ton.

Regardless of the binder used in all mixtures or treatments, 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:

A. **Formula A: $HMA \times [PG\%/100] \times [(Period\ Price - Base\ Price)] = \$ \underline{\hspace{2cm}}$**

Where:

- **HMA:**
 1. For HMA, PMA, UTB-HMA, UTB-PMA, TFWC, BRIC, and SMA mixtures with pay units of tons:
The quantity in tons of accepted HMA, PMA, UTB-HMA, UTB-PMA, TFWC, BRIC, or SMA mixture measured and accepted for payment.
 2. For UTB-HMA and UTB-PMA mixtures with pay units of square yards:
The quantity of UTB-HMA and UTB-PMA mixture delivered, placed, and accepted for payment, calculated in tons as reported according to the Material Documentation provision of the UTB-HMA and UTB-PMA specification.
- **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, PMA, UTB-HMA, UTB-PMA, TFWC, BRIC, or SMA 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 UTB-HMA, UTB-PMA, TFWC, BRIC, and SMA 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%)

B. For Asphalt Rubber Chip Seal:

Formula B: Total Tons x [(Period Price - Base Price)] = \$ _____

Where:

- **Total tons:** The tons of asphalt binder for each lot of asphalt rubber produced, as reported according to the Testing and Certification article of the specification for Asphalt Rubber Chip Seal, and the tonnage of binder used to coat the cover aggregate calculated as follows: 0.6% x tons of cover aggregate.
- **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 Asphalt Rubber Chip Seal mixture was placed.

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 applicable formula(s) 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
Asphalt Adjustment Cost

Pay Unit
est.

ITEM #0601091A – SIMULATED STONE MASONRY

Description: This item shall consist of furnishing and installing textured and colored formed concrete surface on precast concrete retaining wall system modules during their fabrication process using simulated stone molds (form liners) and a color staining system designed to duplicate closely the appearance of the existing stone wall to be replaced and matched in the location and to the limits shown on the plans, including accessories and hardware and in accordance with these specifications. The architectural form liner simulated stone masonry shall be monolithically formed with the concrete.

Materials:

1. **Quality of Work:** The process of form lining, texturing and color staining of the hardened concrete shall be performed in strict accordance with the manufacturer's written recommendations and as approved by the Engineer.
2. The design and pattern of form lined concrete surfaces shall conform to the limits shown on the contract plans and the manufacturer's standard drawing. Final coloration of cast stone concrete surfaces shall accurately simulate the appearance of real stone. It shall also demonstrate the colors that may be apparent from aging, such as staining from oxidation, rusting and/or organic staining from soil and/or vegetation.
3. **Quality Assurance:**
 - a. Manufacturer of Simulated Stone Molds and Custom Coloring Systems shall have five years of experience making custom simulated stone molds and color stains to create formed concrete surfaces to match natural stone shapes, surface textures and colors.
 - b. Contractor/Subcontractor (installer) shall have five years of experience placing vertically formed architectural concrete. The installer shall be trained in the manufacturer's special techniques in order to achieve realistic surfaces.
 - c. Color Stain System Application shall be performed by the manufacturer or manufacturer's authorized representative. The stain shall be applied by an applicator having, and able to demonstrate, experience with similar projects.
 - d. A Pre-installation Meeting shall be scheduled with the manufacturer's representative, installer, designer, and the Municipality's inspection personnel (if applicable) to assure understanding of simulated stone masonry use, patterning, color staining application, and to coordinate the work. Failure to request and conduct a pre-installation meeting may result in the work being rejected.
4. **Protection:** The contractor is solely responsible for construction methods, means, techniques, and for construction site safety precautions. The contractor shall conduct all

construction operations in conformance with all applicable local, state and federal safety laws, rules, regulations and codes. All Material Safety Data Sheets (MSDS) shall be available for inspection.

5. **Manufacturer:** Subject to compliance with the design and specification requirements, the contractor shall provide simulated stone masonry and color staining system as manufactured by:
 - Concrete Rock Surfaces, LLC, Bethel, Connecticut (Pattern: 11766 Denver Drystack)
6. **Materials:**
 - a. Simulated Stone Molds (form liners) shall be made of reusable elastomeric form liners, made of high-strength urethane and cutable form liners, and easily attachable to forms. Form liners shall leave crisp, sharp definition of the architectural surface. Recurring textural configurations exhibited by repeating, recognizable shadow patterns shall be prevented by proper casting of form liner patterns. Form liners shall not compress more than 1/4 inch when concrete is placed at a rate of 10 vertical feet per hour. Form liners shall be removable without causing deterioration of surface or underlying concrete. No substitutions will be permitted.
 - b. The form liner shall conform to the pattern specified herein. The form liner shall have a maximum 4-inch relief and resemble the patterning of the existing wall to be replaced/matched. The color staining system shall be selected to resemble the existing stone walls.
 - c. The form liner shall be designed to permit 180-degree rotation and interconnection with itself or another pattern liner of differing horizontal dimension. The simulated stone pattern shall vary in a random manner in the coursing parameters to prevent noticeable multiple duplicate pattern repetition and avoid stacked joints. The pattern shall be made continuous at all corners and angle points.
 - d. In addition to orthogonal surfaces, the form liner shall be capable of forming curved and/or battered surfaces, if shown on the plans, while maintaining the dimensioned coursing and plumb vertical joints without distortion.
7. **Release Agent:** The release agent shall be compatible with simulated stone masonry and with color staining system to be applied to surface, as recommended by the manufacturer.
8. **Form Ties:** Form ties shall be designed to separate at least one inch back from finished surface, leaving only a neat hole that can be plugged with compatible patching material.
9. **Color Stain:** The color stain shall be a penetrating stain mix as provided by the manufacturer, shall achieve color variations present in the natural stone being simulated for the project, as approved by the Engineer and in accordance Items 1 and 2 above. The stain shall create a surface finish that is breathable (allowing water vapor transmission),

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

Construction Methods:

1. Shop Drawings and Submittals: Before fabricating any materials, the contractor shall submit shop drawings, product data sheets and samples to the Engineer for review and comment in accordance with Article 1.05.02 for the materials listed in Item 3 below. These drawings and submittals shall include, but not be limited to, the following information: manufacturer's name, listing of product compliance with referenced specification standards, complete details of the assemblies, material designations, nominal hardness of appropriate materials, design loads, quantities and locations.

This submittal requires review and written approval from OEP and SHPO per the Memorandum of Agreement dated May 23, 2024 for SPN 0115-0122.

2. Field Measurements: Prior to ordering or fabricating any materials, the contractor shall take complete and accurate field measurements.
3. Submittals:
 - a. Catalog cuts, manufacturer's literature, and technical data for the materials specified herein, including but not limited to simulated stone mold pattern, form liner, release agent, concrete patching material and color charts for staining of hardened concrete.
 - b. Photographs: Color photographs of three (3) similar past projects of the manufacturer. Include project names, locations and a telephone number of the previous projects Owner's representatives.
 - c. Samples: Form ties, sample and description, showing method of separation when forms are removed.
 - d. Plan, elevation and details to show overall pattern, joint locations, form tie locations, and end, edge and other special conditions.
4. Scheduling: Schedule color stain application after adjacent earthwork is completed, to avoid contaminating or damaging the surface. Place topsoil and establish turf after staining application is completed. Coordinate the work to prevent interference with other trades.

5. **Test Panels:** At least 30 days prior to construction of the first textured and colored concrete surfaces, the Contractor shall prepare a test panel with a full-scale field mock-up of the formed concrete surface (4' x 4') showing the proposed color, pattern, joint treatment and layout as shown on the plans or in the Manufacturer's catalog. If the resulting appearance is not acceptable to the Engineer, adjustments shall be made to the color, pattern, finished texture and/or joint treatment and another test panel shall be prepared for inspection. The accepted mock-up shall provide the standard for the work. Failure to provide a test panel and obtain engineers' approval prior to performing the work may result in rejection of the work.
6. **Installation:**
 - a. Contractor's responsibilities:
 1. Install liners. Form liners (pattern) shall match front-to-side and side-to-back.
 2. Apply manufacturer release agent.
 3. Install concrete as specified elsewhere in the Specifications.
 4. Remove form liner.
 5. Patching, grinding and bush hammering of form liner seams as required.
 6. Provide scaffolding and heat as required, and clean water for power washing of the hardened concrete prior to the staining process.
 7. Power washing and patching of form liners.
 8. Return of form liners to manufacturer.
 - b. Manufacturer's responsibilities:
 1. Ship and supply form liners and release agent.
 2. Technical information.
 3. Power wash wall.
 4. Apply the color staining process.
7. **Liner to Form Attachment System:** Securely attach form liners to forms with wood or sheet metal screws; threaded inserts added to the back of the form liner for bolts to fasten the form liner through the forms, or; bolted through the face of the form liner with flat head bolts inserted in a pattern joint and through the form liner and forming system. Construction adhesives may be used, but not on reusable forms. Place adjacent form liners with less than 1/4-inch separation between form liners.
8. **Release of Form Liners From Hardened Concrete:** Only manufacturer recommended form release agents (Lark V or Orna Con) shall be utilized and shall be applied to the form liners before the concrete is poured. Release agents shall be applied in strict accordance with release agent manufacturer recommendations. Hand-charged sprayers will only be allowed if a thin uniform coating of release agent is obtained on the form liner.

Remove the form liner from the wall within 24 hours of placing the concrete. The form liners may be detached from the forms and then removed from the concrete, or they may remain attached to the forms and the entire forming system removed from the concrete. Remove the form liners from the top, down. Curing of concrete may be accomplished with form liners and forms placed back against the wall after the initial detachment. Other means of curing can also be used including curing blankets and/or plastic. Curing compounds shall not be used.

9. **Care and Cleaning of Form Liner:** Form liners shall be cleaned the same day they are removed from the wall with a power wash and mild detergent. Synthetic brushes with stiff bristles may be used on stubborn areas. Mild acid washes may also be used. Solvents shall not be used. If necessary, patching of holes shall be performed with 100% clear silicone caulk. Form liners shall be stored inside or under a protective, non-transparent cover, in a vertical, upside-down position.
11. **Wall Patching and Preparation:** After form liners are removed from the hardened concrete, the textured uncolored surface shall be prepared for color staining. All holes larger than 3/4" in greatest principal dimension shall be filled with concrete patching material with latex or acrylic bonder, as approved by the Engineer. All honeycombed areas shall be filled and textured to match surrounding areas. Seam lines and other unnatural protrusions shall be ground down to match adjacent areas with a hand-held power grinder using discs made for concrete. Grinding of seams shall be performed immediately after removal of the form liners. Perform final bush hammering to blend defects and ground areas into the final rock texture. In particular, the process of wall patching and preparation shall be subject to approval of the manufacturer and Engineer. Failure to patch and prepare the wall prior to staining may result in the work being rejected.
12. **Color Staining:** The hardened concrete shall be a minimum of 30 days old before color staining is applied. Powers wash the wall to free it from latency, dirt, oil and other objectionable materials. After the wall has dried, the color staining process is applied using colors approved by the Engineer. Color staining shall be applied in such a way that the stones shall have individual colorations from one to the other. Water-based stains shall be used in air temperatures between 50 degrees F and 100 degrees F. Solvent-based stains shall be used in air temperatures of 50 degrees F and below, but in no case when the temperature of the hardened concrete is 40 degrees and falling. During color staining operations the Contractor shall protect property, pedestrians, vehicular and other traffic upon, underneath or in the vicinity of the walls against damage or disfigurement from errant stain materials. Comply with all environmental regulations regarding surface cleaning, stain application, ground and watercourse protection and disposal protection of waste materials. Refer to Section 1.10 of the Standard Specifications.

Color: Color shall include a minimum of five color shades including earth tones to simulate a typical random fieldstone pattern. Coloring shall be applied to simulated stones individually and the colors and/or tones shall be varied randomly so as to emulate the variations found in natural stone. The test panel shall exhibit the Contractor's proposed color scheme and staining pattern.

Any areas lacking a uniform appearance (consistent with the approved sample) shall be recoated to the satisfaction of the Engineer at no additional cost to the State.

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

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

Basis of Payment: This work will be paid for at the contract unit price per square yard for "Simulated Stone Masonry", complete in place, which price shall include all equipment, formwork molds, test panels, and all other tools and labor incidental thereto.

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

Concrete shall be paid for under the item "Retaining Wall (Site No. 1)."

Pay Item	Pay Unit
Simulated Stone Masonry	s.y.

ITEM #0601651A – RETAINING WALL (SITE NO. 1)

Description: This item shall consist of designing, furnishing and constructing a retaining wall and all incidentals necessary to complete the work in the location, at the grades, and to the dimensions and details shown on the Plans.

Retaining Wall Selection: The retaining wall type shall be selected from the list of retaining walls shown on the Plans. The Plans may also detail a cast-in-place reinforced concrete retaining wall. The Engineer will reject any proposed retaining wall type that is not listed on the Plans.

The Plans will list all proprietary retaining walls that are appropriate for each Site. This list does not warrant that the walls can be designed to meet either the dimensional, structural, or geotechnical constraints at each Site.

Refer to the Department's Qualified Product List (QPL) for the currently acceptable proprietary retaining wall and for suppliers' contact information; no other proprietary retaining walls will be allowed. The Department's QPL can be found at:

Qualified Products List

NOTE: SEE THE PLANS FOR THE SPECIFIC RETAINING WALL TYPES THAT ARE ACCEPTABLE FOR EACH SITE.

On-Site Representative: A qualified and experienced representative from the retaining wall supplier shall be at the Site at the initiation of wall construction to assist the Contractor and the Engineer at no additional cost to the Department. The wall supplier's on-Site representative shall have, in the past three years, successfully installed at least three retaining walls of the height, length and complexity similar to the retaining wall(s) shown on the Plans and meeting the tolerances specified herein. If there is more than one wall or more than one wall type on the Plans, this criterion will apply to the construction of the initial wall only, or the initial wall of each wall type only. After the initial wall construction, the representative shall also be available on an as needed basis, as requested by the Engineer.

Pre-Installation Meeting: A Pre-Installation meeting shall be scheduled prior to commencement of construction activity. Attendees shall include the Engineer, the Contractor (including wall construction crew chiefs), the wall Subcontractor, wall manufacturer and wall designer, or their respective representatives. No wall construction activity shall be performed until the Contractor's final submittal has been accepted by the Engineer and the Pre-Installation meeting has been held.

Design: Design computations are not required for the cast-in-place wall option detailed on the Plans except the Contractor shall submit Working Drawings and design computations, in

accordance with Article 1.05.02, for any temporary earth retaining systems (TERS) necessary (included in the lump sum item).

The submissions for proprietary retaining walls shall be treated as Working Drawings in accordance with Section 1.05.02.

1. Design Computations: If the Contractor chooses one of the proprietary wall options, he is fully responsible for the design, detailing and additional specifications required. The actual designer of the retaining wall shall be a qualified Professional Engineer licensed in the State of Connecticut. The designer must have designed at least three proprietary walls within the last three years.
2. Designer's Liability Insurance: The Designer of the proprietary retaining wall shall secure and maintain, at no direct cost to the Department, a Professional Liability Insurance Policy for errors and omissions in accordance with Articles 1.03.07 and 1.05.02.
3. Preliminary Submissions for Proprietary Retaining Walls: Prior to the start of fabrication or construction, the Contractor shall submit Working Drawings to the Engineer, which shall include, at a minimum the following:
 - a. Detailed Plans:
 - 1) Full plan view of the wall drawn to scale. The plan view must reflect the horizontal alignment and offset from the horizontal control line to the face of the wall. Beginning and ending stations, all utilities, signs, lights, etc. that affect the construction along with all property lines and easement lines adjacent to the retaining wall shall be shown.
 - 2) Full elevation view of the wall drawn to scale. Elevation views shall indicate the elevation at the top and bottom of walls, horizontal and vertical break points, and the location of finished grade.
 - 3) Typical cross sections drawn to scale including all appurtenances. Detailed cross sections shall be provided at significant reinforcement transitions such as wall ends.
 - 4) Details of all wall components and their connections such as the length, size and type of reinforcement and where any changes occur; modular component and facing details including reinforcing steel and reinforcement connections; joint material including geotextile filter location and horizontal joint compression material, etc.
 - 5) Drainage details for embankment backfill including attachment to outlets shown on Plans.
 - 6) Details of any roadway drainage pipe projecting through the wall, or any attachments to the wall. Details of the treatment of drainage swales or ditches shown on the Plans.
 - 7) Design parameters used along with references from latest edition of American Association of State Highway and Transportation Officials (AASHTO) LRFD Bridge Design Specifications, including the latest interims, as specified in the Plans.
 - 8) Material designations for all materials to be used.
 - 9) Detailed construction methods including a Quality Control plan. Construction Quality Control plans shall include monitoring and testing frequencies (e.g., for

setting batter and maintaining horizontal and vertical control), construction restraints, and specific requirements for construction around obstructions.

- 10) Details of parapet attachments where required, along with any lighting and/or signing requirements.
- 11) Details of architectural treatment where required.
- 12) Details of TERS where required.
- 13) Details of retaining wall treatment where the wall abuts other structures.
- 14) Treatment at underground utilities where required.

b. Design Computations:

- 1) Computations shall clearly refer to the applicable AASHTO LRFD Bridge Design Specifications provisions as stated on the Plans.
- 2) Documentation of computer programs including all design parameters.
- 3) The design shall meet the criteria listed below.

c. Construction Specifications:

- 1) Construction methods shall be specific to the proprietary retaining wall chosen. These specifications shall include construction limitations including vertical clearance, right-of-way limits, etc.
- 2) Submittal requirements for materials such as certification, quality, and acceptance/rejection criteria.
- 3) Details on connection of modular units and connection of reinforcements including assurance of uniform stress transfer.
- 4) Any other requirements.

4. Final Submissions for Proprietary Retaining Walls: Once a proprietary retaining wall design has been reviewed and accepted by the Department, the Contractor shall submit Working Drawings in accordance with Article 1.05.02.

The Working Drawing submission shall be made no later than 14 days after acceptance by the Department. No work shall be performed on the retaining wall until the Department has accepted the Working Drawings.

Acceptance of the Working Drawings shall not relieve the Contractor of responsibility for the successful completion of the work.

The Contractor's designer of the proprietary retaining wall shall review any Shop Drawings prepared for the fabrication of the wall. One set of full-size accepted Shop Drawings shall be submitted per Article 1.05.02 Submittals.

5. General Design Requirements:

- a. All designs for proprietary walls and TERS (if required) shall meet the requirements of the latest edition of the AASHTO LRFD Bridge Design Specifications including the latest Interims published except as noted otherwise herein.
- b. The wall design shall follow the dimensions of the wall envelope shown on the Plans.

For all proprietary walls, the top of the leveling pad or reinforced concrete toe footing shall be located at or below the bottom of the footing elevation shown on the Plans. If no footing elevation is shown, the minimum wall embedment shall be 4 feet as measured to the top of the leveling pad or toe footing.

If steps at the bottom of the wall are required, they shall be kept at or below the footing elevation shown on the Plans. Steps in addition to those shown on the Plans will be permitted at no additional cost to the Department.

- c. The wall shall be designed to be within all property lines and easement lines shown on the Plans. If additional work areas are necessary for the construction of the proprietary retaining wall, the Contractor shall be responsible for obtaining the rights from the affected property owners. Copies of these rights shall be forwarded to the Department.
- d. The top of the wall shall be at the top of the wall elevations shown on the Plans. Where coping or barrier is used, the wall face panel shall extend up into the coping or barrier a minimum of 2 inches. The top of the face panels may be level or sloped to meet the top of the wall line noted.
- e. Cast-in-place concrete will not be an acceptable replacement for areas noted by the wall envelope, except for minor grouting of pipe penetrations and leveling required for coping or traffic barrier.
- f. The wall shall be designed for a minimum live load surcharge as specified in AASHTO LRFD Bridge Design Specifications Article 3.11.6. If there are specific live load surcharges acting on the wall, they shall also be accounted for. The minimum equivalent fluid pressure used to design the wall shall meet the requirements of AASHTO LRFD Article 3.11.5.
- g. If stated on the Plans, the retaining wall shall be designed for seismic forces according to the AASHTO LRFD Bridge Design Specifications.
- h. If the wall is detailed with a concrete parapet, the top two courses of prefabricated modular walls units shall be designed to support a transverse railing load of 10 kips. The 10-kip load may be distributed over the length of the parapet section between joints, but not exceeding 20 feet. Computations that verify the stability of the top two courses of the modular units shall be submitted to the Engineer.

The detailing and reinforcement in the parapet section above the gutterline or finished grade, including any light standard attachments, shall be as shown on the Plans.

- i. The wall shall be designed to accommodate all roadway drainage and drainage structures as shown on the Plans.
- j. At a minimum, an underdrain system shall be provided for leading subsurface and surface water away from the backfill and outside limits of the wall.
- k. Hydrostatic Forces: Unless specified otherwise, when a design high water surface is shown on the Plans at the face of the wall, the design stresses calculated from that elevation to the bottom of wall must include a 3-foot minimum differential head of saturated backfill. In addition, the buoyant weight of saturated soil shall be used in the calculation of pullout resistance.
- l. The Maximum Design Foundation Pressures for both Strength and Service Limit States shall be as shown on the Plans. The foundation pressure stated assumes a uniform

pressure distribution. If additional soils information is required by the Contractor's designer, it must be obtained by the Contractor at no additional cost to the Department.

- m. Backfill: The friction angle of the Previous Structure Backfill used in the reinforced fill zone for the internal stability design of the wall shall be assumed to be 34 degrees unless shown otherwise on the Plans. The friction angle of the in-situ soils shall be assumed to be a maximum of 30 degrees unless otherwise shown on the Plans.
- n. Parapet and Moment Slab Design:
 - 1) General requirements for parapet and moment slab design: Where an unyielding barrier (e.g. concrete barrier, parapet) on top of the retaining wall is warranted, the parapet and moment slab shall be designed in accordance with the latest AASHTO LRFD Bridge Design Specifications, including the latest interim specifications and errata, amended as follows:

The parapet shall be designed and constructed of precast or cast-in-place concrete. The moment slab shall be designed and constructed of cast-in-place reinforced concrete.

Above the finished grade, the parapet dimensions, concrete and reinforcement shall meet the Department's retaining wall parapet details. Below the finished grade, the parapet shall be designed to resist the forces specified in the following table:

MASH Test Level	Parapet Height (in.)	Design Transverse Impact Force F_t (kips)	Height of Design Impact Force (in.)
TL-3	≥ 29	71	19
TL-4	36	68	25
	> 36	80	30
TL-5	42	160	35
	> 42	262	43

The structural design of the moment slab and its connection to the parapet shall resist, at a minimum, a transverse load equal to 100% of F_t . The length of the structural connection between parapet and moment slab assumed to resist transverse force F_t shall be the distance between parapet joints but not greater than 30 feet in any case.

The minimum thickness of the moment slab shall be 1 foot.

The design of the moment slab for overturning and sliding shall be based on a lateral force of 10 kips static load. The length of the moment slab assumed to resist sliding and overturning may exceed parapet joint spacing providing the slab is monolithic beneath the joints but shall be no greater than 30 feet in any case. The moments shall be summed about the front face of the wall facing. All resistance factors shall be taken as 1.0. The internal angle of friction for the soil shall be assumed to be 34 degrees unless otherwise shown on the Plans.

Minimum concrete cover for reinforcing steel shall be 2 inches for top bars and 3 inches for bottom bars.

2) Precast Concrete Parapet Alternative:

- Precast parapet sections shall be no less than 10 feet in length.
- Parapets shall include details for shear transfer between adjacent units by either concrete shear keys or steel dowels as follows:
 - Shear keys, when used, shall be monolithically cast in each parapet section or joint location. Shear keys shall be located vertically within the top 32 inches of the parapet and shall be a minimum of 24 inches in length with a tapered width between 3 and 4 inches, and a minimum interlock depth of 2 inches.
 - Steel dowels, when used, shall be, at a minimum, 14 inches long and have a 1-inch diameter at each parapet interface. The steel dowels shall be smooth and, at a minimum, number 3 bars. Steel dowels shall be located in each parapet joint and spaced approximately 1 foot apart vertically. Steel dowels shall be positioned to project equally into each adjoining parapet section and shall be detailed to avoid impeding shrinkage and thermal movements. Bond breakers may be used with steel dowels for that purpose. Alternatively, pockets may be cast to receive steel dowels in adjacent parapet units. Pocket widths shall not exceed steel dowel diameters by more than 1/2 inch.
- Moment slabs for precast concrete parapets shall be structurally continuous throughout the overall retaining wall length. Construction joints are permitted in moment slabs.

3) Cast-in-Place Parapet Alternative:

The minimum distance between parapet joints shall be 20 feet. Expansion and contraction joints shall be placed in accordance with Section 11.6 of the AASHTO LRFD Bridge Design specifications. Expansion and contraction joints shall be located a minimum of 10 feet from the nearest edge of a catch basin. Expansion and contraction joints shall be located a minimum of 6 feet from the centerline of light standard anchorages and junction boxes. Preformed expansion joint filler, $\frac{1}{2}$ inch thick, shall be installed at the expansion joints in the parapet.

Parapets shall include details for shear transfer between sections by way of concrete shear keys or steel dowels as follows:

- Shear keys, when used, shall be monolithically cast in each parapet section or joint location. Shear keys shall be located vertically within the top 32 inches of the parapet and shall be a minimum of 24 inches in length with a tapered width between 3 and 4 inches, and a minimum interlock depth of 2 inches.
- Steel dowels, when used, shall be a minimum of 14 inches long and have a 1-inch diameter at each parapet interface. The steel dowels shall be smooth and,

at a minimum, number 3 bars. Steel dowels shall be located in each parapet joint and spaced approximately 1 foot apart vertically. Steel dowels shall be positioned to project equally into each adjoining parapet sections and shall be detailed to avoid impeding shrinkage and thermal movements. A bond breaker shall be used with steel dowels for that purpose.

Moment slabs for cast-in-place parapets shall extend to the outside face of the retaining wall as shown on the Plans. Moment slabs for cast-in-place parapets shall be structurally continuous throughout the overall wall length, except for the purpose of crack control at parapet contraction and expansion joint locations, longitudinal reinforcing within 2 feet of the retaining wall face shall be discontinuous. All remaining longitudinal reinforcement in moment slabs at parapet expansion and contraction joints shall be continuous. A vertical 1 inch deep chamfer on the exposed face of the moment slab shall be provided in locations directly under parapet expansion and contraction joints. Construction joints are permitted in cast-in-place moment slabs.

6. Design Requirements for Mechanically Stabilized Earth Walls: The design shall consider the internal stability of the wall mass as outlined below. The global stability of the structure, including slope stability, bearing capacity at strength and service limit states, and total and differential settlement, is the responsibility of the Department.
 - a. Soil Reinforcement: The soil reinforcement shall be the same length from the bottom to the top of each wall section. The reinforcement length defining the width of the entire reinforced soil mass may vary with wall height along the length of wall. The minimum length of the soil reinforcement shall be 70% of the wall height, H, or 8 feet, whichever is greater.

The soil reinforcement shall be of sufficient length to provide for the required factored resistances for sliding, overturning and pullout loads (as designated in AASHTO LRFD Bridge Design Specifications) and shall be the minimum lengths required for external stability as recommended by the Department. Calculations of stresses, pullout factored loads and resistances shall be in accordance with the most recent AASHTO LRFD Bridge Design Specifications.

- b. Calculations for factored loads and resisting forces shall be based on assumed conditions at the end of the design life. The design life shall be 75 years unless otherwise indicated on the Plans. The design of soil reinforcements shall account for section loss as outlined in the AASHTO LRFD Bridge Design Specifications. All soil reinforcement shall be hot-dip galvanized in accordance with ASTM A123.
7. Design Requirements for Prefabricated Modular Walls: The general design of the retaining wall shall be according to the AASHTO LRFD Bridge Design Specifications. The Contractor shall be responsible for internal stability aspects of wall design. The design shall consider the stability at each level of modules. The global stability of the structure, including slope stability, bearing capacity at strength and service limit states, and total and differential settlement, is the responsibility of the Department.

- a. Infill: The maximum assumed unit weight of infill material used for overturning stability analysis shall be 100 pounds per cubic foot. If Doublewal modules are to be filled with crushed stone, the maximum assumed unit weight of the infill shall be 80 pounds per cubic foot.
- b. Resistance Factors: The resistance factors used in the design computations shall be as specified in the AASHTO LRFD Bridge Design Specifications amended as follows: The unfactored resistance for pullout of the concrete stem for T-Walls shall be 1.5 times or greater than the unfactored loads. Shear keys shall not be included in these computations. Only resisting forces developed beyond the theoretical failure plane may be used in these computations.

Materials:

1. Cast-in Place Concrete Walls: The materials furnished and used in the work shall be those prescribed in the Standard Specifications for Roads, Bridges, Facilities and Incidental Construction, including supplemental specifications and applicable special provisions as specified in the Contract.
2. Prefabricated Modular and Mechanically Stabilized Earth Walls: Materials shall meet the following requirements, and those not listed below shall be as prescribed within the Standard Specifications for Roads, Bridges, Facilities and Incidental Construction, including supplemental specifications and applicable special provisions.
 - a. Concrete: The concrete shall meet the requirements of Section M.03 and as follows:

Concrete for all precast components shall be air-entrained, Portland cement, fine and coarse aggregates, admixtures and water. An air-entraining Portland cement or an accepted air-entraining admixture shall be used. The entrained-air content shall be from 3.5 to 6.5%. The concrete shall attain a minimum 28-day strength (f_c) of 5,000 pounds per square inch and conform to the requirements of PRC05060. The mix design shall be furnished to the Engineer.

Concrete for footings or unreinforced leveling pads shall meet the requirements of Class PCC03340. Class PCC04460 shall be used for cast-in-place concrete copings. Class PCC04462 shall be used for traffic barriers.

Concrete Finish: Unless otherwise indicated on the Plans or elsewhere in the specifications, the concrete surface for the exposed face shall have a steel form finish. All non-exposed surfaces shall have an unformed finish which shall be free of open pockets of aggregate and surface distortions in excess of 1/4 inch.

Special Surface Treatment: If a special surface finish is proposed, before proceeding with production, a model face panel shall be provided by the fabricator for the Engineer's acceptance, to establish a guide and standard for the type of finish on the exposed face. This panel shall be stored at the fabricator's plant to be used for comparison purposes during production. Formed surfaces other than the exposed face shall not require a special finish.

Acceptance Criteria for Precast Components: Acceptance of precast components shall be based on the concrete strength, the soil reinforcement connection devices and the panel or module dimensions meeting the manufacturer's allowable tolerances. Any chipping, cracks, honeycomb or other defects shall be within acceptable standards for precast concrete or repaired as determined by the Engineer.

It is recognized that certain cracks and surface defects are not detrimental to the structural integrity of the precast components if properly repaired. The Engineer will determine the need for, and review the proposed method of, such repair and all repairs shall be reviewed by the Engineer prior to acceptance for use in wall construction.

Marking: The date of manufacture, production lot number, and piece-mark shall be clearly marked on the non-exposed side of each element.

- b. **Reinforcing Steel:** Reinforcing steel shall meet the requirements of ASTM A615, Grade 60. All reinforcing bars shall be hot-dip galvanized, after fabrication, to the requirements of ASTM A767, Class 1, including supplemental requirements.
- c. **Attachment Devices for Prefabricated Modular Walls:** All structural connectors shall be hot-dip galvanized according to the requirements of ASTM A123 (AASHTO M111). The minimum thickness of the galvanizing shall be based on the service life requirements in the AASHTO LRFD Bridge Design Specifications.
- d. **Soil Reinforcing and Attachment Devices for MSE Walls:**
 - 1) **Soil Reinforcement:** Steel strip reinforcement bands shall be hot rolled to the required shape and dimensions. The steel shall meet the requirements of ASTM A572 Grade 65 unless otherwise specified.

Welded wire fabric reinforcement shall be shop fabricated from cold-drawn wire of the sizes and spacing shown on the Plans. All wire and welded wire fabric shall meet the requirements of ASTM A1064 or AASHTO M 336M/M 336. Welded wire fabric shall be galvanized in accordance with the requirements of AASHTO M 111 or ASTM A123.

All soil reinforcement and structural connectors shall be hot-dip galvanized in accordance with ASTM A123 (AASHTO M111). The minimum thickness of the galvanizing shall be based on the service life requirements as previously stated.

- 2) **Connection Hardware:** Connection hardware shall be in accordance with the details on the Plans, and shall meet the requirements in the special provisions or Plans. All fasteners shall be galvanized in accordance with ASTM A153 or AASHTO M 232 and shall meet the requirements of AASHTO M 164. The minimum thickness of the galvanizing shall be based on the service life requirements as previously stated.
- e. **Joint Materials:** All horizontal and vertical joints between panels shall be covered by Geotextile (Separation - Class 1) meeting the requirements of Subarticle M.08.01-19. The minimum width and lap shall be 12 inches. Details of installation including connection of the geotextile to coping shall be provided.

f. Backfill: Backfill shall be Pervious Structure Backfill meeting the requirements of Articles M.02.05 and M.02.06. In addition, the backfill for Mechanically Stabilized Earth Walls shall meet all of the following electrochemical requirements:

PROPERTY	REQUIREMENT	TEST METHODS
Resistivity at 100% saturation	Minimum 3000 ohm-cm	ASTM G57-06 (2012) AASHTO T288
pH	Acceptable Range 5.0 – 10.0	ASTM G51-95 (2012) AASHTO T289
Chlorides	Maximum 100 ppm	ASTM D512 or D4327 AASHTO T291
Sulfates	Maximum 200 ppm	ASTM D516 or D4327 AASHTO T290
Organic Content	Maximum 1%	ASTM D2974 or AASHTO T267

g. Smooth Steel dowels: Steel dowels used in parapet joints shall meet the requirements of ASTM A36 and shall be galvanized in accordance with ASTM A153.

Construction Methods:

1. Cast-in-Place Concrete Walls: All construction methods for cast-in-place retaining walls shall be in accordance with the detailed requirements prescribed for the construction of the appropriate component items as specified in the Standard Specifications for Roads, Bridges, Facilities and Incidental Construction.
2. Prefabricated Modular Walls: All construction methods for prefabricated modular retaining walls shall be in accordance with the detailed requirements prescribed for the construction of the appropriate component items as specified in the Standard Specifications for Roads, Bridges, Facilities and Incidental Construction, with the following additional requirements:
 - a. Inspection and Rejection: The quality of materials, process of manufacture, and finished units will be subject to inspection by the Engineer prior to shipment.

Modular units which have imperfect molding, honeycomb, open texture concrete, or broken corners shall be repaired to the satisfaction of the Engineer or will be rejected. Insufficient compressive strength will also be cause for rejection.

Modular units with special surface treatments will be rejected if there are variations in the exposed face that deviate from the accepted model as to color or texture in accordance with precast concrete industry standards.

- b. Installation: The modular units shall be installed in accordance with manufacturer's recommendations. Special care shall be taken in setting the bottom course of units to true line and grade.

The vertical joint opening on the front face of the wall shall not exceed 3/4 inch. Vertical tolerances and horizontal alignment of the wall shall not exceed 3/4 inch in 8 feet from

the vertical. The plumbness of the wall from top to bottom shall not exceed 1/2 inch per 8 feet, or 1 inch total, whichever is less, measured from the face line shown on the Plans. A strip of geotextile shall be installed at all vertical joints.

Assembly of the various components shall not place any undue strain or stress on any of the members that constitute the completed structure.

c. Backfilling:

1) Doublewal:

- Infill for modular units shall be placed one course at a time, in lifts not exceeding two feet in thickness. The dry density of each lift of Pervious Structure Backfill, after compaction, shall meet the requirements of Article 2.16.03.
- Placement of the Pervious Structure Backfill behind the wall shall follow erection of successive courses of modular units. The difference in backfill elevation between the interior and exterior of the wall shall not exceed 6 feet.
- The units may be backfilled with crushed stone if the design of the retaining wall was based on a density of 80 pounds per cubic foot.
- All Pervious Structure Backfill placed outside of the modular units shall be placed in accordance with the requirements of Article 2.16.03.
- At the end of each work shift, the Contractor shall slope the last level of backfill away from the wall facing to direct runoff away from the wall face. The Contractor shall control and divert runoff at the ends of the wall to prevent erosion. In addition, the Contractor shall prevent surface runoff from entering the wall construction site.

2) T-Wall:

- Backfill placement in the interior of the wall unit and behind the wall shall follow erection of each course of prefabricated wall modules. Backfill shall be placed in such a manner as to avoid any damage or disturbance to the wall materials or misalignment of the modules. Any wall materials which become damaged or disturbed during backfill placement shall be removed and replaced at the Contractor's expense or corrected, as directed by the Engineer. Any backfill material placed within the wall envelope which does not meet the specified material requirements shall be corrected or removed and replaced at the Contractor's expense.
- Each lift (10 inches thick maximum) shall be placed and compacted with a mechanical or vibratory compactor to meet the density requirements in Article 2.16.03. The Contractor may reduce the lift thickness to obtain the specified density.
- Compaction within 3 feet of the module face shall be achieved by at least three passes of a lightweight mechanical tamper, roller or vibratory system. The specified lift thickness shall be adjusted as warranted by the type of compaction equipment actually used. Care shall be exercised in the compaction process to avoid misalignment or damage to the module. Heavy compaction equipment shall not be used to compact backfill within 3 feet of the wall face. Sheepfoot rollers and puddling for compaction will not be allowed. The Contractor shall

take soil density tests, in accordance with Article 2.16.03, to ensure compliance with specified compaction requirements and if a compaction test fails, no additional backfill shall be placed over the area until the lift is recompacted and a passing test is achieved.

- The moisture content of the backfill material prior to and during compaction shall be uniform throughout each layer. Backfill material shall have a placement moisture content less than or equal to the optimum moisture content. Backfill material with a placement moisture content in excess of the optimum moisture content shall be removed and reworked until the moisture content is uniform and acceptable throughout the entire lift. The optimum moisture content shall be determined in accordance with Article 2.16.03.
- At the end of each day's operation, the Contractor shall slope the last level of backfill away from the retaining wall facing to direct runoff away from the retaining wall face. The Contractor shall control and divert runoff at the ends of the wall to prevent erosion or washout of the wall section does not occur. In addition, the Contractor shall prevent surface runoff from entering the wall construction site.

3. Mechanically Stabilized Earth Walls: All construction methods for items not listed below shall be in accordance with the detailed requirements prescribed for the construction of the appropriate items as specified in the Standard Specifications for Roads, Bridges, and Incidental Construction.

- a. Foundation Preparation: The foundation for the structure shall be graded level for a width equal to or exceeding the length of the soil reinforcements, or as shown on the Plans. Prior to wall construction the foundation, if not rock, shall be compacted. Any foundation soils found to be unsuitable shall be removed and replaced with Granular Fill or as shown on the Plans.

At each panel foundation level, an un-reinforced concrete leveling pad shall be constructed as shown on the Plans. Granular Fill leveling pads are not allowed. The concrete leveling pad shall be cast to the design elevations as shown on the Plans and shall meet the pertinent requirements of Section 6.01.

- b. Wall Erection: Panels shall be placed in successive horizontal lifts in the sequence shown on the Plans as backfill material is placed behind the panels, and the panels shall be maintained in a vertical position. The vertical joint opening on the front face of the wall panels shall not exceed 3/4 inch. Vertical tolerances and horizontal alignment of the wall face shall not exceed 3/4 inch in 8 feet from the vertical. The plumbness of the wall from top to bottom shall not exceed 1/2 inch per 8 feet, or 1 inch total, whichever is less, measured from the face line shown on the Plans.

The allowable offset in any panel joint shall be 3/4 inch. The final horizontal and vertical joint gaps between adjacent facing panel units shall be within 1/8 inch and 1/4 inch, respectively, of the design final joint opening per the accepted Working Drawings.

c. Placement of Reinforcements: Soil reinforcements shall be placed normal to the face of the wall, unless otherwise shown on the Plans. All reinforcement bands shall be structurally connected to the wall face per the manufacturer's detail.

The reinforcement shall bear uniformly on compacted soil from the wall connection to the free end of the reinforcing elements. The reinforcement placement elevation shall be at, or at most 2 inches above, the connection elevation. Bending of reinforcement in the horizontal plane that results in a permanent deformation in their alignment is not allowed. Gradual bending in the vertical direction that does not result in permanent deformations is allowable.

Connection of reinforcements to piles or bending of reinforcements around piles is not allowed. A structural connection (yoke) from the retaining wall panel to the reinforcement shall be used to avoid cutting or excessive skewing of reinforcements due to pile or utility conflicts.

Where overlapping of reinforcement may occur, such as at corners, reinforcing connections to panels shall be adjusted to maintain at least 3 inches of vertical separation between overlapping reinforcement.

d. Backfill Placement: Backfill placement shall follow erection of each course of panels. Backfill shall be placed to avoid any damage, disturbance to the wall materials or misalignment of the facing panels, or damage to soil reinforcement. The Contractor shall place backfill to the level of connection and shall ensure that no voids exist directly underneath the reinforcing elements.

Any wall materials which become damaged or disturbed during backfill placement shall be either removed and replaced at the Contractor's expense or corrected, as directed by the Engineer. The Contractor may submit alternative corrective procedures to the Engineer for consideration. Proposed alternative corrective procedures shall have the concurrence of the MSE wall supplier and designer, in writing, prior to submission to the Engineer for consideration. All corrective procedure development and actions shall be at the Contractor's expense.

Any backfill material placed within the reinforced soil mass which does not meet the specified requirements shall be corrected or removed and replaced at the Contractor's expense.

The fill shall be spread by moving the machinery parallel to or away from the wall facing so that the steel reinforcement remains normal to the face of the wall. Construction equipment shall not operate directly on the steel reinforcement. A minimum fill thickness of 3 inches over steel reinforcement shall be required prior to operation of vehicles. Sudden braking and sharp turning shall be avoided.

Backfill shall be installed in accordance with Article 2.16.03, except as follows:

If 30% or more of the backfill material is greater than 3/4 inch in size, the acceptance criterion for control of compaction shall be either a minimum of 70% of the dry density of the material as determined by a test method performed by the Contractor, or by following a specification provided by the wall supplier. The wall supplier's specification shall be based on a test compaction section, which defines the type of equipment, lift thickness, number of passes of the specified equipment, and placement moisture content.

Backfill shall be compacted using a static-weighted or vibratory roller. Sheepfoot or grid type rollers shall not be used for compacting material within the limits of the soil reinforcement. The Contractor shall take soil density tests, in accordance with Article 2.16.03, to ensure compliance with specified compaction requirements.

The maximum lift thickness after compaction shall not exceed 10 inches, regardless of the vertical spacing between layers of soil reinforcements. The Contractor shall decrease this lift thickness, if necessary, to obtain the specified density. Prior to placement of the soil reinforcements, the backfill elevation at the face shall be level with the connection after compaction. From a point approximately 3 feet behind the back face of the panels to the free end of the soil reinforcements, the backfill shall be 2 inches above the attachment device elevation unless otherwise shown on the Plans.

Compaction within 3 feet of the back face of the panels shall be achieved by at least three passes of a lightweight mechanical tamper, roller or vibratory system. The minimum number of passes and rolling pattern shall be determined, prior to construction of the wall, by constructing a test pad section. The minimum dimensions of the test pad shall be 5 feet wide, 15 feet long, and 3 feet final depth. The specified lift thickness shall be adjusted as warranted by the type of compaction equipment actually used. Care shall be exercised in the compaction process to avoid misalignment of the panels or damage to the attachment devices. Heavy compaction equipment shall not be used to compact backfill within 3 feet of the wall face.

The moisture content of the backfill material prior to and during compaction shall be uniform throughout each layer. Backfill material shall have a placement moisture content less than or equal to the optimum moisture content. Backfill material with a placement moisture content in excess of the optimum moisture content shall be removed and reworked until the moisture content is uniform and acceptable throughout the entire lift. The optimum moisture content shall be determined in accordance with Article 2.16.03 (with oversize correction, as outlined in Note 7).

At the end of each day's operation, the Contractor shall slope the last level of backfill away from the wall facing to direct runoff away from the wall face. The Contractor shall control and divert runoff at the ends of the wall to prevent erosion. In addition, the Contractor shall prevent surface runoff from entering the wall construction site.

Method of Measurement: This work, being paid for on a lump sum basis, will not be measured for payment. Prior to the commencement of work on this item, the Contractor shall submit a proposed schedule of values for review and comment by the Engineer.

Basis of Payment: This work will be paid for at the Contract lump sum price for "Retaining Wall (Site No. 1)," complete in place, which price shall include all work shown within the pay limits on the Plans for the retaining wall including the following:

1. Design and construction of the proprietary retaining wall.
2. Excavation required for the construction of the retaining wall.
3. Design, construction, removal, and abandonment of temporary earth retaining systems to retain the existing facilities during construction.
4. The furnishing, placing and compacting of Pervious Structure Backfill within the payment lines.
5. The furnishing and placing of backfill drainage systems for the wall.
6. The furnishing and placing of rigid metal conduit, junction boxes, light standard anchorages, and other electrical appurtenances located within the wall proper.
7. Services of the On-Site Representative.
8. Any other work and materials shown on the Plans for the retaining wall.

The price shall also include all materials, equipment, tools and labor incidental thereto.

Bedrock or boulders in excess of 1 cubic yard encountered in the excavation, will be paid for under the item "Structure Excavation – Rock (Complete)."

Texture or relief on precast concrete wall units created by the use of architectural form liner shall be paid separately under the item "Simulated Stone Masonry".

Removal of the existing wall shall be paid separately under the item "Removal of Existing Masonry."

Pay Item	Pay Unit
Retaining Wall (Site No. 1)	l.s.

ITEM #0605003A – MASONRY FACING

Work under this item shall conform to the applicable requirements of Section 6.05 of Form 819, amended as follows:

Article 06.05.01 – Description: Add the following:

Work shall also include reuse of stone from the existing historic masonry wall, where practicable, as the masonry facing to be constructed to the lines, grades and dimensions indicated and/or shown on the plans, and as directed by the Engineer. The Contractor is permitted to import stone for use in the masonry facing, however, such stone shall be selected to resemble, as closely as possible, the existing stone walls within the project limits in size, shape, color, and pattern.

Mortar used to install the stone masonry facing shall be selected to match the existing historic masonry wall as directed by the Engineer and in accordance with the Secretary of the Interior's Standards for Treatment of Historic Properties publication "Preservation Briefs: Repointing Mortar Joints in Historic Masonry Buildings" (see Appendices). Work will include preparing the joints to be pointed, installing new mortar, finishing with the proper profile, and cleaning of the work area once completed.

The Contractor to perform this work shall demonstrate a minimum of five (5) years of successful repointing experience in masonry restoration projects for historic structures. The Contractor shall provide names, dates, and locations of a minimum of three (3) similar projects.

Article 06.05.02 – Materials: Delete the only paragraph and replace with the following:

The materials for this work shall meet the requirements of M.11.01 for masonry facing stone. Masonry facing stone shall match the existing as closely as possible in color, character, and size. Stone from the existing wall to be removed may also be utilized for the masonry facing where the appearance and integrity of the stone has not been damaged by the demolition.

A demonstration test area including the proposed mortar sample shall be completed for the Engineer to review and approve before full-scale repair work is initiated.

The test area described above shall also be subject to review by OEP and SHPO and shall require written approval from OEP and SHPO per the Memorandum of Agreement dated May 23, 2024 for SPN 0115-0122.

Mortar shall meet the requirements of Article M.11.04.

Metal dowels and ties shall meet the requirements of Article M.06.01.

Article 06.05.03 – Construction Methods: Delete item 8 and replace with the following:

8. **Pointing:** The joints in the masonry facing masonry shall be thoroughly raked out and cleaned of all loose mortar, dirt, or other foreign material to a depth of about two (2) inches or as ordered. The joints shall be thoroughly wet with water and filled with mortar. The mortar shall be well driven into the joints and finished with an approved pointing tool. The wall shall be kept wet while pointing is being done; and in hot or dry weather, the pointed masonry shall be protected from the sun and kept wet for a period of at least three (3) days after completion. Pointing of mortar joints shall take place when air temperature is between 40 and 90 degrees F and is predicted to remain so for at least 7 days after the completion of work. The stone to be pointed shall not contain frost. After the pointing is completed and the mortar set, the wall shall be thoroughly cleaned and left in a neat and workmanlike condition.

a. **Demonstration Test Area:** Prior to commencing the pointing operations, the Contractor shall install a trial application of the proposed pointing methods on a portion of the masonry wall, as directed by the Engineer. The surface area of the demonstration test shall be approximately three (3) by three (3) feet (0.91m x 0.91m) in area. The demonstration test area shall be cleaned using methods, materials and means previously submitted and approved. The production work of pointing the masonry shall not begin without approval from the Engineer of the methods, materials, and equipment used. The evaluation by the Engineer of the acceptability of the Contractor's proposed repointing will include a seven (7) day observation period after completion of the pointing to allow the mortar to cure. The approved sample shall remain as part of the finished work. In the event that the pointing sample is not approved, a new sample shall be prepared at a new location selected by the engineer. The rejected sample areas shall be repointed as directed by the Engineer.

Article 06.05.04 – Method of Measurement: Delete this section in its entirety and replace with the following:

The quantity of masonry facing shall be the actual number of square yards of the face area of accepted masonry facing, completed within the neat lines as shown on the plans, or as ordered by the Engineer.

No measurement will be made for areas of rejected cleaning and pointing samples.

Article 06.05.05 – Basis of Payment: Delete this section in its entirety and replace with the following:

Masonry facing will be paid for at the Contract unit price per square yard for "Masonry Facing", complete in place, which price shall include all equipment, tools and labor incidental thereto and all materials including metal dowels or ties. The cost of drilling holes for dowels or ties shall be considered as included in the general cost of the work.

Pay Item

Masonry Facing

Pay Unit

SY

ITEM #0607001A – DRY RUBBLE MASONRY

Work under this item shall meet the requirements of Section 6.07, amended as follows:

6.07.01–Description: *Delete the existing paragraph and replace with the following:*

This item shall consist of removal, stockpiling, and reuse of stone from existing walls on site, and furnishing of additional stone material as needed, laid without the aid of mortar, constructed in such shapes and at such places as indicated on the plans or where directed, and in accordance with these specifications.

6.07.02–Materials: *Delete the existing paragraph and replace with the following:*

The Contractor shall reuse to the greatest extent possible stone from existing walls on site impacted by the proposed construction. If additional stone is required to supplement on site materials to complete the reconstruction, such materials shall meet the requirements of M.11.02 for rubble masonry stone and be selected to match the onsite material as closely as possible.

6.07.03–Construction Methods: *To Item 2. Laying Stone, add the following:*

The Contractor shall photograph the wall prior to removal in order to seek to match the construction of the existing walls as closely as possible and to minimize the visual difference between the existing and reconstructed wall sections.

Add the following:

6.07.05–Basis of Payment: *Delete the existing paragraph and replace with the following:*

Dry rubble masonry will be paid at the Contract unit price per cubic yard for “Dry Rubble Masonry” complete in place which price shall include all materials, equipment, tools, and labor incidental thereto. Removal, stockpiling, and storage of the existing stone to be reused is included for payment under the item “Removal of Existing Masonry.”

ITEM #0714991A – MONITORING STRUCTURES (SITE NO. 1)

Description: The work covered under this item consists of performing condition surveys and monitoring of existing stone masonry walls to remain as well as the historic Cargill Falls Mill building.

Work shall include, but not necessarily be limited to:

1. Conducting pre- and post-construction condition surveys.
2. Laying out, furnishing, installing, protecting, maintaining, monitoring, and preparing reports for all monitoring instrumentation: Deformation Monitoring Points and Vibration Monitors.
3. Replacement of failed, damaged, or stolen instrumentation.
4. Notifying the Engineer and taking immediate remedial action to prevent the limiting values from being reached. Meeting with the Engineer to review current field conditions to determine further steps to be taken, before exceeding the limiting values.
5. Making adjustments to construction operations in order to not exceed the limiting values.
6. Removal of all monitoring instruments (Deformation Monitoring Points and Vibration Monitors) as specified herein, or as directed by the Engineer, at the completion of construction activities.

Material: Products and materials shall be in accordance with the following:

A. Deformation Monitoring Points (DMPs): DMPs shall be used as targets in monitoring by conventional survey methods. The target shall allow for repeatable and reproducible readings when measured with conventional survey equipment.

1. DMPs shall be used to monitor vertical and horizontal deformation of the existing stone masonry walls to remain or as directed by the Engineer.
2. The following types of DMPs shall be used to monitor deformation:
 - a. DMP-Type 1 shall consist of a 1-1/2 to 2-in long masonry nail with an identification tag. The nail shall be manufactured from hardened, zinc-plated steel. The nail shall have ribbed threads along its shank and shall have a conical point. It shall also have an indent in the center of its head to receive a surveyor's plumb bob. The identification tag shall be metallic and have a punched number for identification. Deformation monitoring points on concrete or steel shall be marked with permanent paint and stamped or etched with crosshairs.
 - b. DMP-Type 2 shall consist of a 3/8 in. dia. x 4-1/2 in. long (or longer) expandable anchor for masonry or wood structures. These anchors shall typically be installed

into vertical surfaces of building or bridge foundation or into mortar joints of cement rubble masonry walls.

- c. DMP-Type 3 shall consist of a 1-foot-long No. 4 or No. 5 reinforcing bar.

- B. Vibration Monitors: Provide four-component seismographs or vibration monitors, capable of measuring and recording particle velocity data and frequency in three mutually perpendicular directions. The Contractor's vibration specialist shall install, maintain, and calibrate the vibration monitoring instruments in accordance with the instrument manufacturer's recommendations. Any instrument showing indication of damage, malfunction, or erratic functioning shall be immediately replaced with a calibrated, functioning instrument.

Construction Methods:

- A. Pre- and Post-Conditions Surveys:

The Contractor shall engage the services of a qualified, independent professional, acceptable to the Engineer to conduct pre- and post-construction surveys of the portions of the Cargill Falls Mill stone masonry retaining wall to remain, the stone masonry retaining walls along the northerly side of Route 44 within the limits of the project, and the exterior faces of the Cargill Falls Mill building within the work zone adjacent to the one lane, one way travelway around the mill. The qualified professional shall be a licensed Connecticut professional engineer and have a minimum of 5 years of experience providing similar services. Work under this item included furnishing all necessary labor, equipment and materials to perform the condition surveys and monitor cracks. Work also includes contacting the owner by certified letter to obtain permission for entry required for the work.

A pre-construction condition survey shall be completed, and 5 copies of the survey and initial monitoring measurements submitted at least 10 days prior to the start of construction activities or at an earlier stage of construction if requested by the Engineer.

The pre-construction condition survey shall consist of a visual inspection, photograph and video documentation, and written description of the specified structures. Descriptions shall identify any existing cracks, damage, or other defects and shall include such information to make it possible to determine the effect, if any, of the construction operations on the defect. Where significant cracks or damage exists, or for defects too complicated to describe in words, photographs shall be taken and made part of the record. Crack width measurements shall be made with suitable measuring devices. Initial crack measurements shall be recorded in the presence of Engineer and Owner's representative. All parties shall sign the record copy of the form used to record the initial readings.

The initial record of each property examined shall be signed by the representatives present and, if practicable, by the Owners of the property, whether or not they are present at the examinations.

A post-construction condition survey will be conducted upon completion of construction activities, or at a later date if requested by the Engineer.

The post-construction condition survey shall repeat the process used in the preconstruction survey, paying particular attention to any areas where complaints of damage have been received or damage claims have been filed. Notice shall be given to all interested parties, including but not limited to SHPO and OEP, so that they may be present during the post-construction condition survey.

The final record of the examined structures shall be signed by the representatives present and, if practicable, by the Owner, whether or not they are present at the examinations. The Contractor shall submit 5 copies of the pre- and post-construction condition surveys including all documentation to the Engineer within 10 days of the completion of the post-construction condition survey.

Copies of the pre- and post-construction surveys shall be submitted to OEP and SHPO in accordance with the Memorandum of Agreement dated May 23, 2024.

B. Monitoring Instrumentation Installation:

1. Prepare and submit a vibration monitoring plan indicating the proposed locations of DMPs and Vibration Monitors, equipment to be used, and anticipated monitoring schedule for review and approval by the Engineer.

This submittal requires review and written approval from OEP and SHPO per the Memorandum of Agreement dated May 23, 2024 for SPN 0115-0122.

2. Install the DMPs and Vibration Monitors at the locations as directed by the Engineer.
 - A minimum of four DMP locations (two on each side of the limits of wall replacement) and two Vibration Monitor locations (one on each side of the limits of wall replacement) shall be established to monitor the portions of the Cargill Falls Mill retaining wall to remain.
 - A minimum of 18 DMP locations and one Vibration Monitor location shall be established to monitor the portions of the stone masonry retaining walls on the northerly side of Route 44 within the project limits. The points shall be established approximately every 50-feet or at the direction of the Engineer.
 - One Vibration Monitor location shall be established to monitor the Cargill Falls Mill building. The location shall be determined in the field by the Engineer.
3. All DMPs shall be installed in the presence of the Engineer.
4. Contractor to coordinate uninterrupted access, power supply (if applicable), and wireless signal (if applicable).

5. All DMPs shall be securely fixed at the approved locations and position, so that the instruments are capable of resisting disturbance from vandalism. Establish the initial elevation and location of DMPs to an eighth of an inch precision.
6. DMP benchmarks shall be selected by the contractor and protected from damage for the duration of the work.
7. The Engineer reserves the right to modify the DMP and Vibration Monitor layout as is deemed necessary to monitor the impact of the Contractor's proposed method of construction. The DMPs shall be arranged so that monitoring can continue until completion without interruption. Adequate access for maintenance and reading of the DMPs shall be provided.

C. Monitoring Schedule and Submittal:

1. All DMPs shall be installed and initial readings completed with the pre-construction condition survey as noted above.
2. In addition to the initial readings, DMPs shall be monitored:
 - Prior to the start of and then at least daily during the removal of the existing retaining wall and installation of the Temporary Earth Retaining System (TERS).
 - One week after completion of the removal of the wall and installation of the TERS, and then weekly until there is no change in readings.
 - Prior to the start of and then at least daily during the preparation of subgrade and installation of the pavement section. This period of monitoring is applicable to the DMPs located on the walls along the north side of Route 44 only.

The Engineer may increase the frequency of monitoring at no additional cost should there be any changes in the measurements or other indications of movement. Measurements shall be submitted on a form showing both the past and current measurements. A hard copy of the form with any changes from the previous days measurements circled shall be given to the Engineer by the morning after the day the readings were taken. A typed and signed form shall be submitted on a weekly basis during periods requiring monitoring, unless the Engineer approves submittal less frequently.

3. The Contractor's vibration specialist shall maintain a log of all vibration producing activities for which ground vibrations were monitored. The vibration monitoring log shall include the recorded maximum peak particle velocity and the associated frequency and the date and time for each event recorded and the type and location of the vibration producing activity, location of monitoring instruments, and the closest distance from the vibration producing activity to the monitoring instrument. In addition

to immediate verbal and email notifications of significant vibrations, the vibration specialist shall submit weekly reports of vibration monitoring to the Engineer during periods when such monitoring is required. The monitoring reports shall include the vibration monitoring record data, a location plan showing areas of construction activity and monitoring locations, and a written narrative summarizing the vibration monitoring performed and the results.

D. Response to Monitoring Program Readings

The Contractor shall respond to the monitored readings from instrumentation as follows:

1. Implement remedial action if readings approach the Limiting Values of $\frac{1}{2}$ " for DMPs and a peak particle velocity (i.e. ground vibrations) of 0.5 inch per second. The term "peak particle velocity" shall be considered to mean the resultant vector sum of particle velocities in three mutually perpendicular directions at any instant in time.
2. Take all necessary steps so that the limiting values are not exceeded. The Contractor may be directed to suspend activities in the affected area with the exception of those actions necessary to avoid exceeding the limiting value.
3. If any readings exceed 50 percent of the limiting values, the Contractor shall:
 - a. Halt operations that are causing the instrument response values to reach 50 percent of the limiting value.
 - b. Meet with the Engineer to discuss response actions.
 - c. Implement the reviewed plan of action, which includes modifications to the Contractor means and methods necessary to reduce the potentially damaging effects of the construction activities such that the limiting values are not reached.

E. Damage to Instrumentation:

The Contractor shall protect all DMPs and Vibration Monitors from damage due to construction operations, weather, and vandalism. If an instrument is damaged or unusable, the Contractor's instrumentation personnel shall replace the damaged DMP or Vibration Monitor within 72 hours, at no additional cost to the State. The Engineer will be the sole judge of work stoppage in the vicinity of the damaged or unusable instrument until it is again operational, at no additional cost to the State.

F. Removal of Instruments:

Prior to completion of the Contract, the Contractor shall remove all DMPs and restore the surface to the Engineer's satisfaction. All instruments or portions thereof removed by the Contractor shall become the property of the Contractor.

Method of Measurement: Within sixty (60) calendar days of the award of the Contract, the Contractor shall submit to the Engineer for approval a cost breakdown of the lump sum bid prices for these items. The submission must include substantiation showing that the cost breakdowns submitted are reasonable based on the Contractor's lump sum bids. The cost breakdown shall be in accordance with the following payment schedule:

Pre-Construction Surveys: The cost to develop and perform pre-construction surveys meeting site requirements. The cost shall not exceed 20 percent of the lump sum value.

Furnishing and Installation of Monitoring Devices: The cost to procure and install all required devices at each site. The cost shall not exceed 20 percent of the lump sum value.

Monitoring and Maintenance of Devices: The number of months and monthly cost to perform the required monitoring and prepare documentation at each site. The cost shall be a minimum of 40 percent of the lump sum value.

Post-Construction Surveys and Removal of Monitoring Devices: The cost to perform the post-construction surveys and remove monitoring devices at each site. The cost shall be a minimum of 5 percent of the lump sum value.

Basis of Payment: This work will be paid for at the contract lump sum price for "Monitoring Structures (Site No. 1)" which price shall include all materials, tools, equipment and labor for the required work at each site including: the services of an independent professional to perform the pre- and post- construction surveys; furnishing, installation, monitoring, and removal of DMPs; furnishing, installation, monitoring, and removal of Vibration Monitors; preparation of reports; notification of the Engineer of any readings which reach 50 percent of the limiting values; and adjusting the means and methods in order not to exceed the limiting values.

Pay Item	Pay Unit
Monitoring Structures (Site No. 1)	l.s.

ITEM #0819002A – PENETRATING SEALER PROTECTIVE COMPOUND

Description: Work under this item shall consist of cleaning concrete surfaces of dirt, dust, and debris, and furnishing and applying a clear, penetrating sealer to concrete surfaces where shown on the plans, to provide a barrier against the intrusion of moisture and chlorides. 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 and traffic from overspray.

Materials: The penetrating sealer shall conform to Article M.03.09. A Materials Certificate shall be submitted for the penetrating sealer in accordance with Article 1.06.07. A product not listed on the Qualified Products List (QPL) may be considered for approval. A Certified Test Report shall be submitted in accordance with Article 1.06.07 indicating that the product being considered conforms to the Test Requirements listed on the QPL.

Construction Methods:

Submittals: The Contractor shall submit to the Engineer Safety Data Sheets (SDS), Technical Data Sheets and product literature for the approved sealer. The literature shall include written instructions how to apply the sealer to vertical and horizontal surfaces, and where required, overhead surfaces. Application rate and number of applications of sealer shall be addressed.

The Contractor shall submit to the Engineer, in accordance with Article 1.05.02, written procedures for cleaning the concrete surfaces prior to sealer application. 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 protection of the deck and curb to which membrane waterproofing will be applied. Should the membrane already be present, the submittal shall address shielding of the membrane. It shall also indicate how vegetation and regulated areas 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 concrete surfaces that:

- Need repair
- Require special attention or cleaning procedures
- Have been previously treated with coatings or curing compounds that would hinder penetration of the sealer into the concrete
- Will be new or newly repaired

Written procedures shall include observations listed above. Application of penetrating sealer to new concrete shall be addressed in the application procedures. Forms for surfaces of new

concrete to receive penetrating sealer shall not be treated using form release oil, which can inhibit or prevent penetration of the sealer into the concrete.

Surface Preparation: Concrete surfaces to which penetrating sealer will be applied shall be clean and free of grease, oil, and other surface contaminants, including biological growth. 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 that are to remain.

Application: Application of the sealer may begin only after the Engineer evaluates the concrete surfaces and determines that conditions for installation comply with the accepted written application procedures.

The sealer shall be applied in accordance with the accepted application procedures at the rate specified by the manufacturer. The Contractor shall monitor and record the number of square feet of concrete surface sealed and the number of gallons of sealer applied over that surface area to verify that the required application rate is being met. A minimum of three applications of sealer shall be assumed to be needed. After the first application of the sealer, curing time shall be recorded and submitted to the Engineer. Additional applications of sealer shall be applied as specified in the application instructions, provided adequate time between applications and appropriate curing of the sealer have occurred. For each application, the Contractor shall record the area and number of gallons of sealer applied as well as the curing time for that application. The Contractor may be directed to apply sealer in up to three separate applications if concrete surfaces readily absorb the previous application.

If the Contractor is directed to apply more than three applications of sealer, the additional applications will be compensated as extra work. Should salts, oil or other visually undesirable materials be evacuated from the concrete by the penetrating sealer and remain on the surface after sufficient rain events have occurred, the Engineer may order surface cleaning of the concrete as extra work.

The Engineer shall be provided access to inspect the concrete surface during application and after the sealer has had adequate time to cure.

Method of Measurement: This work will be measured for payment by the actual number of square yards of concrete, sealed 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.

The following are not included in the cost of this item and will be considered Extra Work:

- Special cleaning procedures ordered by the Engineer to properly prepare the concrete surface for application of the penetrating sealer (such as removal of tightly adherent biological growth, graffiti, or other difficult-to-remove surface contaminants)
- Additional applications of sealer as noted in the Construction Methods
- Cleaning of evacuated material from sealed surfaces as ordered by the Engineer.

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

ITEM #0913952A – PROTECTIVE FENCE (5' HIGH)

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

Materials: Materials for this work shall be as follows:

1. **Chain Link Fabric:** The fabric shall be a black Poly(Vinyl 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. **Posts and Rails:** The material used to manufacture framework for color chain link fencing systems shall be galvanized sheet steel, in coils, meeting the general requirements of ASTM A924 and the specific product requirements of ASTM A653, quality level HSLA (high strength, low alloy), Type I, Grade 50 (50,000 psi minimum yield strength), coating designation Z600 (2.0 oz./ft²) applied by the hot-dip process. The framework shall be manufactured in accordance with commercial standards to meet the requirements of ASTM F1043, Group IC, electrical resistance welded round steel pipe. All burrs and sharp edges shall be removed and smoothed before galvanizing.
3. The manufactured framework shall be subjected to a complete thermal stratification coating process (multi-stage, high temperature, multi-layer) including a pretreatment wash with zinc phosphate, an electrostatic spray application of an epoxy base, and a separate electrostatic spray application of a polyester finish. The color of the finish coat shall be black.
4. The material used for the base coat shall be a zinc-rich thermosetting epoxy. The minimum thickness of the base coat shall be 2 mils. The material used for the finish coat shall be a thermosetting “no mar” TriGlycidyl IsoCyanurate (TGIC) polyester powder. The minimum thickness of the finish coat shall be 2-3 mils.
5. The coated framework shall demonstrate 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 demonstrate the ability to withstand exposure in a weatherometer apparatus for 1,000 hours without failure in accordance with Practice D1499 and to show satisfactory adhesion when subjected to the cross-hatch test in accordance with ASTM D3359. The polyester finish coat shall not fade, crack, blister or split under normal use.
6. **Fence Fittings:** 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.

7. **Galvanizing Compound:** Galvanizing compound shall conform to the requirements of Military Specification MIL-DTL-24441.
8. **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.
9. **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."

All components of the chain link fence shall be the color black as described in ASTM F934. Coating which exhibits 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, all fittings and for the chemical anchoring material. 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.

Shop Drawings: Before fabricating any materials, the Contractor shall submit shop drawings to the Engineer for approval in accordance with Article 1.05.02. These drawings shall include but not be limited to the following information: a layout plan showing all post and rail spacing, all fence and anchorage details, material lists and material designations and the name and telephone number of a person to contact who can answer questions about the shop drawings.

Construction Methods: The protective fence shall be accurately fabricated and installed in accordance with the plans and as directed by the Engineer.

Posts shall be centered in the preformed holes in the concrete and held plumb. Non-shrink grout shall then be placed in the annular space around the post, overfilling the hole to build the grout up above the surrounding concrete so water drains away from the post.

After the grout has completely set, place silicone joint sealant around the base of the post against the non-shrink grout to seal against moisture intrusion around the post.

All rails shall be erected to produce a smooth, continuous appearance with posts placed vertically and with all rails parallel to the grade of the parapets. 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 manufacturer.

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.

Basis of Payment: This work will be paid for at the contract unit price per linear foot for "Protective Fence (5' High)", complete and accepted in place, which price includes all materials, equipment, tools and work incidental thereto.

Pay Item	Pay Unit
Protective Fence (5' High)	l.f.

ITEM #0950019A – TURF ESTABLISHMENT – LAWN

All of the provisions of Section 9.50 of the Standard Specifications shall apply as amended or supplemented by the following:

Article 9.50.02 - Materials: Replace the seed mix specified in M.13.04 with the following:

Metro Select Seed Mix

Pure Seed:

50% Turf type Perennial Ryegrass

20% Shamrock Kentucky Bluegrass

15% Foxfire Creeping Red Fescue

15% Brittany or Shadow II Chewings Fescue

Under no circumstances should annual Ryegrass, Italian Rye or any other seed be added to the seed mixture.

Article 9.50.03 - Construction Methods:

Replace the first paragraph with the following:

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 1 lb. per 175sf. The seed shall be mulched in accordance with the Standard Specification.

Article 9.50.04 - Basis of Payment: Add the following:

This work will be paid for at the contract unit price per square yard for "Turf Establishment - Lawn" which price shall include all materials, mowing, maintenance, equipment, tools, labor, and work incidental thereto.

Pay Item
Turf Establishment - Lawn

Pay Unit
s.y.

ITEM #0969062A – CONSTRUCTION FIELD OFFICE, MEDIUM

Description: Under the item included in the bid documents, 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	Small	Med.	Large	Extra Large
Minimum Sq. Ft. of floor space with a minimum ceiling height of 7 ft.	400	720	1400	2800
Minimum number of exterior entrances.	2	2	2	2
Minimum number of parking spaces.	7	7	10	15

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.

Unless otherwise approved by the Engineer, office space shall be partitioned into segregated work areas for each user as follows:

- A. Each work area (or cubicle) shall be a minimum of 8 feet x 8 feet, with full height walls or tall cubicle partitions (minimum 6 feet high), placed to provide a minimum of 6 feet walking space around and between each user work area (for social distancing).
- B. Only one user (workstation/desk) per work area.
- C. Desks, tables, and other work surfaces shall be arranged so that adjacent users do not face each other.

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, electronics, 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 and properly operating, heating, air conditioning, and ventilation equipment to maintain a temperature range of 68°-80° Fahrenheit within the field office. The Contractor shall increase ventilation rates and increase the percentage of outdoor air that circulates into the system where possible.

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 one (1) telephone line for phone/voice service. For an Extra-Large field office this shall consist of three (3) telephone lines for phone/voice service. The Contractor shall pay all charges.

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.

Data Communications Facility Wiring: As soon as the field office is in place, the Contractor shall propose a central wiring location, to designated CTDOT District personnel for the review and approval of CTDOT OIS. The central wiring location shall be large enough to house the Contractor supplied modem, Contractor supplied patch panel (if applicable), and CTDOT OIS supplied LAN switch and router. The Contractor shall supply the number of Category 6A 568B patch panels necessary to support the anticipated number of networked devices. The central wiring location shall also house the data circuit with appropriate power requirements and Category 6A cable run to the location of the installed data circuit. Power shall be provided at the central wiring location to power the hardware installed.

The Contractor shall install CAT 6A cables from the central wiring location to each workstation, Smart Board/TV location, Multifunction Laser Printer/Copier/Scanner and any other networked devices. The CAT 6A cables shall terminate in a (Category 6A 568B) wall or surface mount data jack at each networked device. Each run / jack shall be clearly labeled with an identifying Jack Number. The CAT 6A cables shall be terminated at the central wiring location with a service loop and RJ45 connectors. The Contractor shall also supply CAT6A cables of adequate length to reach from the wall or surface mount jack to the device being networked.

The number of networked devices anticipated shall be at least equal to the number of personal computer tables, Multi-Function Laser Printer/Copier/Scanner, Contractor supplied devices, and smartboards listed below.

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			
	Small	Med.	Large	Extra Large
	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.	1	3	5	8
Standard secretarial type desk and matching desk chair that has pneumatic seat height adjustment and dual wheel casters on the base.	-	-	-	1
Personal computer tables (4 ft. x 2.5 ft.).	2	3	5	8
Drafting type tables (3 ft. x 6 ft.) and supported by wall brackets and legs; and matching drafter's stool that have pneumatic seat height adjustment, seat back and dual wheel casters on the base.	1	1	1	2
Conference table, 3 ft. x 12 ft.	-	-	-	1
Table – 3 ft. x 6 ft.	-	-	-	1
Office Chairs.	2	4	8	20
Mail slot bin – legal size.	-	-	1	1
Non-fire-resistant cabinet.	-	-	2	4
Fire resistant cabinet (legal size/4 drawer), locking.	1	1	2	3
Storage racks to hold 3 ft. x 5 ft. display charts.	-	-	1	2
Vertical plan racks for 2 sets of 2 ft. x 3 ft. plans for each rack.	1	1	2	2
Double door supply cabinet with 4 shelves and a lock – 6 ft. x 4 ft.	-	-	1	2
Case of cardboard banker boxes (Min 10 boxes/case)	1	1	2	3
Open bookcase – 3 shelves – 3 ft. long.	-	-	2	2
White Dry-Erase Board, 36" x 48" min. with markers and eraser.	1	1	1	1
Interior partitions – 6 ft. x 6 ft., soundproof type, portable and freestanding.	-	-	6	6
Coat rack with 20 coat capacity.	-	-	-	1
Wastebaskets - 30 gal., including plastic waste bags.	1	1	1	2
Wastebaskets - 5 gal., including plastic waste bags.	1	3	6	10
Electric wall clock.	-	-	-	2
Electronic Level	1	1	1	2

Furnishing Description (continued)	Office Size			
	Small	Med.	Large	Extra Large
	Quantity			
Telephone.	1	2	3	-
Full size stapler 20 (sheet capacity, with staples)	1	2	5	8
Desktop tape dispensers (with Tape)	1	2	5	8
8 Outlet Power Strip with Surge Protection	3	4	6	9
Rain Gauge	1	1	1	1
Business telephone system for three lines with ten handsets, intercom capability, and one speaker phone for conference table.	-	-	-	1
Mini refrigerator - 3.2 c.f. min.	1	1	1	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	1	1	1
Microwave, 1.2 c.f., 1000W min.	1	1	1	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.	1	2	2	2
Multi-Function Laser Printer/Copier/Scanner combination unit, network capable, as specified below under <u>Field Office Technology</u>	1	1	1	1
Field Office Internet Service and Hardware as specified below under <u>Field Office Technology</u>	1	1	1	1
Digital Camera as specified below under <u>Field Office Technology</u>	1	1	3	3
Teleconferencing Equipment as specified below under <u>Field Office Technology</u>	-	1	-	-
Infrared Thermometer, including annual third-party certified calibration, case, and cleaning wipes.	1	1	1	2
Concrete Curing Box as specified below under Concrete Testing Equipment.	1	1	1	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	1	1	1
Concrete Slump Cone and accessories as specified below under Concrete Testing Equipment.	1	1	1	1
First Aid Kit	1	1	1	1
T-handle concrete cylinder mold splitter as specified below under Concrete Testing Equipment	1	1	1	1
Smart Phones as specified under <u>Computer Related Hardware and Software</u> .	-	-	-	-

The furnishings and equipment required herein shall remain the property of the Contractor. Any supplies required to maintain or operate the above listed equipment or furnishings shall be provided by the Contractor for the duration of the project.

Field Office Technology:

The Contractor shall supply the internet service connection, Contractor supplied modem, associated hardware, Digital Camera(s), Smart Phones, Multifunction Laser Printer/Copier/Scanner, Conference Room Teleconferencing Equipment, associated hardware and software meeting the requirements of this specification, as well as the latest minimum specifications posted, as of the Project advertising date, at CTDOTs [Construction Field Office Technology](#) web site.

Within 10 calendar days after the signing of the Contract, but before ordering/purchasing the required Digital Camera(s), Smart Phones, Multifunction Laser Printer/Copier/Scanner, Teleconferencing Equipment, 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 modem, digital cameras, smart phones, and Teleconferencing Equipment will be reviewed by CTDOT District personnel for approval. The Multifunction Laser Printer/Copier/Scanner 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, setup of the internet service connection and the configuration of the modem with a static IP address. Installation shall be coordinated with CTDOT District and Project personnel. Specifically, the Contractor shall supply the District with a Static IP Address, Subnet Mask Address and Gateway Address immediately upon establishment of internet service connection to assist with OIS equipment installation.

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 modem / Internet Service Connection, Digital Camera(s), Smart Phones, Multifunction Laser Printer/Copier/Scanner, Teleconferencing Equipment, as well as associated hardware, software, supplies, and support documentation. The hardware and cabling shall be installed in the field office to and at locations acceptable to the Engineer. Adequate electric service shall be supplied at all hardware and workstation locations to support the Department staff and hardware specified.

The Contractor shall provide all supplies, paper, maintenance, service, and repairs (including labor and parts) for the printer(s), copiers, field office Wi-Fi / internet service, and other equipment and facilities required by this specification for the duration of the Contract. All repairs of contractor supplied equipment and internet service 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 Contractor supplied 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 rainwater 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.

Electronic Level: The Contractor shall supply and maintain in working order, for the duration of the Contract, the number of electronic levels, identified in the Additional Equipment, Facilities and Services table of this specification. The electronic level(s) shall meet the following requirements:

- A. 48-inch length, box beam type
- B. IP65 water and dust proof
- C. 0.1-degree accuracy
- D. Backlit display
- E. Carrying case included
- F. New or like new condition

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 T 119, Standard Test Method for Slump of Hydraulic-Cement Concrete.
- D. T-handle concrete cylinder mold splitter.

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) 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. Insured 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, 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, CTDOT will reimburse the Contractor for replacement costs exceeding the amount of the required coverage.

Maintenance: During field office occupancy by 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 professional cleaning including vacuuming carpet, washing and waxing floors, cleaning restrooms, removal of trash, general cleaning, 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 way 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 specified herein.

Pay Item
Construction Field Office, Medium

Pay Unit
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:

US Route 44 – Pomfret Street

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. During the allowable periods and when the Contractor is actively working, the Contractor will be permitted to 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 US Route 44 – Pomfret Street and the Church Street intersection to through traffic and detour traffic as shown on the Local and Regional Detour Plans. The Contractor shall notify the Engineer at least 30 days in advance of implementing the detour.
3. During the allowable period, the Contractor will be permitted to close pedestrian sidewalks and detour pedestrian traffic as shown on the Pedestrian Detour Plans. The Contractor shall notify the Engineer at least 14 days in advance of implementing the pedestrian detour.
4. Where sidewalks are closed for the retaining wall replacement and a pedestrian detour is not provided, the Contractor shall provide Temporary Shuttle Service as indicated on the Staged Construction Plan (MPT-01) and in accordance with the Special Provisions.
5. Work under this item shall include furnishing and erecting a temporary 6' High Chain Link Fence to maintain safe pedestrian passage at the end of each workday where indicated on the plans. The chain link fence materials should be acceptable to the Engineer.

All Other Roadways

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:

During the allowable periods and when the Contractor is actively working, the Contractor will be permitted to 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.

Commercial and Residential Driveways

The Contractor shall maintain access to and egress from all commercial and residential driveways throughout the Project limits except where noted on the plans. The Contractor will be

permitted to temporarily close affected driveways while actively working with coordination and permission from the owner or proprietor.

Intermediate Term Sidewalk Closures

The Contractor shall maintain and protect existing pedestrian accommodations, or a minimum of 4 feet in width, on all existing sidewalks, sidewalk ramps, and access to pedestrian pushbuttons, with the following exception:

- During the allowable periods and when the Contractor is actively constructing pedestrian amenities or installing signal equipment, the Contractor will be allowed to close pedestrian sidewalks and sidewalk ramps and restrict access to pedestrian pushbuttons for no more than a continuous 48 hour period of time.

No more than two corners of an intersection may be closed for an intermediate term sidewalk closure at any time. Where all four corners of an intersection have sidewalks and sidewalk ramps, diagonal corners shall not be closed at the same time.

During the intermediate term sidewalk closure, all approaches to the sidewalk shall be blocked by Pedestrian Barricades with Sidewalk Closed signs.

Intermediate term sidewalk closures may be extended to 72 hours with prior approval of the Engineer.

Pedestrians

The Contractor shall provide and maintain clear pedestrian travelpaths (minimum 4 feet wide) on new or existing sidewalk or temporary walks on at least one side of the street at all times at the Project site. During the allowable periods, the Contractor shall provide Temporary Shuttle Service where temporary walks or pedestrian detour cannot be provided.

If the Contractor proposes changes to the plans, or the Contract does not include plans, 30 days in advance of implementation, the Contractor shall submit plans and procedures to the Engineer for review. The submittal shall be in accordance with typical details of the Manual on Uniform Traffic Control Devices (MUTCD) for maintaining pedestrian sidewalk access during the reconstruction of the sidewalk. When a sidewalk or pedestrian route is closed, pedestrian traffic must be detoured or temporary sidewalk must be provided. Pedestrian detours and temporary sidewalks must meet ADA requirements. The appropriate signs for the pedestrian detour shall be installed in accordance with the MUTCD. All approaches to the closed sidewalks shall be blocked by Pedestrian Barricade with Sidewalk Closed signs. All pedestrian detour signage will be paid under Contract Item "Construction Signs."

When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility. Pedestrian traffic signal displays controlling closed crosswalks shall be covered or deactivated.

Pedestrians shall be detoured to existing crosswalks, or temporary crosswalks, which shall be located at intersections. If this is not possible, temporary midblock crosswalks may be installed, if directed by the Engineer or as indicated on the plans. On-street parking shall be restricted for at least 50 feet in advance of any temporary crosswalk.

Article 9.71.03 - Construction Methods *is supplemented as follows:*

General

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

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

When the Contractor is excavating adjacent to the roadway, the Contractor shall provide a 3 foot shoulder between the work area and travel lanes, with traffic drums spaced every 40 feet. At the end of the work shift if the vertical drop-off exceeds 3 inches, the Contractor shall provide a temporary bituminous concrete traversable slope of 4:1 or flatter that is acceptable to the Engineer.

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.

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.

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 - 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	MINIMUM TAPER LENGTH FOR A SINGLE LANE CLOSURE (FEET)
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(MPH)	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) TMA_s 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) TMA_s 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.

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>Message No.</u>	<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.

11. Equipment Operation and Protection on Parkways

11.a) The following roads are designated as Parkways in the State of Connecticut:

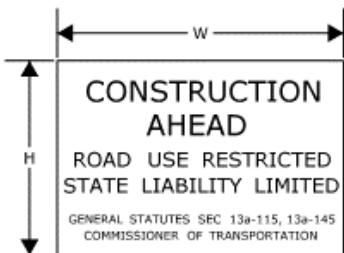
- i. Route 15 (Merritt Parkway) - New York State Line, Greenwich to west begin of Housatonic River Bridge, Stratford
- ii. Route 15 (Wilbur Cross Parkway) - West begin of Housatonic River Bridge, Stratford to begin overpass Interstate Route 91, Meriden
- iii. State Route 796 (Milford Parkway - Officer Daniel S. Wasson, Milford Police Department, Connector) - United States Route 1 (Boston Post Road) to Route 15 (Wilbur Cross Parkway), Milford

11.b) All trucks using any road designated as a Parkway must be equipped with a lighting/signal system that shall be in operation continuously while on the Traveled Way, as follows:

- i. Two (2) amber strobe type flashers, visible from the rear only.
- ii. Two (2) reflectorized "slow moving vehicle triangles" 14 inches H x 16 inches W mounted on the rear of the vehicle.
- iii. The lights must show the full overall width of the vehicle.

- iv. Each light shall be mounted on a hinged or telescoping post, so that the center of the light will not be less than 10 feet above the ground in the operating position.
- 11.c) In accordance with Section 14-298-237(b) of the State Traffic Administration Regulations, the Engineer has the authority to allow the Contractor's trucks and equipment to travel over portions of the Parkway from which they are normally excluded. Prior to authorization the following must occur:
 - i. The Contractor shall provide the Engineer with a list of all trucks and equipment that will need to access the Parkway. The list shall include those truck and equipment specifications requested by the Engineer. The Engineer will contact the Department's Oversize/Overweight Permit Section at DOT.OSOWPermits@ct.gov to request a review of the Contractor's trucks and equipment to ensure they can safely travel on the Parkway to and from the work site. This will include verifying that any structures the trucks and equipment will have to travel under or traverse will have sufficient vertical clearance or weight carrying capacity. The Engineer shall inform the Contractor of the results of the review.
 - ii. The Contractor shall obtain oversize/overweight permits for any trucks and equipment requiring them as determined by the Oversize/Overweight Permit Section.
 - iii. The Engineer has inspected each vehicle and has found them to meet the specifications included within this section.
- 11.d) Each operator of such equipment shall be given instructions by the Contractor concerning the manner of operation while on the Parkway.
- 11.e) All vehicles shall be limited in travel between the nearest Parkway interchange and the work site.
- 11.f) The Contractor will not be permitted to park equipment on the median strip and will not be permitted to cross the median strip without specific permission of the Engineer.
- 11.g) The Engineer reserves the right to revoke authorization if the Contractor fails to abide by the regulations herein prescribed.

SERIES 16 SIGNS



		W	H
16-E	80-1605	84" x 60"	
16-H	80-1608	60" x 42"	
16-M	80-1613	30" x 24"	



		W	H
16-S	80-1619	48" x 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 RAMPS 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

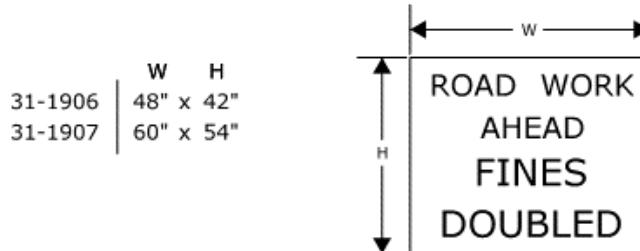
APPROVED

Tracy L. Fagarty
Tracy L. Fagarty, P.E.
2013-10-09 16:30:32-04:00
PRINCIPAL ENGINEER

REGULATORY SIGN "ROAD WORK AHEAD, FINES DOUBLED"

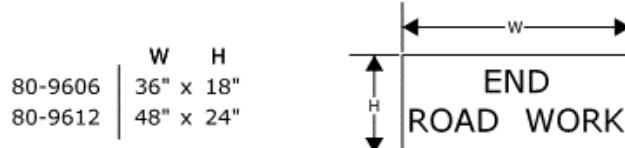
THE REGULATORY SIGN "ROAD WORK AHEAD FINES DOUBLED" SHALL BE INSTALLED FOR ALL WORK ZONES THAT OCCUR ON ANY STATE HIGHWAY AND MUNICIPAL ROAD IN CONNECTICUT WHERE THERE ARE WORKERS PRESENT ON THE HIGHWAY.

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.



"END ROAD WORK" SIGN

THE LAST SIGN IN THE PATTERN SHALL BE THE "END ROAD WORK" SIGN.



CONSTRUCTION TRAFFIC CONTROL PLAN
ROAD WORK AHEAD
SIGNS

SCALE: NONE

APPROVED

Tracy L. Fogarty
Tracy L. Fogarty, P.E.
2019.08.12 15:56:44 04000

PRINCIPAL ENGINEER

NOTES FOR TRAFFIC CONTROL PLANS

1. IF A TRAFFIC STOPPAGE OCCURS IN ADVANCE OF SIGN **(A)**, THEN AN ADDITIONAL SIGN **(A)** SHALL BE INSTALLED IN ADVANCE OF THE STOPPAGE.
2. SIGNS **(A)**, **(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 TRAVELEPATHS 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

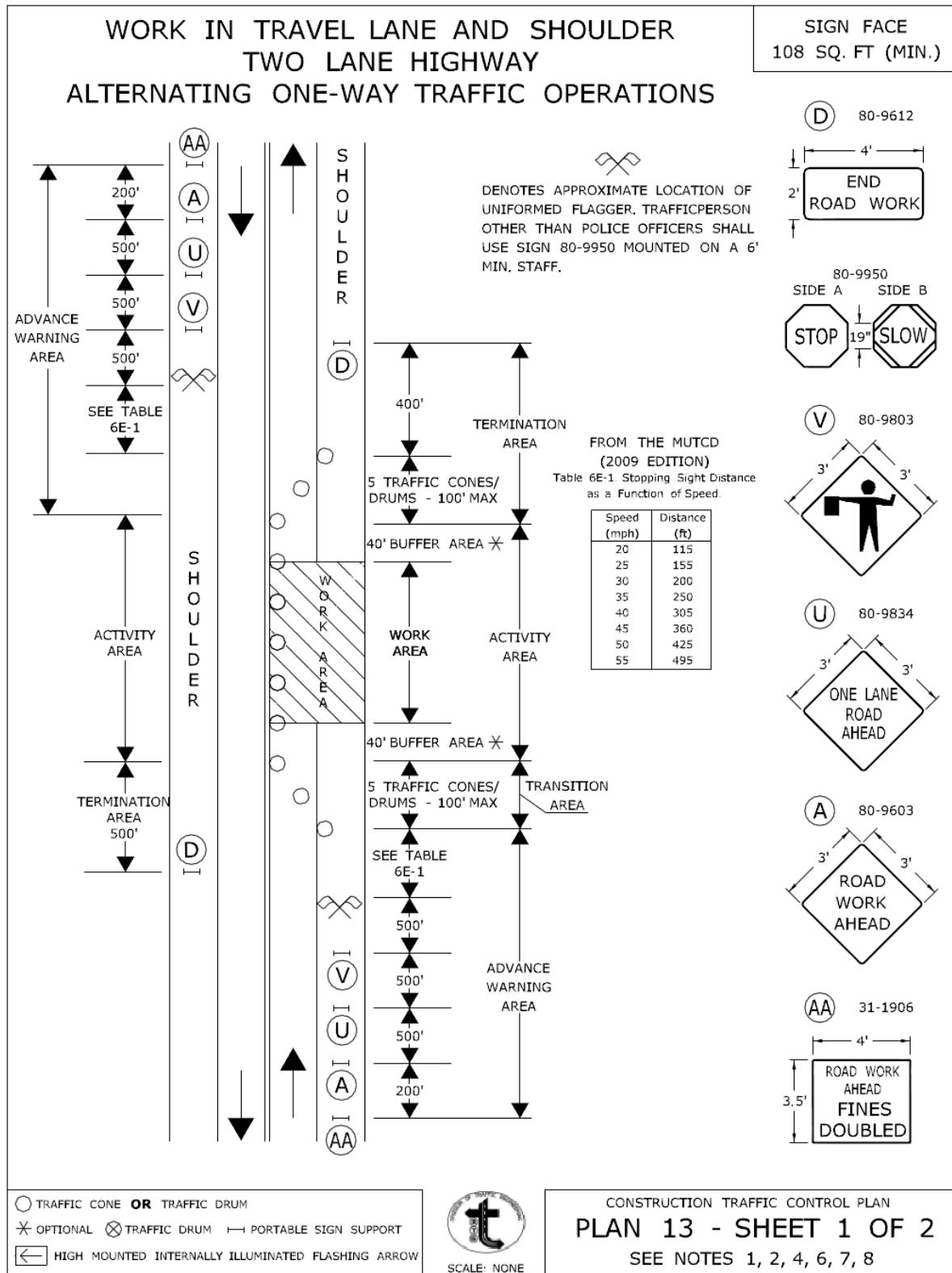
NOTES

SCALE: NONE

APPROVED

Tracy L. Fogarty
Tracy L. Fogarty, P.E.
2019-09-13 06:47:47-0400

PRINCIPAL ENGINEER



WORK IN TRAVEL LANE AND SHOULDER
TWO LANE HIGHWAY
ALTERNATING ONE-WAY TRAFFIC OPERATIONS

SIGN FACE
108 SQ. FT (MIN.)

HAND SIGNAL METHODS TO BE USED BY UNIFORMED FLAGGERS

THE FOLLOWING METHODS FROM SECTION 6E.07, FLAGGER PROCEDURES, IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES," SHALL BE USED BY UNIFORMED FLAGGERS WHEN DIRECTING TRAFFIC THROUGH A WORK AREA. THE STOP/SLOW SIGN PADDLE (SIGN NO. 80-9950) SHOWN ON THE TRAFFIC STANDARD SHEET TR-1220 01 ENTITLED, "SIGNS FOR CONSTRUCTION AND PERMIT OPERATIONS" SHALL BE USED.

A. TO STOP TRAFFIC

TO STOP ROAD USERS, THE FLAGGER SHALL FACE ROAD USERS AND AIM THE STOP PADDLE FACE TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FREE ARM SHALL BE HELD WITH THE PALM OF THE HAND ABOVE SHOULDER LEVEL TOWARD APPROACHING TRAFFIC.



B. TO DIRECT TRAFFIC TO PROCEED

TO DIRECT STOPPED ROAD USERS TO PROCEED, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FLAGGER SHALL MOTION WITH THE FREE HAND FOR ROAD USERS TO PROCEED.



C. TO ALERT OR SLOW TRAFFIC

TO ALERT OR SLOW TRAFFIC, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. TO FURTHER ALERT OR SLOW TRAFFIC, THE FLAGGER HOLDING THE SLOW PADDLE FACE TOWARD ROAD USERS MAY MOTION UP AND DOWN WITH THE FREE HAND, PALM DOWN.



TRAFFIC CONE TRAFFIC DRUM
* OPTIONAL TRAFFIC DRUM PORTABLE SIGN SUPPORT
 HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

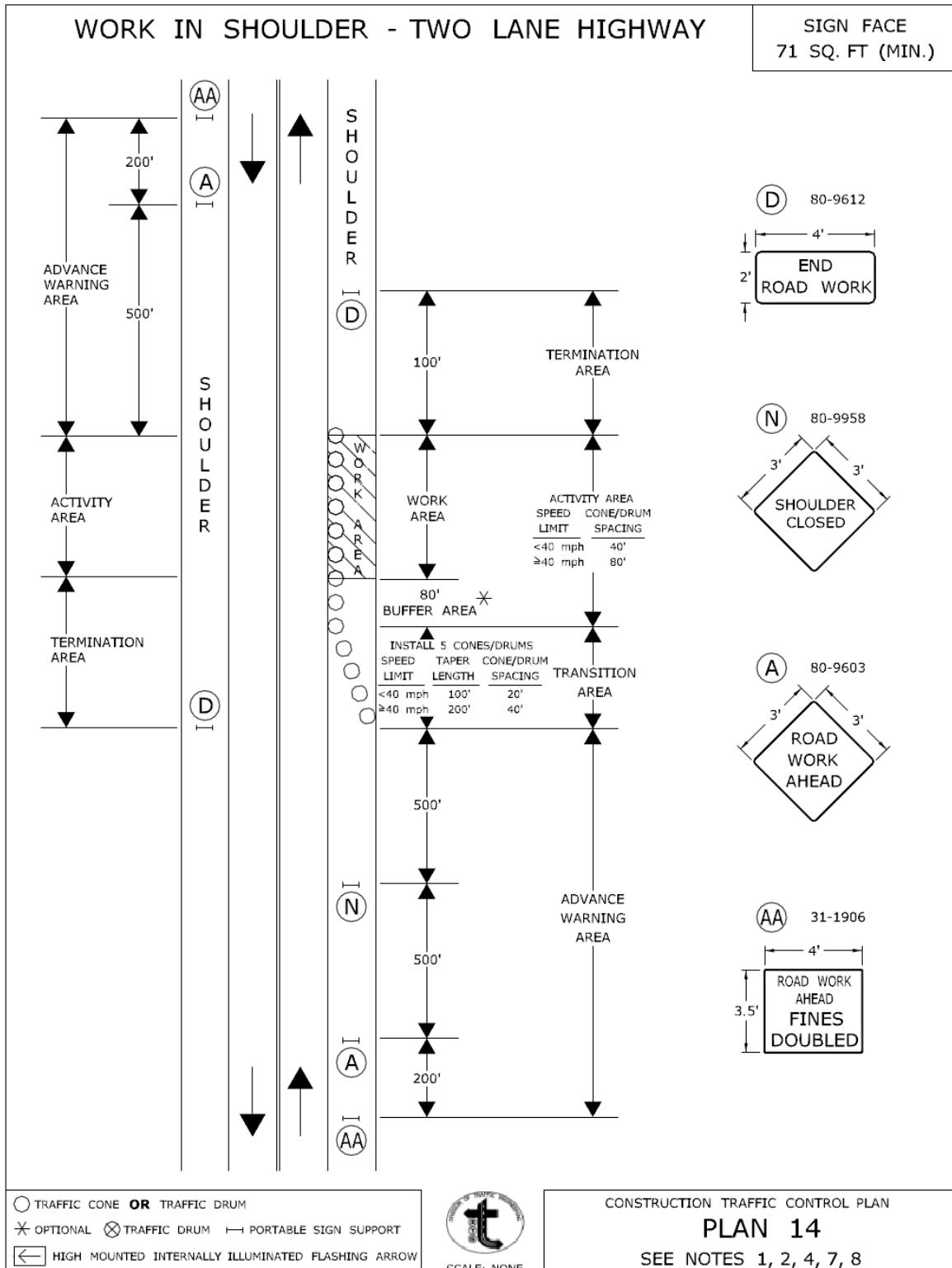
CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 13 - SHEET 2 OF 2
SEE NOTES 1, 2, 4, 6, 7, 8

APPROVED


Charles S. Harlow
PRINCIPAL ENGINEER

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CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION



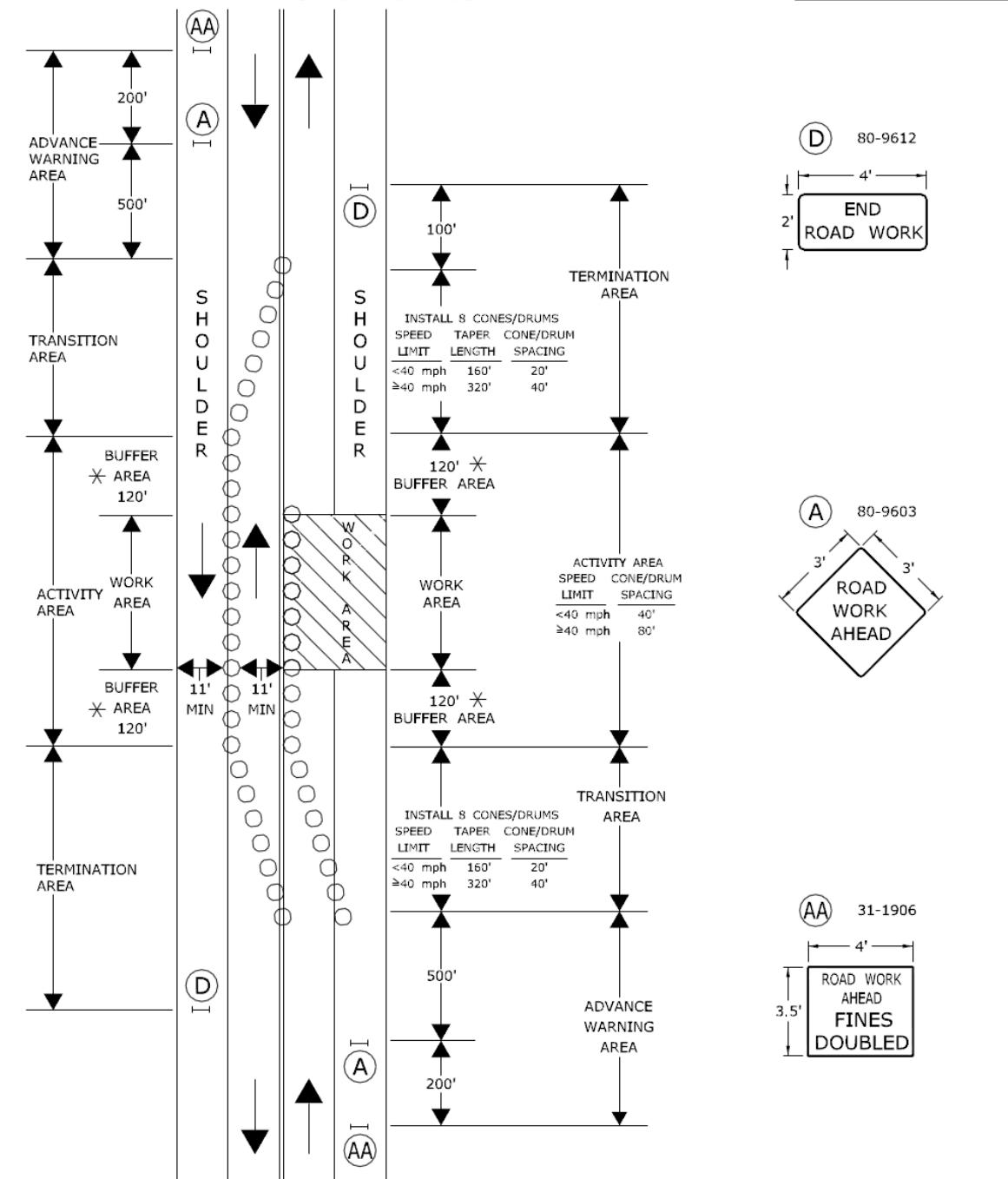
CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED

Charles S. Harlow
2012.06.05 15:56:09-04'00'
PRINCIPAL ENGINEER

WORK IN TRAVEL LANE AND SHOULDER
TWO LANE HIGHWAY

SIGN FACE
62 SQ. FT (MIN.)



TRAFFIC CONE **OR** TRAFFIC DRUM
 OPTIONAL TRAFFIC DRUM PORTABLE SIGN SUPPORT
 HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



CONSTRUCTION TRAFFIC CONTROL PLAN

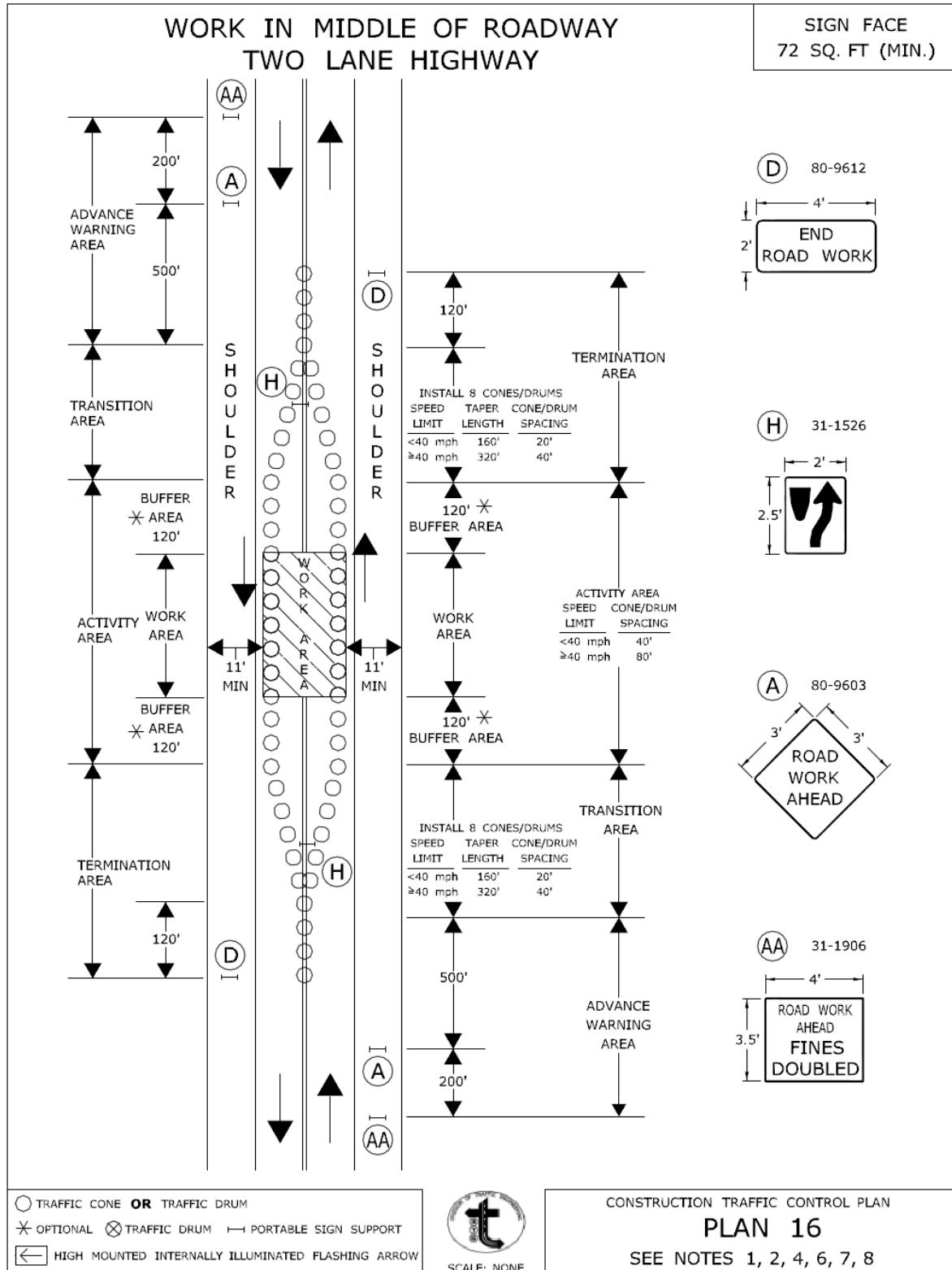
PLAN 15

SEE NOTES 1, 2, 4, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED

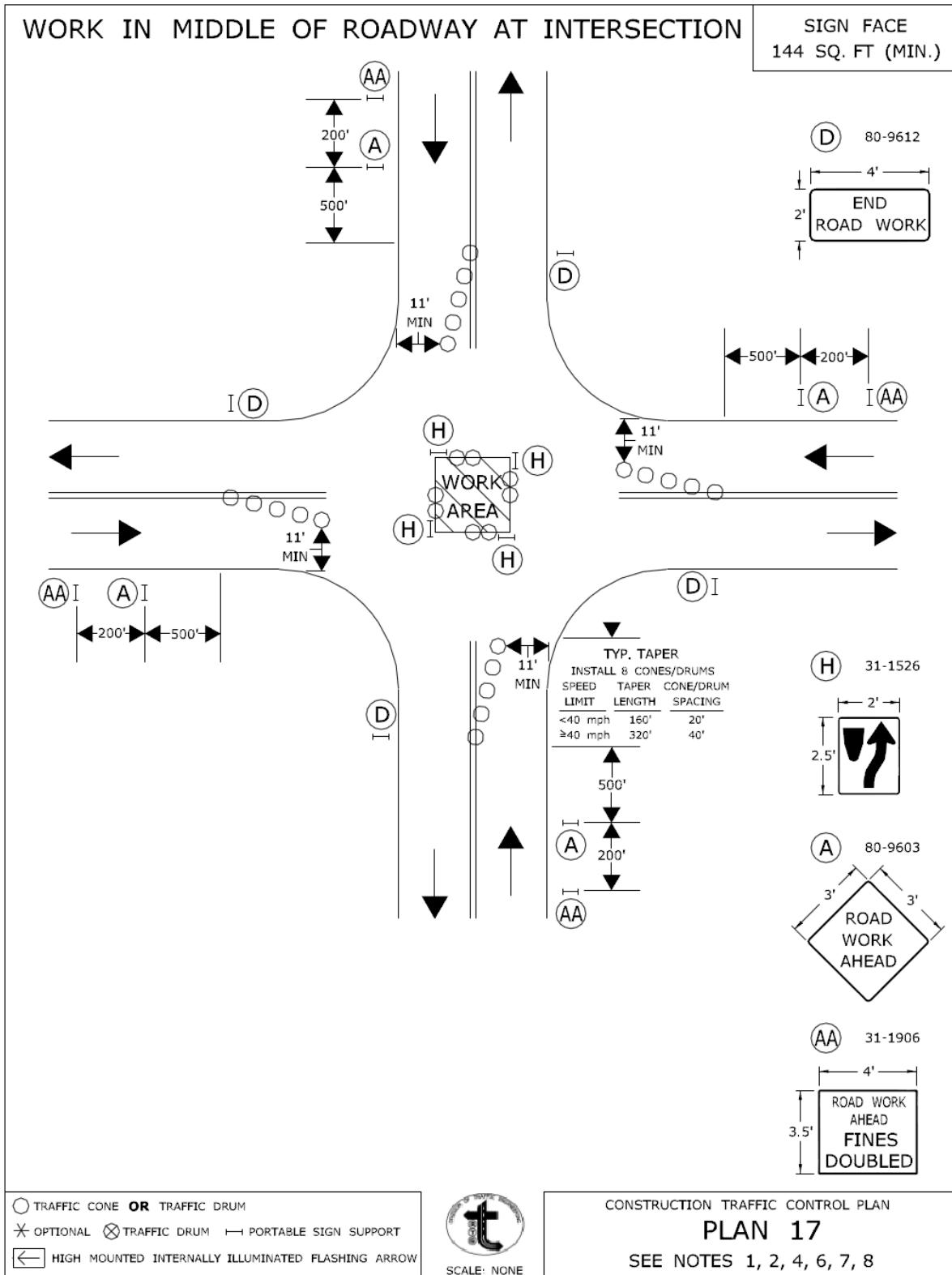
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PRINCIPAL ENGINEER

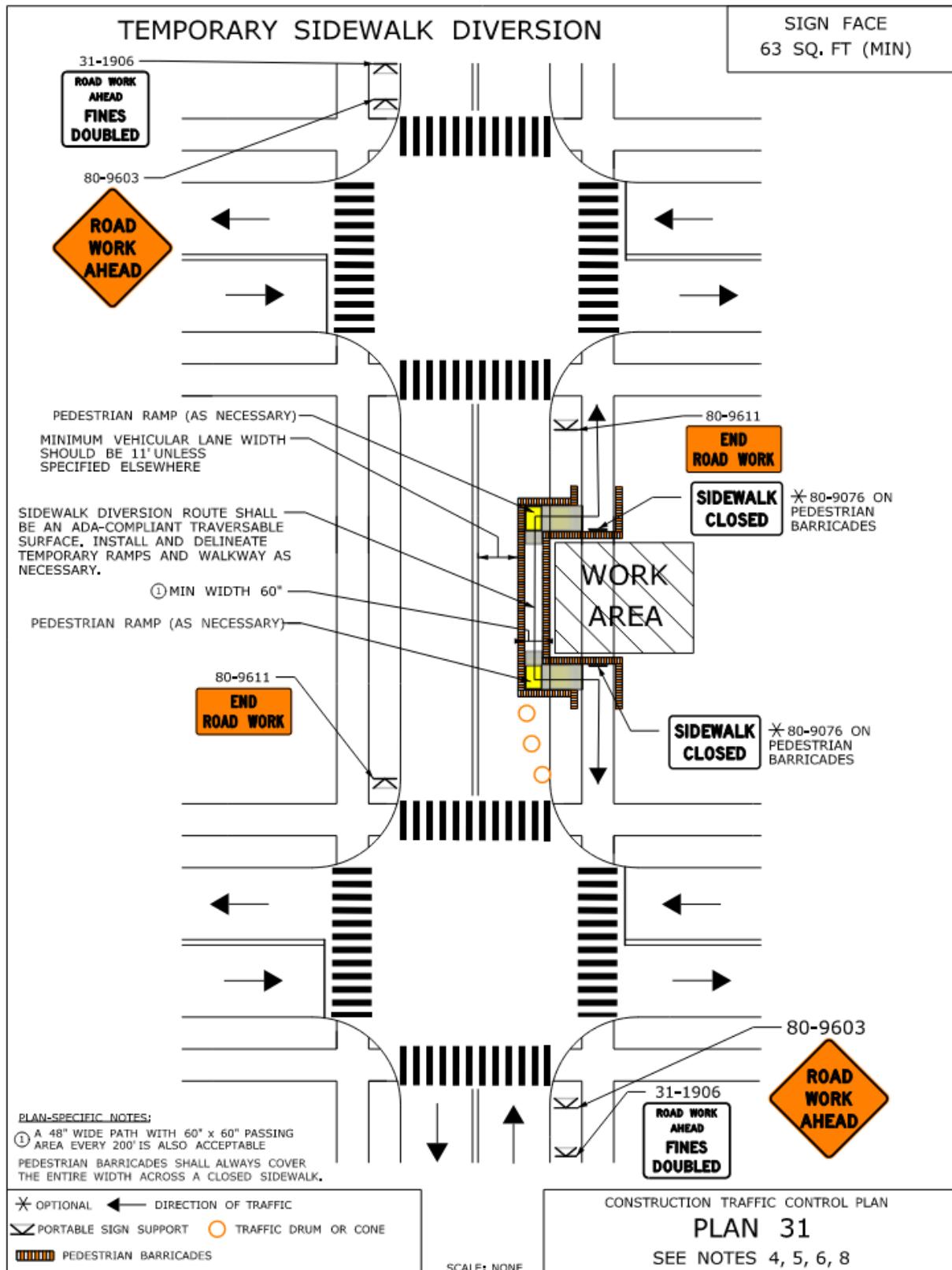


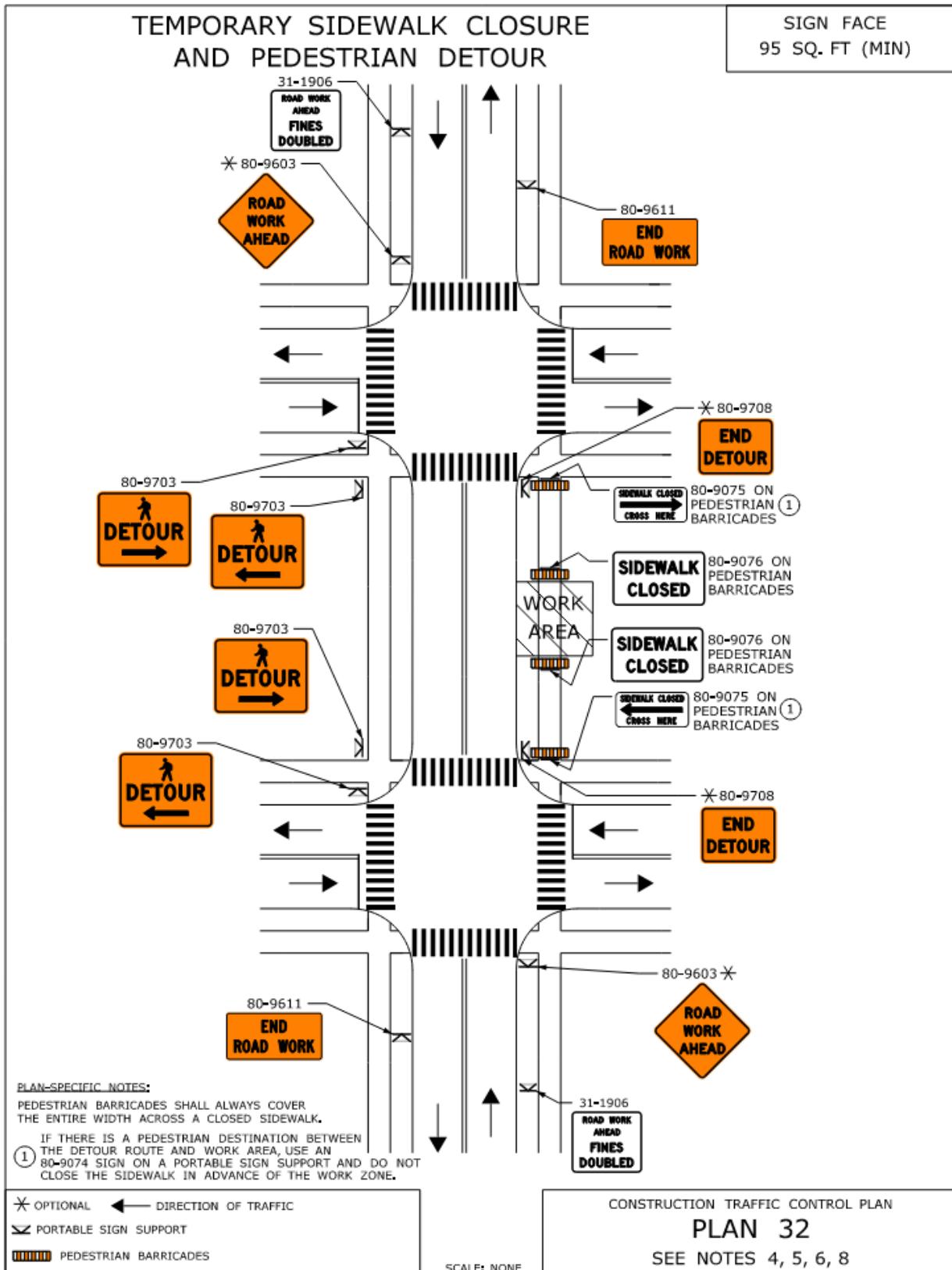
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BUREAU OF ENGINEERING & CONSTRUCTION

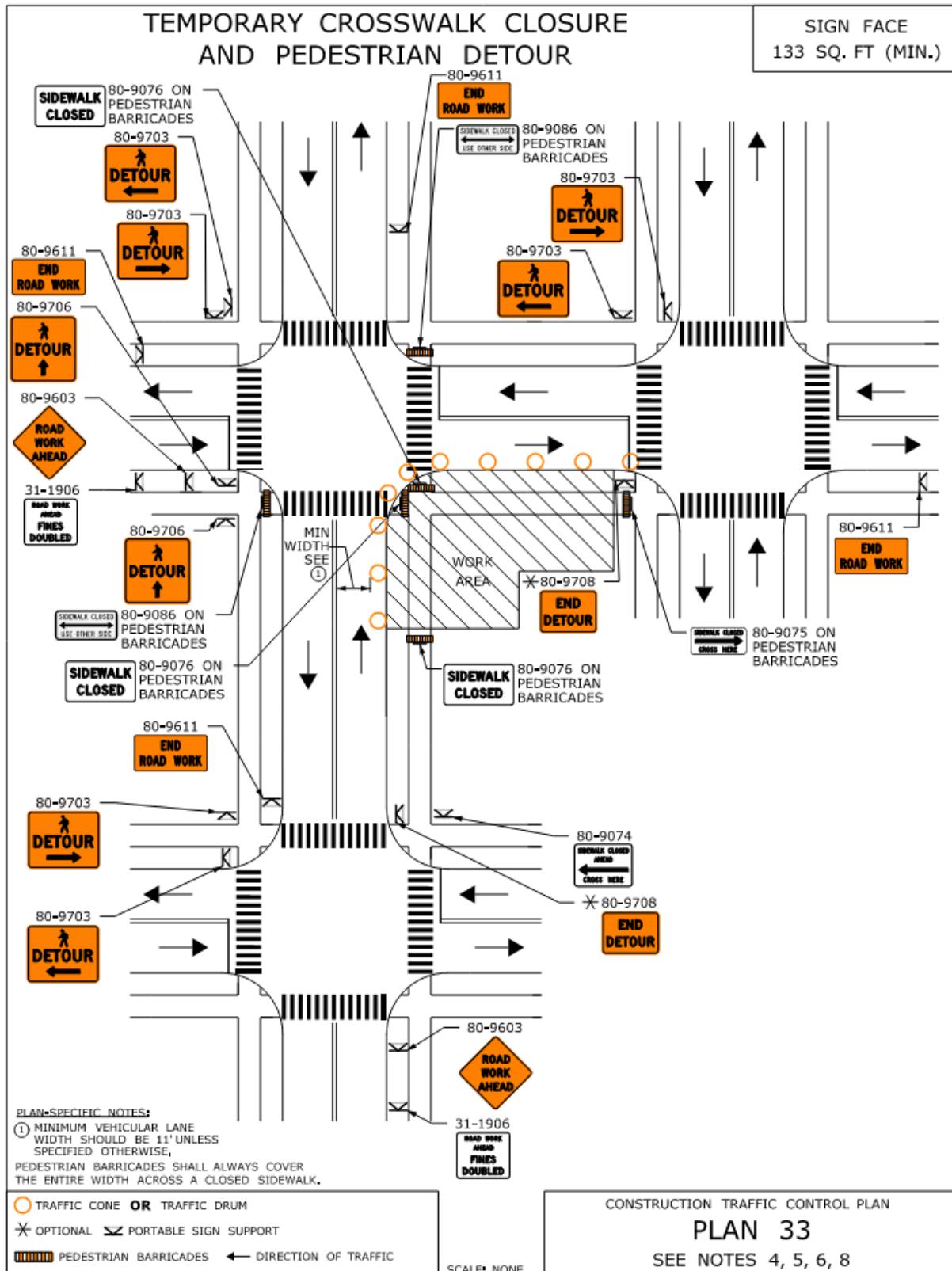
APPROVED Charles S. Harlow Charles S. Harlow
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Article 9.71.05 – Basis of Payment is supplemented by the following:

The temporary relocation of signs and supports, and the furnishing, installation and removal of any temporary supports shall be paid for under the item “Maintenance and Protection of Traffic”. Temporary overhead sign supports and foundations shall be paid for under the appropriate item(s).

The cost of furnishing, installing, and removing the material for the 4H:1V traversable slope shall be paid for under the item “Maintenance and Protection of Traffic”.

The cost for furnishing and installing temporary 6' High Chain Link Fence at the end of each work day, as indicated on the plans, shall be paid for under the item “Maintenance and Protection of Traffic”.

“Temporary Shuttle Service” will be paid separately.

ITEM #0971301A – TEMPORARY SHUTTLE SERVICE

Description: This work shall consist of providing a temporary shuttle service for transporting pedestrians and cyclists around the closed portion of Pomfret Street/Route 44 in the Town of Putnam during the allowable roadway closure periods for replacement of the existing retaining wall.

Materials: The contractor shall furnish an 8-passenger ADA/lift equipped van with a rack capable of carrying a minimum of 2 bicycles, and fully licensed and insured operator for all hours of operation. The van shall be clean, in good condition, and well maintained at all times.

The service may not be suspended for any reason for more than one hour. The service may not be suspended for any reason including equipment breakdown. In the event of equipment breakdown, alternate arrangements such as taxi service shall be provided until fully functional shuttle service can be restored.

Temporary signs shall be placed at all designated stops. The signs shall indicate “Pedestrian/Bicycle Shuttle Stop” and shall conform to Section 12.20 – Construction Signs.

Construction Methods: The shuttle service shall operate whenever the sidewalk or temporary walkway is closed to pedestrians. The service shall have a regular schedule and conduct a round-trip every fifteen minutes via the project local detour route. The schedule shall be posted on the sign at each stop location.

One week prior to the closure of Pomfret Street/Route 44, a message shall be placed on the Changeable Message Signs notifying users of the impending closure to pedestrians and cyclists.

A shuttle stop shall be established on both sides of the roadway closure, a safe distance from the work zone. The stop shall provide a safe place for pedestrians and cyclists to wait and an adequate pullout or pullover area for the shuttle to park while loading. Sign number 80-9928, as shown on Standard Sheet No. TR-1220_01, shall be placed at all established stops conforming to Section 12.20 and shall contain the phrase “PEDESTRIAN – BICYCLE SHUTTLE STOP.”

The service shall conduct a round trip once every fifteen minutes with a schedule posted at each stop location. The schedule shall be posted on a sign with a minimum letter height of 0.5 inches. The service shall operate on a continuous basis, free to the public, with wait times not exceeding 30 minutes for pedestrians and cyclists. The service may not be suspended for any reason for more than one hour. In the event of equipment breakdown resulting in an inability to provide service, alternate arrangements, such as taxi service, shall be provided until fully functional shuttle service can be restored.

The contractor shall maintain required insurance and licensure applicable to operate such service and provide a copy to the Engineer.

The contractor shall maintain a log of the number of pedestrians and cyclists that use the shuttle each day, by the hour, and shall make the information available to the Engineer upon request.

Submittals:

The contractor shall submit a Temporary Shuttle Service Plan 30-days prior to the start of the shuttle service. This plan shall include the following:

- a) Times and Dates of Service
- b) Passenger Capacity
- c) Bicycle Capacity
- d) Type of Vehicle
- e) Proposed Signage Locations, Dimensions, Font Height, and Mounts
- f) Qualifications of Service Provider
- g) Applicable Permits, Licenses and Insurances Required to Operate the Service
- h) Most Recent Inspection of ADA Compliant Lift Platform, in Compliance with Manufacturer Recommended Intervals

Method of Measurement: This work will be measured for payment by the number of hours for "Temporary Shuttle Service" complete and accepted, including all equipment, materials, tools, labor, and incidental expenses thereto.

Basis of Payment: This item shall be paid for at the contract unit price per hour for "Temporary Shuttle Service" complete and accepted which price shall include all labor, materials, signs, equipment, vans, trailers, operators, tools, maintenance, alternate arrangements in the case of failure to provide service, and incidentals.

Pay Item
Temporary Shuttle Service

Pay Unit
hr.

ITEM #0974001A – REMOVAL OF EXISTING MASONRY

Work under this item shall conform to the applicable requirements of Section 9.74 of Form 819, amended as follows:

Article 9.74.01 – Description: Add the following:

The work shall also include salvage and storage of the existing retaining wall stones for reuse in accordance with the specifications for item “Dry Rubble Masonry” as well as the salvage and storage of the existing concrete block support structure including miscellaneous appurtenances.

Article 9.74.03 – Construction Methods: To Section 1: Submittals, add the following:

- Storage location(s) of salvaged retaining wall stones for reuse

To Section 2. Removal: add the following:

The existing stone wall and concrete block support structure shall be dismantled in a manner chosen by the Contractor that will not damage the existing stones, concrete blocks, or miscellaneous appurtenances to be salvaged.

Add the following at the end of the section:

5. Storage: The Contractor shall store the stone removed during the stone wall and the material shall be stored in such a manner as to protect the stone from damage pending its reuse.

The Contractor shall store the concrete blocks and miscellaneous appurtenances from the removal of the concrete block support structure pending delivery to the DOT Maintenance Facility. See Notice to Contractor – Salvage for additional information regarding the coordination and delivery of salvaged items.

Article 9.74.05 – Basis of Payment: Delete this section in its entirety and replace with the following:

Payment for “Removal of Existing Masonry” will be made at the Contract unit price per cubic yard, which price shall include all equipment, tools and labor incidental to the removal and shall include the storage and proper disposal thereof. The cost of furnishing, installing and removing protective debris shielding, falsework and working platforms is included in the cost of this item. The cost of storage of materials removed under this item to be reused on-site or salvaged shall also be included.

Pay Item
Removal of Existing Masonry

Pay Unit
c.y.

ITEM #0979005A – PEDESTRIAN BARRICADE

Section 9.79 is supplemented and amended as follows:

9.79.01—Description:

Replace the entire Article with the following:

Under this item the Contractor shall furnish all Pedestrian Barricades required on the Project as stated in the item “Maintenance and Protection of Traffic,” as shown on the Plans, and as directed by the Engineer.

Pedestrian barricades visible to vehicular traffic shall have retroreflective sheeting compliant with the Retroreflective Sheeting: Construction Barricade Sheeting section of the [Department’s Qualified Product List](#) on the side(s) facing vehicular traffic.

9.79.02—Materials:

Replace the entire Article with the following:

Pedestrian Barricades used on the Project shall be listed on the [Department’s Qualified Product List](#) under the Pedestrian Barricade category as follows:

- The barricades listed under the Test Level 3 category may be used on roadways with a posted speed limit of 60 miles per hour or less;
- The barricades listed under the Test Level 2 category may be used on roadways with a posted speed limit of 40 miles per hour or less;

Water filled Pedestrian Barricades shall only be used when the air temperature is above 33°F. Such barricades shall only be filled with water and may not contain additional chemicals.

9.79.03 - Construction Methods:

Add the following:

Pedestrian Barricades shall be installed per manufacturer guidelines.

Barricade supports shall not protrude more than 4 inches into the pedestrian facility.

Pedestrian Barricades used to close a pedestrian facility shall cover the entire width of the pedestrian facility.

Pedestrian Barricades used for channelizing pedestrian traffic shall meet the following requirements:

1. Barricades along the pedestrian path shall be interlocked and the gap between adjacent devices shall not exceed 1 inch;
2. Barricades shall be installed to produce a smooth continuous length of barrier, except for locations where access to, or crossing, a pedestrian facility is allowed;

9.79.04—Method of Measurement:

Replace the entire Article with the following:

Pedestrian Barricades will be measured as the number of feet along the top rail of pedestrian barricades installed and accepted on the Project.

9.79.05—Basis of Payment:

Replace the entire Article with the following:

Pedestrian Barricades will be paid at the Contract unit price per linear foot for "Pedestrian Barricade." The length of Pedestrian Barricades will be paid for once, regardless of the number of times used on the Project.

Pay Item	Pay Unit
Pedestrian Barricade	l.f.

ITEM #1118012A – REMOVAL AND/OR RELOCATION OF TRAFFIC SIGNAL EQUIPMENT

Section 11.18: Replace the entire section with the following:

11.18.01 – Description:

Remove all abandoned traffic signal equipment. Restore the affected area. Where indicated on the plans remove and reinstall existing traffic signal equipment to the location(s) shown. Lead paint is presumed present on the painted surface of all cabinets and structures located within project limits. Any activities performed by the contractor that results in a painted surface being impacted or altered, shall be performed in accordance OSHA Lead in Construction Standard 29CFR 1926.62, or the painted surface shall be tested prior to any paint being disturbed by a qualified third party hired by the contractor to confirm that no lead is present.

11.18.02 – Materials:

The related sections of the following specifications apply to all incidental and additional material required for the proper relocation of existing equipment and the restoration of any area affected by this work.

- Division III, “Materials Section” of the Standard Specifications.
- Current Supplemental Specifications to the Standard Specifications.
- Applicable Special Provisions to the Standard Specifications.
- Current Department of Transportation, Functional Specifications for Traffic Control Equipment.

Article 11.18.03 - Construction Methods:

Schedule/coordinate the removal and/or relocation of existing traffic signal equipment with the installation of new equipment to maintain uninterrupted traffic signal control. This includes vehicle signals and detectors, pedestrian signals and pushbuttons, coordination, and pre-emption.

Abandoned Equipment

The contract traffic signal plan usually does not show existing equipment that will be abandoned. Consult the existing traffic signal plan for the location of abandoned material especially messenger strand, conduit risers, and handholes that are a distance from the intersection. A copy of the existing plan is usually in the existing controller cabinet. If not, a plan is available from the Division of Traffic Engineering upon request.

Unless shown on the plans it is not necessary to remove abandoned conduit in-trench and conduit under-roadway.

When a traffic signal support strand, rigid metal conduit, down guy, or other traffic signal equipment is attached to a utility pole, secure from the pole custodian permission to work on the pole. All applicable Public Utility Regulatory Authority (PURA) regulations and utility company requirements govern. Keep utility company apprised of the schedule and the nature of the work. Remove all abandoned hardware, conduit risers, and down guys. Remove anchor rods to 6" below grade.

When underground material is removed, backfill the excavation with clean fill material. Compact the fill to eliminate settling. Remove entirely the following material: pedestal foundation; controller foundation; handhole; pressure sensitive vehicle detector complete with concrete base. Unless otherwise shown on the plan, remove steel span pole and mast arm foundation to a depth of 2 feet below grade. Restore the excavated area to a grade and condition compatible with the surrounding area.

- If in an unpaved area, apply topsoil and establish turf in accordance with Section 9.44 and Section 9.50 of the Standard Specifications.
- If in pavement or sidewalk, restore the excavated area in compliance with the applicable Sections of Division II, "Construction Details" of the Standard Specifications.

All material not listed as salvage becomes the property of the Contractor, which assumes all liabilities associated with material's final disposition.

In the presence of the Engineer, verify the condition and quantity of salvage material prior to removal. After removal transport and store the material protected from moisture, dirt, and other damage. Coil and secure copper cable separate from other cable such as galvanized support strand.

Within 4 working days of removal, return all salvaged equipment to the Department of Transportation Stores warehouse listed below. Supply all necessary manpower and equipment to load, transport, and unload the material. The condition and quantity of the material after unloading will be verified by the Engineer.

State-owned Salvage materials from within controller cabinet to be returned to Department of Transportation Signal Lab

CTDOT Signal Lab
280 West Street
Rocky Hill, CT
DOT.SignalLab@ct.gov

All other State-owned Salvage material to be returned to the Department of Transportation Stores Warehouse listed below.

DOT Salvage Store #134
660 Brook Street
Rocky Hill, CT

Contact Materials Management Salvage Coordinator, at (860) 258-1980, and CTDOT Traffic Signals Lab, at DOT.SignalLab@ct.gov, at least 24 hours prior to delivery.

Municipal Owned Traffic Signal Equipment

Return all municipal owned material such as pre-emption equipment to the Town.

Article 11.18.04 – Method of Measurement:

This work will be measured as a Lump Sum.

Article 11.18.05 – Basis of Payment:

This work will be paid for at the contract lump sum price for “Removal and/or Relocation of Traffic Signal Equipment” which price shall include relocating signal equipment and associated hardware, all equipment, material, tools and labor incidental thereto. This price shall also include removing, loading, transporting, and unloading of signal equipment/materials designated for salvage and all equipment, material, tools and labor incidental thereto. This price shall also include removing and disposing of traffic signal equipment not to be salvaged and all equipment, material, tools and labor incidental thereto.

Payment is at the contract lump sum price for “Removal and/or Relocation of Traffic Signal Equipment” inclusive of all labor, vehicle usage, storage, and incidental material necessary for the complete removal of abandoned equipment/material and/or relocation of existing traffic signal equipment/material. Payment will also include the necessary labor, equipment, and material for the complete restoration of all affected areas.

A credit will be calculated and deducted from monies due the Contractor equal to the listed value of salvage material not returned or that has been damaged and deemed unsalvageable due to the Contractor’s operations.

Pay Item	Pay Unit
Removal and/or Relocation of Traffic Signal Equipment	l.s.

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.

Pay Item
Removal and Relocation of Existing Signs

Pay Unit
l.s.

**ITEM #1208931A – SIGN FACE - SHEET ALUMINUM (TYPE IX
RETROREFLECTIVE SHEETING)**

**ITEM #1208937A – SIGN FACE - SHEET ALUMINUM (TYPE XI
RETROREFLECTIVE SHEETING)**

Section 12.08 is supplemented and amended as follows:

12.08.01—Description:

Add the following:

All signs shall use Type XI retroreflective sheeting with the exception of side-mounted signs with white background which shall be Type IX.

This item shall also include field testing of metal sign base posts as directed by the Engineer.

Signs shall conform to the sign details located at <https://portal.ct.gov/DOT/Traffic-Engineering/Catalog-of-Signs> with legend for variable signs as shown in the plans.

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 #1210111A - 4" (YELLOW) TYPE I EPOXY RESIN PAVEMENT MARKINGS

ITEM #1210113A - 6" (WHITE) TYPE I EPOXY RESIN PAVEMENT MARKINGS

Section 12.10 is supplemented and amended as follows:

Article 12.10.01—Description:

Replace the entire Article with the following:

This item shall consist of furnishing and installing retroreflective Yellow and White Type I Epoxy Resin Pavement Markings of the width and color specified at the locations indicated on the plans, in conformance with the plans, this specification, and as directed by the Engineer.

Type I Epoxy Resin Pavement Markings include center lines, lane lines, and shoulder lines.

Type I Epoxy Resin Pavement Markings shall be installed in a pavement marking groove. Pavement marking grooves are specified elsewhere in the Contract.

Article 12.10.02—Materials:

Replace the entire Article with the following:

Type I Epoxy Resin Pavement Markings shall meet the requirements of **Article M.07.22 – Epoxy Resin Pavement Markings** amended as follows:

Delete the last sentence and add the following:

(j) Type I Epoxy Resin Pavement Markings shall consist of one of the following mixes of retroreflective beads, or approved equal:

- Potter's VISIMAX glass bead and a clear glass bead that meets the requirements of AASHTO M 247, Type 4.
- Potter's VISIULTRA glass bead and a clear glass bead that meets the requirements of AASHTO M 247, Type 1.
- 3M's tinted microcrystalline ceramic bead with minimum indexes of refraction of 1.89 (dry) and 2.4 (wet) when tested using the ASTM E1967 method and a clear glass bead that meets the requirements of AASHTO M 247, Type 4. Yellow tinted beads shall be installed on yellow pavement markings and white tinted beads shall be installed on white pavement markings.

Article 12.10.03—Construction Methods:

In Subarticle 1. Equipment, delete paragraph 1 and add the following:

Equipment furnished shall include an applicator truck of adequate size and power, together with:

- (a) remote application equipment designed to apply an epoxy resin material in a continuous pattern, and
- (b) portable retroreflective bead applicators, one for each size bead, designed to provide uniform and complete coverage of the epoxy binder by a controlled free-fall method. Pressurized retroreflective bead application shall not be used.

In Subarticle 2. Procedures, delete paragraphs 3, 7, and 8 and add the following:

All surfaces that are power washed shall be allowed to dry sufficiently prior to the application of the epoxy markings. The areas to be marked shall be broom cleaned immediately prior to the application of the epoxy markings. Retroreflective beads shall be applied immediately after application of the epoxy resin marking to provide an immediate no-track system.

The epoxy for Type I Epoxy Resin Pavement Markings shall be uniformly applied to the surface to be marked to ensure a wet film thickness, without retroreflective beads, of 20 mils \pm 1 mil.

For Potter's VISIMAX glass bead Type I Epoxy Resin Pavement Markings, a first drop consisting of Potter's VISIMAX glass beads shall be applied at the rate of 8 lb./gal. of epoxy pavement marking material, immediately followed by a second drop consisting of glass beads meeting the requirements of AASHTO M 247, Type 4 at the rate of 8 lb./gal. of epoxy pavement marking material. Traffic cones or other acceptable methods shall be used to protect the Type I Epoxy Resin Pavement Markings until cured.

For Potter's VISIULTRA glass bead Type I Epoxy Resin Pavement Markings, a first drop consisting of Potter's VISIULTRA glass beads shall be applied at the rate of 10 lb./gal. of epoxy pavement marking material, immediately followed by a second drop consisting of glass beads meeting the requirements of AASHTO M 247, Type 1 at the rate of 5 lb./gal. of epoxy pavement marking material. Traffic cones or other acceptable methods shall be used to protect the Type I Epoxy Resin Pavement Markings until cured.

For 3M's tinted microcrystalline ceramic bead Type I Epoxy Resin Pavement Markings, a first drop consisting of tinted microcrystalline ceramic beads shall be applied at the rate of 5 lbs./gal. of epoxy pavement marking material, immediately followed by a second drop consisting of glass beads meeting the requirements of AASHTO M 247, Type 4 at the rate of 10 lbs./gal. of epoxy pavement marking material. Traffic cones or other acceptable methods shall be used to protect the Type I Epoxy Resin Pavement Markings until cured.

Replace Subarticle 3. Initial Performance with the following:

The retroreflectivity of the markings applied shall be measured by the Contractor using the procedure and equipment detailed below for the Initial Test Period, Review Period, and Observation Period.

Test Lots: The following test lots will be randomly selected by the Engineer to represent the line markings applied:

Table 12.10.03-3.1: Line Test Lots

<u>Length of line</u>	<u>Number of Lots</u>	<u>Length of Test Lot</u>
< 1000 feet	1	Length of Line
< 1.0 mile	1	1000 feet
≥ 1.0 mile	1 per 1.0 mile	1000 feet

Measurement Equipment and Procedure: Retroreflectometer equipment shall be calibrated using the instructions from the instrument manufacturer within 24 hours prior to use.

Skip line measurement shall be obtained for every other stripe, taking no more than 2 readings per stripe with readings no closer than 20 inches from either end of the marking.

Solid line test lots shall be divided into 10 sub-lots of 100 foot length and measurements obtained at 1 randomly select location within each sub-lot.

The Contractor shall perform retroreflectivity readings on the Type I Epoxy Resin Pavement Markings between 30 and 37 days after installation per the measurement and sampling procedures contained in ASTM D7585 (*Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments*). Portable Retroreflectometer and Mobile Retroreflectometer testing is allowed using the following methods.

- ASTM E1710 (*Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer*);
- ASTM E2177 (*Standard Test Method for Measuring the Coefficient of Retroreflected Luminance (R_L) of Pavement Markings in a Standard Condition of Wetness*).

Additional Contents of Certified Test Report (CTR): The CTR shall also list:

- Project, Route number, and Route direction.
- Geographical location of the test site(s), including distance from the nearest reference point.
- Manufacturer and model of retroreflectometer used.
- Most recent calibration date for equipment used.
- Time of Day the readings are taken.

Recordings shall be certified by the Contractor, reviewed by the Engineer, and provided to the CTDOT Division of Traffic Engineering.

A CTR, in accordance with 1.06.07 or 1.20-1.06.07, shall be submitted to the Engineer no later than 10 days after the measurements are taken.

The Materials Certificates (MC) shall also list:

- Liquid binder application rate.
- Retroreflective bead type(s) and drop rate.

Recordings shall be certified by the Contractor, reviewed by the Engineer, and provided to the CTDOT Division of Traffic Engineering.

The MC, in accordance with 1.06.07 or 1.20-1.06.07, shall be submitted to the Engineer no later than 10 days after the measurements are taken.

Initial Test Period: The minimum initial retroreflectivity readings shall meet or exceed the following minimum values using an observation angle of 1.05 degrees and an entrance angle of 88.8 degrees:

	*Type I White Markings	*Type I Yellow Markings
ASTM E1710 (Dry)	350 mcd/lux/m ²	225 mcd/lux/m ²
ASTM E2177 (Wet Recovery)	300 mcd/lux/m ²	200 mcd/lux/m ²

Review Period: A 90-day Review Period shall be implemented for Type I Epoxy Resin Pavement Markings. The Contractor shall be responsible for any defects in materials and workmanship of the Type I Epoxy Resin Pavement Markings for a period of 90 days from the date the Type I Epoxy Resin Pavement Markings are installed and subjected to live traffic conditions.

At the end of the Review Period, the Engineer will inspect the Type I Epoxy Resin Pavement Markings for durability, color, and retroreflectivity, and inform the Contractor of all rejected pavement markings that require replacement. The Type I Epoxy Resin Pavement Markings will be rejected for any of the following conditions:

- Insufficient thickness or line width, uneven cross-section.
- Poor adhesion or delamination.
- Insufficient groove depth.

The Contractor shall be responsible for replacing all rejected Type I Epoxy Resin Pavement Markings at no cost to the State. All rejected Type I Epoxy Resin Pavement Markings shall be replaced within 14 days of notification to the Contractor of the failed Review Period test. All Type I Epoxy Resin Pavement Markings installed as the result of a failed Review Period test shall meet all testing requirements of the initial performance testing procedures, and shall be subject to an additional Review Period.

Article 12.10.04—Method of Measurement:

Replace the entire Article with the following:

Type I Epoxy Resin Pavement Markings will be measured for payment by the actual number of linear feet of Type I Epoxy Resin Pavement Markings installed on the pavement and accepted by the Engineer.

The cost of all measuring and testing of the retroreflectivity of the Type I Epoxy Resin Pavement Markings by the Contractor will be considered incidental to the cost of the item.

Article 12.10.05—Basis of Payment:

Replace the entire Article with the following:

This work will be paid for at the Contract unit price per linear foot for “Type I Epoxy Resin Pavement Markings” of the width and color specified, installed on the pavement and accepted. These prices shall be for all the work required by this Section and all materials, equipment, tools and labor incidental thereto. Payment will not be made for pavement markings affected by Contractor error and ordered removed.

Pay Item (Width) (Color) Type I Epoxy Resin Pavement Markings	Pay Unit l.f.
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ITEM #1220027A – CONSTRUCTION SIGNS

Section 12.20 is supplemented and amended as follows:

Article 12.20.01 – Description:

Add the following:

The Contractor shall also furnish, install, maintain, and remove Bipartisan Infrastructure Law project signs. The Bipartisan Infrastructure Law project signs shall be of the details, colors and materials as shown on the attached detail sheet.

The sign legend for this Project shall include the U.S. Department of Transportation pictograph on the lower right side of the sign with the legend Project funding source: Federal Highway Administration.

Article 12.20.03 — Construction Methods:

Add the following:

The Contractor shall install the Bipartisan Infrastructure Law (BIL) project signs prior to initiating construction.

The Contractor shall install BIL project sign 80-5957 on each major roadway approach to the construction Site in advance of the Project limit(s).

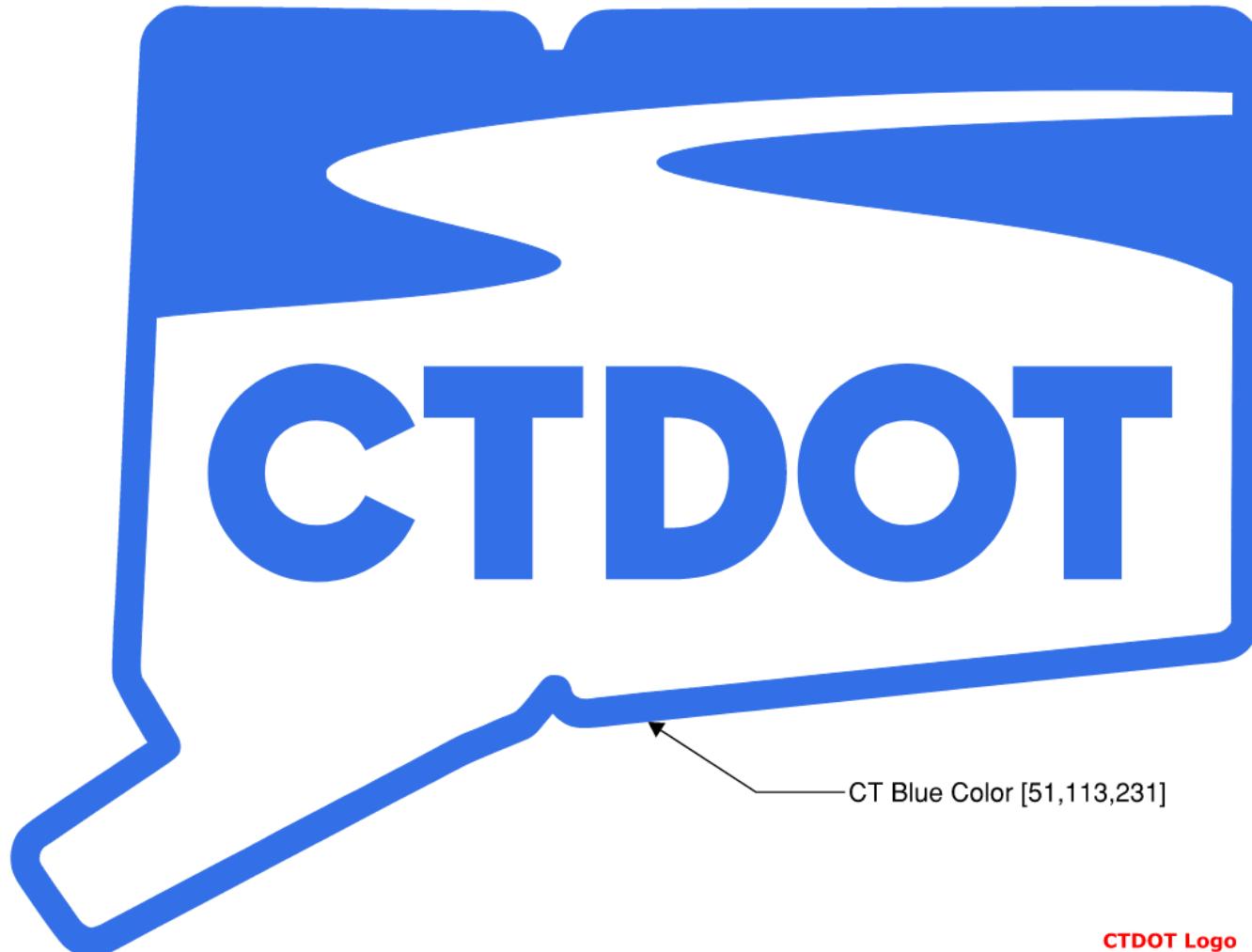
The sign detail is included and is also available at [80-5957](#).

The Contractor shall maintain the BIL project signs for the entire duration of the Project. The Contractor shall relocate the BIL project signs during construction as needed and shall remove the signs after construction work is completed.

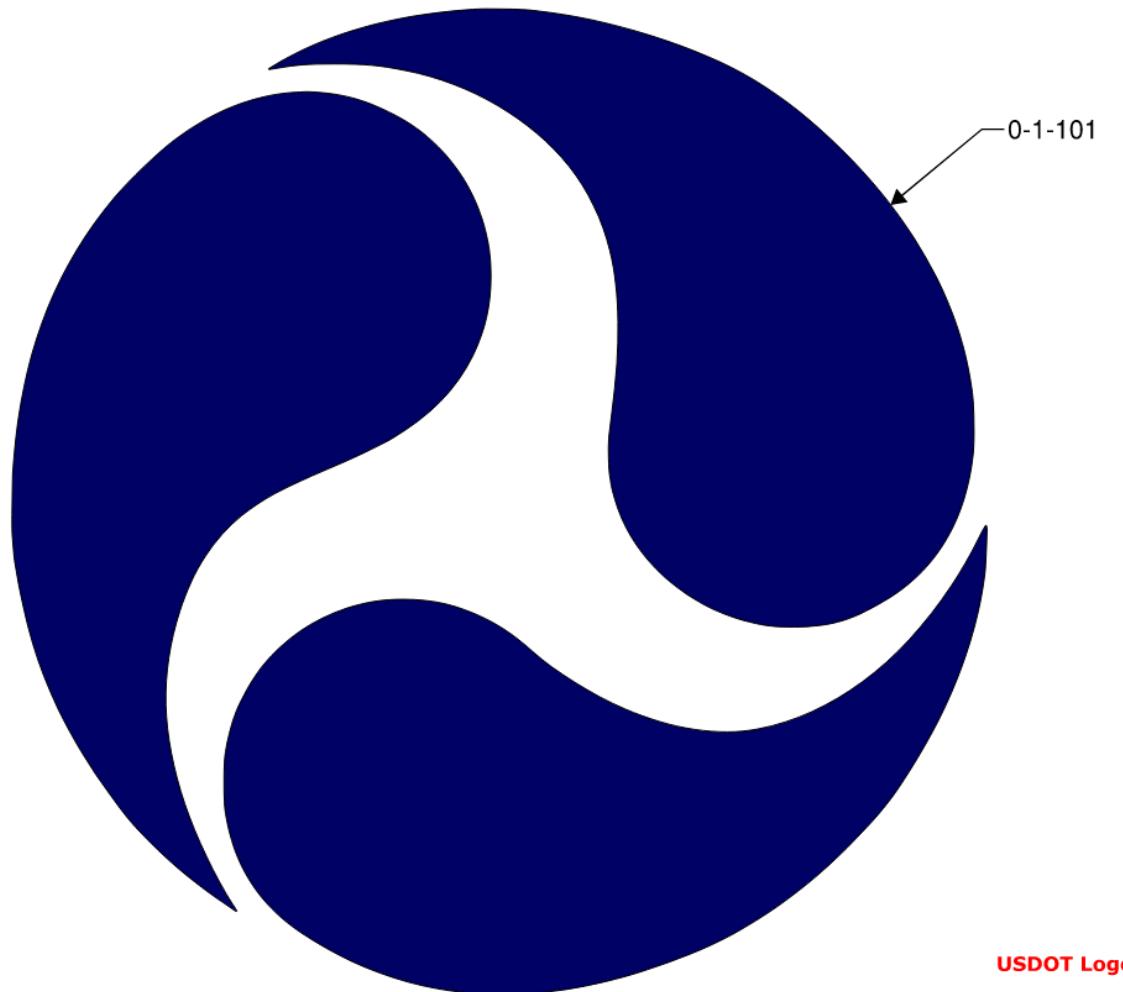
Article 12.20.05 – Basis of Payment:

Add the following:

The price shall also include furnishing, installing, maintaining, relocating, and removing the Bipartisan Infrastructure Law project signs and sign posts and all hardware, materials, and labor incidental thereto.



Link to .dgn file: [New_CTDOT_Logos.dgn](#)



USDOT Logo

Link to .dgn file: [USDOT_logo.dgn](#)

ITEM #1301069A – INSULATED AND NON-INSULATED 8" DUCTILE IRON WATER MAIN

ITEM #1301085A – INSULATED AND NON-INSULATED 16" DUCTILE IRON WATER MAIN

ITEM #1301933A – 20" STEEL PIPE SLEEVE

Description: This work shall consist of furnishing, preparing and installing ductile iron water pipes of the size and type specified, bedding material, rubber gasket push-on joints, restrained joints, fittings, insulation, steel sleeve/casing for pipe protection, water pipe trench excavation, backfilling, connecting proposed water pipe to existing system, testing and disinfection, plugging or abandoning existing pipes and removal of existing pipe within trench limits, as shown on the plans or as directed by the Engineer.

Materials:

1. Ductile Iron Pipe and Fittings:

Ductile Iron Pipe shall be Class 52 per AWWA C151 unless directed by Engineer, and provided in standard lengths as much as possible.

1. The thickness design shall be per AWWA C150
 - a. Piping 12 inches and smaller: Minimum thickness Class 52
 - b. Piping 14 inches to 20 inches: Minimum thickness Class 52
2. Ductile Iron Pipe shall be hydrostatically tested at point of manufacture to 500 psi for a duration of 10 seconds per AWWA C151. Testing may be performed prior to machining bell and spigot. Test failure is defined as any leak or rupture of pipe wall.
3. Ductile Iron Pipe and Fittings shall be marked in accordance with all applicable AWWA standards.
4. Pipe, fittings, specials, and appurtenances shall be legibly and permanently marked to be consistent with the laying schedule and marking drawings (if required) with the following information:
 - a. Manufacturer.
 - b. Date of manufacture.
 - c. Size, type, class, or wall thickness.
 - d. AWWA Standard(s) produced to.
 - e. Sequential numbering consistent with the laying schedule and marking drawings, and each pipe shall appear on the marking drawings in the identified location for installation.
 - f. Special fittings, bends, and appurtenances requiring specific orientation shall be appropriately marked with the words "TOP" in the correct position and in a consistent location.

5. Restrained Pipe and Fitting Joints: Push-on rubber gasket, locking ring type joints per the manufacturer's standard described below.
6. Gasket materials: Per Table 5-1 of AWWA M-41.
7. Rubber-Gasket Joints: Per AWWA C111. Styrene butadiene rubber (SBR).
8. Ductile Iron pipe and pipe fittings shall be supplied by one of the following manufacturers or an Engineer approved equivalent.
 - a. American Cast Iron Pipe Co.
 - b. U.S. Pipe and Foundry.
 - c. McWane Company; all pipe divisions.
 - d. Tyler Pipe and Coupling Company
 - e. An approved equivalent member of the Ductile Iron Pipe Research Association (DIPRA).

Restraints for push-on joint pipe and fittings to be positive locking, utilizing restraints independent of the joint gasket.

1. Joint Test Pressure 350 psig.
2. Joint Fabrication: Heavy section ductile iron casting.
3. Bolts and Nuts: Low carbon steel conforming to ASTM A193, Grade B7.
4. Restraint for mechanical joint pipe shall use retainer glands for restraining joint.
5. Provide restrained push on joints from one of the following manufacturers or an Engineer approved equivalent.
 - a. US Pipe and Foundry Company: "TR Flex" or "HDSS" (high deflection high pressure restrained pipe, sizes 12", 16", 20", 24", 30", 36", 42", and 48").
 - b. American Cast Iron Pipe Company: "Lok-Ring" or "Flex Ring (positive locking style)."
 - c. Clow Water Systems Company: "Superlok."

Pipe manufacturer proprietary mechanical joint restraint systems that utilize a wedge-style gripping system or a gland/ring positive restraint system shall be considered acceptable on a case by case basis as determined by the Engineer.

1. The mechanical joint restraint shall be incorporated in the design of a follower gland. The gland shall be manufactured of ductile iron per ASTM A536. Dimensions of the gland must be such that it can be used with the standard mechanical joint bell and tee-headed bolts, as specified with the pipe.
2. Restraint Mechanism:
 - a. Individually activated gripping surfaces maximizing restraint capability.
 - b. Wedges designed to spread the bearing surfaces on the pipe.
 - c. Torque limiting twist-off nuts sized same as T bolts for mechanical joints.
When the nut is sheared off, standard hex nut shall remain.
3. Restraint Device for Ductile Iron Pipe: EBAA Iron Megalug Series 1100, or approved equivalent.
 - a. Working Pressure: 250 psi and a safety factor of 2:1.

Pipe fittings shall be mechanical joint ductile iron per AWWA C110 or AWWA C153 as applicable. Fittings shall have the same pressure rating, as a minimum, of the connecting pipe. Piping 24 inch and smaller shall have a minimum pressure rating of 350 psi.

1. Closures: Made with mechanical joint ductile iron long body solid sleeves. Locate in straight runs of pipe at minimum cover outside the limits of restrained joint sections, subject to approval of the Engineer.
2. Plugs for ductile iron pipe shall be style F-1137 solid plug as manufactured by Clow Corporation or approved equal.

Interior lining for ductile iron pipe and fittings shall be cement mortar lining per AWWA C104 double thickness, cement type per ASTM C150.

1. Ductile iron pipe and fittings shall have the same type of lining.
2. At suppliers' option, fittings may be lined per AWWA C550; NSF/ANSI 61 certified.

Exterior coating of ductile iron pipe and fittings shall be bituminous coating per AWWA C151 and C110 respectively.

1. Where required, insulated pipe shall be pre-insulated Class 52 ductile iron pipe.
 - a. Pipe insulation shall consist of factory-applied 2-inch thick rigid polyurethane foam with a thermal conductivity K-value of 0.020-0.026 W/m°C and encased in a black high-density polyethylene (HDPE) pipe jacket with heat tracing conduit. Pipe insulation shall be manufactured in accordance with ISO 9001 Standards by Urecon Ltd., or approved equivalent.
 - b. Insulation kits consisting of preformed rigid polyisocyanurate or polyurethane foam half-shells and 12-mil thick black polyethylene tape shall be used for field application of insulation for pipe fittings and joints. The polyethylene tape jacket shall have a modified butyl rubber adhesive to ensure positive adhesion to the foam insulation and shall be field applied with a minimum of 3/4-inch overlap for one layer, or a 50% overlap for a two layer finished product.
 - c. Butt-fused and welded joints shall be insulated using pre-fabricated rigid polyisocyanurate or polyurethane foam half-shells and sealed with the application of suitable wrap around adhesive lined heat shrink sleeves as supplied by Urecon, Ltd. or approved equivalent. The heat shrink sleeves shall overlap the insulation jacket by a minimum of 3-inches on either side of the joint.

Unrestrained pipe and fitting joints shall be push-on rubber gasket type per AWWA C111.

Contractor shall furnish two-year manufacturer's warranty for ductile iron pipe and fittings.

The contractor shall excavate test pits to measure the dimensions and pipe outside diameters for the required solid sleeves at the connection points between new and existing piping prior to ordering new solid sleeves.

Underground pipe marking ribbon tape shall be polyethylene silver metal detectable tape brightly colored blue for water, and continuously printed with the warning message for water such as "CAUTION – WATER LINE BURIED BELOW". Size shall be minimum 6 inches wide by 5 mil thick, and manufactured for direct burial service. Underground pipe marking ribbon tape shall be manufactured by one of the following or approved equal:

1. Mutual Industries, Inc.
2. Terra Tape, Dic. Of Reef Industries Inc.

2. **Corporation Stops:** Corporation stop valves shall be 1-inch diameter. Valves shall be installed within valve boxes with locking covers.
 1. Shall be manufactured by one of the following or approved equal:
 - a. The Ford Meter Box Co., Inc. Model F 400
 - b. Mueller Company Figure H-10003
 - c. A.Y. McDonald
 2. Corporation stops shall conform to AWWA C800, not less than 1-inch in diameter and shall be installed where indicated on the Drawings.
 - a. AWWA/CC taper thread inlet by Male Iron Pipe thread outlet.
3. **Screened Gravel Fill:** Shall consist of natural stone; washed, hard, durable, rounded, or sub-angular particles of proper size and gradation, and shall be free from sand, loam, clay, excess fines, and other deleterious materials; to the following limits:
 1. Percent Passing per Sieve Size:
 - a. 5/8-inch: 100 percent
 - b. 1/2-inch: 40 to 100 percent
 - c. 3/8-inch: 15 to 45 percent
 - d. No. 10: 0 to 5 percent
4. **Common Fill:** Common fill shall be approved on site excavated material or imported fill material that is composed of durable soil free of debris, organic matter, or other deleterious materials. Common fill shall not contain stones larger than 6 inches in largest diameter, a maximum of 35 percent passing the No. 200 sieve, and a maximum dry density of at least 85 pounds per cubic foot (pcf) as determined by ASTM D1557. Common fill shall not contain granite blocks, broken concrete, masonry rubble, or other similar materials and shall have physical properties such that it can be readily spread and compacted during filling.
5. **Select Common Fill:** Shall be as specified above for common fill except that the material shall contain no stones larger than 2 inches in largest diameter or 100% passing the 2-inch sieve.
6. **Geotextiles:** Geotextile fabric shall be Mirafi Type 140N, or approved equal product and shall conform to the following requirements:
 1. Minimum grab strength of 120 lbs per ASTM D1682.
 2. Equivalent open size (EOS) to be equal to or greater than the U.S. Standard Sieve No. 100 (0.210 mm) per ASTM D442.

3. Percent open area not to exceed 25 percent. The percent open area is defined as the ratio of the sum of 20 or more individual open areas (times 100) to the sum of the corresponding 20 or more individual total areas.
4. Coefficient of permeability shall not be less than 10-2 cm/sec.

7. **Precast Concrete Thrust Blocks:** Precast concrete thrust block materials as called for on the drawings shall conform to Section 5.14 Prefabricated Concrete Structural Components of Form 819.

8. **Disinfection of Water Main:** Chemical used for disinfection shall be Hypochlorite and comply with AWWA B300.

Construction Methods:

1. **Submittals:**

Prior to pipe shipment, the contractor shall provide certified test reports and materials certificates for all ductile iron pipe, fittings, appurtenances and accessories, including gaskets, linings, exterior coatings, and encasements outlined in this section in accordance with Section 1.06.07 of Form 819. Pipe and fittings shall be inspected and tested at foundry as required by specified referenced standards. Certified test results shall be furnished in duplicate to Engineer 5 days prior to shipment

Contractor shall submit manufacturer's recommendations for two sets of spare parts.

Contractor shall provide qualifications statements, including qualifications for manufacturer, fabricator, applicator, installer, erector, and licensed professional, and manufacturer's approval of applicator fabricator, and installer.

1. The manufacturer of all ductile iron pipe and fittings and other appurtenances shall meet the following criteria and furnish the necessary project information, which demonstrates the required experience:
 - a. Experience that includes successful fabrication (followed by installation, acceptance and service) to AWWA C151 standards of at least 50,000 lineal feet of the largest specified diameter or larger ductile iron pipe with similar linings/coatings within the past 5 years.
 - b. Experience shall include the successful fabrication of at least 50 fittings in compliance with AWWA C110 or C153 of the largest specified diameter or larger with similar lining/coatings within the past 5 years.
 - c. Experience that includes the successful fabrication (followed by installation, acceptance and service) of at least 10,000 lineal feet of the largest specified diameter or larger push-on style, boltless restrained joint for ductile iron pipe within the last 5 years.

Contractor shall provide written certification from fitting manufacturer certifying that all fittings are compatible with supplied brand of pipe shall be provided.

Contractor shall submit signed and sealed shop drawings with design calculations and assumptions for required thrust anchorage.

Contractor shall submit a Tabulated Laying Schedule which shall including the following:

1. Stations and invert elevations as shown on the Drawings.
 - a. Fittings, bends, outlets, restrained joints, tees, special deflection bells, adapters, solid sleeves, and specials shall be included.
2. Manufacturer's drawings and specifications providing complete details of all items. Show on the laying schedule:
 - a. Pipe class
 - b. Class coding
 - c. Station limits
 - d. Transition stations
 - e. Various pipe classes
 - f. Submit to engineer for approval before manufacture and shipment.
3. Full length pipe may be supplied from inventory provided that all specification requirements are met. Shop drawings shall include but not be limited to:
 - a. Complete and dimensional working drawings of pipe layouts, including pipe stationing, invert elevation at changes in grade or horizontal alignment, all elements of curves and bends both in horizontal alignment and vertical position.
4. The grade of material; size, wall thickness, of the pipe and fittings and appurtenances, type and location of fittings, specials, and valves; and the type and limits of the lining, lining reinforcing and coating systems of the pipe and fittings. Methods and procedures recommended by the coating manufacturer shall also be documented.
5. Joint details: methods and locations of supports and complete information concerning type, and size.
 - a. Locations and proposed joint details shall also be clearly identified.
6. Method of manufacture of pipe; joint details, fittings and any specials.
7. All other pertinent information for all items to be furnished; product data shall show compliance of all solid sleeves, supports, fittings, coatings and related items.
8. Contractor shall provide record documents showing actual locations of pipe.
9. Contractor shall document results of required tests and inspections.

Contractor shall provide a written, detailed Sequence of Construction for the installation of the 8" dia. temporary water main and the 16" dia. permanent water main. Prepare and provide figures / drawings to show the sequence of phases. The sequence of construction shall incorporate the following items. See the contract drawings for the suggested sequence of construction and incorporate all phases and tasks.

1. Coordination for isolating the existing, in-service water mains with the Town of Putnam.
2. Installation of new 16" dia. gate valve with restrained solid sleeves for further isolating the existing water main prior to the temporary water main installation.
3. Installation of new water mains prior to cut-ins with existing water mains.
4. Pressure and leakage testing, chlorination and flushing of new 8" dia. water main.

5. Isolating existing mains for cut-ins with new water mains, coordinated with the Town of Putnam.
6. Removing the existing 16" dia. water main and replacing with new water main.
7. Pressure and leakage testing, chlorination and flushing of new 16" dia. water main.
8. Isolation of bypass water main and cut in with new 16" dia. water main.
9. Removal of bypass piping and return to the Town.

Contractor shall provide submittals for precast concrete thrust blocks in accordance with Section 5.14 Prefabricated Concrete Structural Components of Form 819.

Contractor shall submit the following items related to chlorination of Ductile Iron water main:

1. Product data, including procedures, proposed chemicals, and treatment levels.
2. Manufacturer's Certificate showing products meet or exceed specified requirements.
3. Certifications proving:
 - a. Cleanliness of water distribution system meets or exceeds specified requirements.
 - b. Water conforms or fails to conform to bacterial standards of authority having jurisdiction.
 - c. Water conforms to quality standards of authority having jurisdiction.
4. Test and evaluation reports comparative to specified requirements.
5. Field quality control submittals with the results of Contractor-furnished tests and inspections.
6. Disinfection and Chlorination Water Disposal Plan for review and acceptance by Owner and Engineer.
7. Qualifications Statements for water treatment firm and testing firm in adherence with requirements in this provision. Shall include operator's license to perform the disinfection Work as required by authorities having jurisdiction.
 - a. Water Treatment Firm shall be a company specializing in disinfecting potable water systems specified in this Provision with minimum three years' documented experience
 - b. Testing Firm shall be a company specializing in testing potable water systems, certified by State of Connecticut.
8. Disinfection Report which shall include:
 - a. Type and form of disinfectant used.
 - b. Date and time of disinfectant injection start and time of completion.
 - c. Test locations.
 - d. Special disinfecting procedures used for connections to existing pipes.
 - e. Name of person collecting samples.
 - f. Initial and 24-hour disinfectant residuals in treated water in ppm for each outlet tested.
 - g. Date and time of flushing start and completion.
 - h. Disinfectant residual after flushing in ppm for each outlet tested.
9. Bacteriological Report which shall include:

- a. Date issued, project name, and testing laboratory name, address, and telephone number.
- b. Time and date of water sample collection.
- c. Name of person collecting samples.
- d. Test locations.
- e. Initial and 24-hour disinfectant residuals in ppm for each outlet tested.
- f. Coliform bacteria test results for each outlet tested.
- g. Submit bacteriologist's signature and authority associated with testing.

2. Water Trench Excavation:

Contractor is responsible for all construction layout and reference staking necessary for the proper control and satisfactory completion of all structures, cutting, filling, grading, drainage and utilities installation, fencing, curbing, and all other appurtenances required for the completion of the construction work and acceptance of the Contract as specified and as shown on the Drawings.

All construction layout, staking and surveying shall be performed by a Professional Land Surveyor registered by the State of Connecticut, experienced and skilled in construction layout, staking and surveying of the type required under this Contract, and acceptable to the Engineer and Owner.

The Engineer will furnish the Contractor with control points, benchmarks and other data as may be necessary for the construction staking, layout and survey.

The Contractor shall be responsible for the placement and preservation of adequate ties to all control points necessary for the accurate re-establishment of all base lines or center lines shown on the Drawings.

The Engineer may check the control of the work as established by the Contractor, at any time as the work progresses. The Contractor will be informed of the results of these checks, by but in so doing, the Engineer in no way shall relieve the Contractor of his responsibility for the accuracy of the layout work.

For excavations relating to Water Main and Bypass installation, Contractor shall:

1. Prior to excavation, ensure that erosion and sedimentation controls are in place and comply with project requirements and authorities having jurisdiction. Contractor shall proceed with installation only after unsatisfactory conditions have been corrected.
2. Where excavation activities occur across active vehicular or pedestrian circulation paths, use temporary controls to maintain circulation during operations required by this Provision. Contractor shall maintain temporary controls for each day circulation paths are restricted.
3. Identify required lines, levels, contours, and datum locations.
4. Protect features to remain-in-place including benchmarks, existing structures, fences, sidewalks, paving, curbs, etc. from excavating equipment and vehicular traffic.

5. Maintain and protect above and below grade utilities indicated to remain.
6. Provide dewatering and drainage.
7. Cut rigid and flexible pavement with a saw, wheel, or pneumatic chisel along straight lines before excavating.
8. Strip and stockpile topsoil from grassed areas crossed by trenches.
 - a. At Contractor's option when required, topsoil may be disposed of and replaced with approved topsoil of equal quality.
9. While excavating and backfilling is in progress, maintain traffic and protect utilities and other property.
10. Excavate trenches to indicated depths and in widths sufficient and of practical minimum for pipe laying, bracing, and pumping and drainage facilities.
11. Accomplish excavation and dewatering by methods preserving undisturbed state of subgrade soils. Excavate trench by machinery to or just below designated subgrade, if material remaining in trench bottom is no more than slightly disturbed.
 - a. Contractor shall remove subgrade soils that become soft, loose, quick, or otherwise unsatisfactory due to inadequate excavation, dewatering, or other construction methods and replace with screened gravel fill acceptable to the Engineer at Contractor's expense.
12. Use care when working in clay and organic silt soils, which are particularly susceptible to disturbance due to construction operations. When excavation is to end in such soils, use a smooth-edge bucket to excavate the last 12 inches of depth.
13. Where pipe is to be laid in screened gravel bedding, excavate trench by machinery to normal depth of pipe, provided material remaining in trench bottom is no more than slightly disturbed.
14. Where pipe is to be laid directly on trench bottom, manually perform final excavation, providing a flat-bottom, true to grade upon undisturbed material. Make bell holes required by project conditions.
15. Stack excavated material without excessive surcharge on trench bank or obstructing free access to hydrants and gate valves. Avoid inconvenience to traffic and abutters. Segregated excavated material for use in backfilling as specified below.
16. Not remove excavated material from work site, except as directed by the Engineer. When removal of surplus materials is approved by the Engineer, dispose of such surplus material in approved designated areas.
17. Should conditions make it impracticable or unsafe to stack material adjacent to trench, haul and store material at a location provided. When required, re-handled and use it in backfilling trench.
18. Provide and maintain sheeting and bracing required by Federal, State, or local safety requirements to support sides of excavation and prevent loss of ground which could endanger personnel, damage, adjacent structures, or delay the work.
 - a. Engineer may order additional supports placed at Contractor's expense if it is determined that at any point sufficient or proper supports have not been provided. Compliance with such order shall not relieve Contractor from their responsibility for sufficiency of such supports. Contractor shall take care to prevent voids outside of sheeting; if voids are formed, Contractor shall immediately fill and ram them.

19. When moveable trench bracing such as trench boxes, moveable sheeting, shoring or plates are used to support trench sides, take care in placing and moving the boxes or supporting bracing to prevent pipe movement, disturbance of pipe bedding, or screened gravel backfill.
20. When using Rigid Pipe Installation (such as Ductile Iron): Raise that portion of box extending below mid-diameter above this point prior to moving box ahead to install next pipe. Contractor shall perform to prevent separation of installed pipe joints due to box movement.
21. Carefully remove sheeting and bracing in manner to not endanger construction of other structures, utilities, or property, whether public or private. Immediately refill voids left after withdrawal of sheeting using sand by ramming with tools especially adapted to that purpose and watering or otherwise directed by the Engineer.
22. Leave sheeting driven below mid-diameter of pipe in place from driven elevation to at least 12 inches above top of pipe.
23. Drain trench completely and effectively be in-the-dry, whatever the nature of unstable material encountered or groundwater conditions.
 - a. If Contractor excavates below grade through error or for their own convenience, through failure to properly dewater the trench, or disturbs subgrade before dewatering is sufficiently complete, the Engineer may direct Contractor to excavate below grade as set forth in following Paragraph, where work shall be performed at its own expense.
 - b. If material at trench bottom consists of fine sand, sand and silt or soft earth which may work into the screened gravel, even with effective drainage, Contractor shall remove subgrade material to extent directed. Contractor shall refill excavation with a 6-inch layer of coarse sand or a mixture graded from coarse sand to fine pea stone to form a filter layer preserving voids in pipe gravel bed. Composition and gradation of gravel shall be approved by the Engineer prior to placement. Screened gravel shall be placed in 6-inch layers thoroughly compacted up to normal grade of pipe. If directed by the Engineer, bank-run gravel shall be used for refill of excavation below grade.

Engineer may give permission to use steel sheeting in lieu of wood sheeting for entire job wherever sheeting use is necessary.

For the installation of Geotextiles Contractor shall:

1. Comply with manufacturer's published installation instruction. Do not install damaged materials.
2. Lay and maintain smooth and free of tensile stresses, folds, wrinkles, or creases.
3. Ensure that material is in direct contact with subgrade.
4. Ensure Minimum Unseamed Joints Overlap of 18 inches.
5. Insert Securement Pins or Staples through geotextile midway between edges of overlaps and minimum 6 inches from free edges with a minimum spacing of 5 feet (on center). Contractor shall ensure that washer bears against geotextile.

6. Repair torn or damaged geotextile by placing patch of same type of geotextile over damaged area minimum of 12 inches beyond edge of damaged area and fasten as recommended by geotextile manufacturer.
 - a. Contractor shall remove and replace geotextile rolls which cannot be repaired.
7. Fill to prevent tensile stress or wrinkles in geotextile.
8. Not drop fill from height greater than 3 feet.
9. Not leave materials uncovered for more than 14 days after installation to protect against UV exposure.
10. Not operate equipment directly on top of geotextile.

Contractor shall begin backfilling as soon as practicable after laying and jointing pipe and continue expeditiously. Contractor shall place bedding gravel of specified type for pipe installed up to 12 inches over the pipe.

1. Contractor shall construct an impervious dam or bulkhead cutoff of clay or other impervious material in the trench, as directed by the Engineer, to interrupt unnatural flow of groundwater after construction is completed. Contractor shall key dam into trench bottom and sidewalls, provide at least one clay or other impervious material dam in pipe bedding between each manhole where directed or every 300 feet, whichever is less.
2. Where pipes are laid cross-country, remainder of trench shall be filled with common fill material in layers not to exceed 12 inches and mounded 6 inches above existing grade or as directed by the Engineer. Where a loam or gravel surface exists prior to cross-country excavations, Contractor shall remove, conserve and replace it to full original depth as part of the work under pipe items. Where necessary, excess material shall be removed during clean-up process, so that ground may be restored to its original level and condition.
3. Where pipes are laid in streets, remainder of trench shall be backfilled up to a depth of 12 inches below bottom of specified permanent paving with select common fill material in layers not to exceed 12 inches and thoroughly compacted. Bank-run gravel shall be used for subbase layer of paving and compact in 6 inches layers.
4. To prevent longitudinal pipe movement, Contractor shall not dump backfill material into trench and then spread, until selected material or screened gravel has been placed and compacted to a level at least 12 inches over the pipe.
5. Contractor shall bring backfill up evenly on all sides. Each layer of backfill material shall be thoroughly compacted by rolling, tamping, or vibrating with mechanical compacting equipment or hand tamping to 95 percent compaction according to ASTM D 1557 or 98 percent according to ASTM D 698. If rolling, a suitable roller or tractor shall be used being careful to compact fill throughout full width of trench.
 - a. Contractor shall not compact by puddling or water jetting.
 - b. Contractor shall use hand or pneumatic ramming with tools weighing at least 20 pounds for compacting in confined areas. Contractor shall spread and compact material in layers not exceeding 6 inches thick, an uncompacted loose measurement.
6. Granular fill material shall be used as backfill around structures. Spread and compact specified backfill under and over pipes connected to structures.

7. Contractor shall not place bituminous paving in backfill. Do not use frozen material under any circumstances.
8. Road surfaces shall be broom and hose-cleaned immediately after backfilling. Employ dust control measures throughout construction period.

Where trench occurs adjacent to paved streets, in shoulders, sidewalks, or in cross-country areas, Contractor shall thoroughly consolidate backfill and maintain surface as the work progresses. If settlement takes place, additional fill shall immediately be deposited to restore ground level.

In and adjacent to streets, 12 inches of trench backfill below specified initial pavement shall consist of compacted bank-run gravel. If Contractor wants to use material excavated from trench as gravel subbase for pavement replacement, Contractor shall take samples at intervals not to exceed 500 feet of material and test by an independent testing laboratory at Contractor's expense. Only materials approved by the Engineer shall be used.

Contractor shall restore surface of driveways or other areas which are disturbed by trench excavation to a condition at least equal to that existing before work began. In areas where pipeline passes through grassed areas, Contractor shall remove and replace sod or loam and seed surface at Contractor's own expense.

The Contractor shall furnish and employ such shores, braces, pumps, or ancillary equipment as needed for the proper protection of property, proper completion of the work, as well as safety of the public and employees of both the Contractor and the Department. All bracing and shoring shall be removed when no longer required for the construction or safety of the work. When required, the Contractor shall provide or have on the Site at all times any OSHA certification for equipment to be used, per 1.07.07. For support of trenches greater than 10 feet in depth, working drawings shall be submitted, in accordance with 1.05.02. The Contractor shall control erosion and sedimentation at trench locations and ensure that pumped water from the drainage excavation is discharged in accordance with the requirements of 1.10.

3. Water Pipe Installation: Contractor shall assure compatibility between all items supplied, and install ductile iron water pipe per the requirements of the laying schedule and AWWA C600, unless otherwise specified.

Contractor shall comply with AWWA C600 and referenced AWWA Standards for shipping, handling and storage procedures.

1. Materials shall be delivered in manufacturer's packaging including application instructions.
2. Materials shall be handled to prevent injury to the pipe, pipe linings, and pipe coatings.
 - a. Contractor shall examine pipe and fittings, damage to linings or coatings discovered during examination shall be repaired to the satisfaction of the Engineer before proceeding with work.

3. Pipe shall be transported to the job site on padded bunks or oak timbers and secured with steel banding or nylon tie down straps adequately protecting the pipe and coating.
 - a. Pipe shall be handled using slings, hooks, pipe tongs or other devices acceptable to the Engineer.
 - b. Non-cushioned ropes, chairs, wedges, cables or levers shall not be used when handling finished pipe, fittings or solid sleeves.
 - c. Pipe or fittings shall not be dropped
 - d. Pipe or fittings shall not skid against each other.
 - e. Pipe or fitting coatings shall not be marred.
 - f. Contractor shall utilize padded wooden pipe cradles, or chocks suitable for protecting coatings between and beneath finished pipes when pipes are placed upon rough surfaces.
4. Pipe shall not be stored on bare ground unless soft sand berms are used to support the pipe and is approved by the Engineer.
5. Contractor shall keep materials safe from damage if stored. The interior of pipe, fittings and other appurtenances to be kept free from dirt, excessive corrosion or foreign matter. All pipes shall have suitable caps or plugs on each end during shipping and onsite storage to prevent entry of dirt, debris, or foreign matter.
6. Pipes shall not be stacked higher than the limits recommended by manufacturer. The bottom tier shall be kept off the ground using timbers, rails, or concrete. Stacking shall conform to manufacturer's recommendations and/or AWWA C600.
7. Contractor shall store gaskets for mechanical and push-on joints in a cool location out of direct sunlight, not in contact with petroleum products. Gaskets shall be used on a first-in, first-out basis.
8. Lined and coated pipe shall be suitably protected from exposure and heating from the sun. Contractor shall follow procedures recommended by the coating and lining system manufacturer.
9. Exposure shall not be allowed except for short periods such as installation, assembly and repairs.
10. Metal tools or heavy objects shall not come in contact unnecessarily with the finished coating.
11. Contractor shall prevent damage to linings and coatings caused by handling, onsite storage, and exposure to low temperatures (due to embrittlement), high temperatures, or direct sunlight.

Prior to ordering and installing new couplings, Contractor shall verify field locations and sizes of connections to existing piping and equipment, including excavating test pits to measure the dimensions and pipe outside diameters for the required coupling at the connection points between new and existing pipelines. Field measurements shall be indicated on shop drawings. Pipes and fittings shall be examined before laying, and any damage to the pipe, lining or coatings shall be repaired per manufacturer's recommendations prior to installation. The interior of all pipe, fittings, and other appurtenances shall be kept free from dirt, excessive corrosion or foreign matter at all times. As pipe laying progresses and at the conclusion of the work, Contractor shall thoroughly clean all new pipelines by flushing with

water or other means to remove all dirt, stones, pieces of wood or other material which may have entered during the construction period. If, after this cleaning, obstructions remain, they shall be removed.

Ductile iron water pipe shall be installed per the requirements of the laying schedule and AWWA C600, unless otherwise specified. Contractor shall:

1. Provide firm, even bearing the length of the pipe. Dig bell holes at each joint. Tamp backfill materials on pipe sides to the spring line per details on the Drawings.
2. Blocking shall not be permitted.
3. Replace with sound pipe or fitting, defective pipe or fitting discovered after having been laid.
4. Ensure when laid, pipe and fittings perform to lines and grades required. When laying is not in progress, contractor shall close open ends of the pipe with watertight plug or other approved means.
5. Place sufficient backfill to prevent flotation. Joint deflection shall not be placed to exceed 1/2 the maximum angle recommended by the manufacturer.
6. Provide 5 feet cover for pipe laid underground unless Drawings show otherwise or otherwise specified.
7. Lay pipe such that the invert elevations shown on Drawings are not exceeded.
8. Provide fittings, in addition to those shown on the Drawings, where required, in crossing utilities which may be encountered upon opening the trench. Install solid sleeve closures at locations approved by the Engineer.
9. Broom clean and maintain a dry pipe interior throughout construction period.
10. Remove lumps of clay, mud and cinders from outside surface of pipe prior to installation.

Where required, field cuts shall be smooth cut by machine perpendicular to pipe axis. Pipe ends shall be bevel cut per manufacturer's recommendations for the spigot end.

1. Contractor shall repair coating removed from cut per manufacturer's recommendation and/or the coating and lining provisions in the Materials section above (whichever method is more stringent in the opinion of the Engineer).
2. Contractor shall ensure cement lining will be undamaged.
3. Cutting of restrained joint pipe shall not be allowed, unless approved at specific joints in conjunction with the use of restrainer glands by EBAA Iron or field adaptable restrained joints.
4. Where Field Cuts are Permitted Pipe shall be supplied by the factory as "gauged full length".
 - a. If Gauged Full Length Pipe is unavailable, pipe shall be field gauged at the location of the new spigot using a measuring tape, or other means approved by the manufacturer, to verify that the diameter is within tolerances permitted in Table 1 of AWWA C151.

Push-On joints shall be installed per manufacturer's instructions, AWWA C600 and Appendix B of AWWA C111. If there is conflict, manufacturer's instructions shall take precedence. Contractor shall:

1. Lay pipe with bell ends looking ahead.
2. Insert rubber gasket in the groove of bell end of pipe.
3. Clean and lubricate joint surfaces.
4. Align the plain end of the pipe with the bell of the pipe to which it is to be joined and pushed home.
5. Use a metal feeler to make certain that the rubber gasket is properly sealed.

Mechanical Joints shall be installed per manufacturer's instructions, AWWA C600 and Appendix A of AWWA C111. If there is conflict, manufacturer's instructions shall take precedence. Contractor shall:

1. Lay pipe with bell ends looking ahead.
2. Clean and lubricate joint surfaces and rubber gasket.
3. Tighten bolts to the specified torques.
4. Not use extension wrenches or pipe over handle of ordinary ratchet wrench to secure greater leverage.
5. Encapsulate bolts and nuts using a bitumastic coating.

Bolts in mechanical or restrained joints shall be tightened alternately and evenly.

Restraints for mechanical joint pipe shall be installed according to pipe manufacturer's instructions.

1. Shall include retainer glands for restraining joint
2. Restrained mechanical joints shall be suitable for the specified test pressure

Solid sleeves shall only be installed for closure, or as shown on the Drawings. Do not assemble solid sleeves until adjoining joints have been assembled .

Blowoffs, outlets, valves, fittings, and other appurtenances to be set and jointed as indicated on the Drawings and per manufacturer's instructions.

Precast concrete thrust blocks shall be furnished and installed as shown on the drawings and in accordance with Section 5.14 Prefabricated Concrete Structural Components of Form 819.

All new tees shall be anchoring tees.

Piping underneath structures shall be concrete encased.

Water mains shall be laid at least 10 feet horizontally from any existing or proposed sanitary sewer, drain, sewer or drain manhole, septic tank, or subsoil treatment system. Water mains crossing sewers shall be laid to provide a minimum vertical distance of at least 18-inches between the outside of the water main and outside of the sewer or drain and this shall be the case where the water main is either above or below the sewer with preference to the water main located above the sewer. At crossings, one full length of water pipe shall be located so that both joints are as far away from the sewer or drain as possible. Water mains that cross under existing sewers or drains shall be concrete encased for a minimum of 10 feet on each

side of the drain or sewer pipe centerline at the crossing. Deviations from this requirement must be approved by the Engineer and Owner.

Piping shall be located substantially as shown on the Drawings. The Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference between pipes or for other reasons. Pipe fitting notation is for the Contractor's convenience and does not relieve him/her from installing and jointing different or additional items where required to achieve a complete piping system.

4. Disinfection of Water Pipes:

Work shall be performed according to the following standards:

1. AWWA C651 Continuous Feed Method and CTDOT
2. AWWA C655 – Field Dechlorination
3. NSF 61 – Drinking Water System Components Health Effects.

Contractor shall maintain a copy of each standard affecting Work of this Provision on site.

Contractor shall verify that piping system has been cleaned, inspected, and pressure tested.

Contractor shall perform scheduling and disinfecting activity with startup, water pressure testing, adjusting and balancing, and demonstration procedures, including coordination with related systems.

Disinfection of all water mains and valves shall be in accordance with AWWA C651 standards. Contractor shall furnish all necessary equipment and labor for cleaning and testing and chlorinating the pipelines. The procedures and methods shall be approved by the Engineer. Contractor shall make taps and furnish all necessary caps, plugs, etc., as required in conjunction with testing pipelines. Contractor shall furnish a test pump, gauges and any other equipment required in conjunction with carrying out the hydrostatic tests.

Ends of existing pipelines cut into shall be covered and capped during the construction duration to protect them from debris entering the existing pipelines until the final connections are made. This includes cutting and capping existing mains that may be removed during a later time in the project schedule. Contractor shall thoroughly clean all new pipelines by flushing with water or other means to remove all dirt, stones, pieces of wood or other material which may have entered during the construction period. If, after this cleaning, obstructions remain, they shall be removed.

All new pressure pipelines shall be pressure and leakage tested. Pipelines shall be subjected to a hydrostatic pressure of 150 psig or 50 percent above the normal operating pressure, whichever is greater, and this pressure maintained for at least 2 hours. The leakage test shall be conducted at the maximum operating pressure as determined by the Engineer, and this pressure shall be maintained for at least two hours. The test pump and water supply shall be arranged to allow accurate measurement of the water required to maintain the test pressure.

Where applicable, hydrant branch gate valves shall remain open during this test. The amount of leakage which will be permitted shall be in accordance with AWWA C600, latest edition.

Before being placed in service, all new potable water pipelines shall be chlorinated using the continuous feed method specified in AWWA C651. The procedure shall be approved by the Engineer in advance.

The location of the chlorination and sampling points will be determined by the Engineer in the field. Taps for chlorination and sampling shall be installed by the Contractor and shall meet AWWA C651 requirements. The Contractor shall uncover and backfill the taps as required.

The general procedure for chlorination shall be first to flush all dirty or discolored water from the lines and then introduce chlorine in approved dosages through a tap at one end, while water is being withdrawn at the other end of the line.

1. The chlorine solution shall remain in the pipeline for 24 hours. Disinfection shall be in accordance with AWWA C561 standard, latest edition.
2. Transmission mains that are taken out of service to facilitate the installation of valves, piping and appurtenances shall be disinfected including all existing pipeline that has been dewatered.
3. Potable water discharged into storm drains shall be in accordance with the requirements of all Federal, State and local laws and regulations.
4. Water main dewatering shall be accomplished through existing hydrants, existing blow-offs, proposed taps for dewatering, and other methods proposed by the Contractor and accepted by the Engineer and Owner.
5. The Owner will operate all valves and hydrants.
6. Dewatering will require the Contractor to provide pumping and treatment labor and equipment for dewatering.
7. The Contractor shall not release any water from existing potable water lines into the surroundings, drainage and sewer systems prior to dechlorination and permission of the Owner.
8. Chlorine discharge limits in water releases into receiving streams and wetlands shall not exceed 0.01 mg/L.

Following the chlorination period, all treated water shall be flushed from the lines at their extremities and replaced with water from the distribution system.

1. All treated water flushed from the lines shall be disposed of by discharging by means approved by the Owner and Engineer in accordance with all Federal, State and local standards.
2. Water main dewatering shall be accomplished through existing hydrants, existing blow-offs, proposed taps for dewatering, and other methods proposed by the Contractor and accepted by the Engineer and Owner.

3. The Owner will operate all valves and hydrants.
4. Dewatering will require the Contractor to provide pumping and treatment labor and equipment for dewatering.
5. The Contractor shall not release any water from existing potable water lines into the surroundings, drainage and sewer systems prior to dechlorination and permission of the Owner.
6. Chlorine discharge limits in water releases into receiving streams and wetlands shall not exceed 0.01 mg/L.

Engineer will require bacteriological sampling and analysis of the replacement water by the Contractor in full accordance with the latest edition of the AWWA C651 standard.

1. Contractor shall make payment for bacteriological sampling and testing required by the Engineer and in accordance with Owner's Construction Specifications.
2. The Contractor will be required to rechlorinate, if necessary, and the line shall not be placed into service until all requirements of the State of Connecticut and the Owner are met.
3. Additional testing by a qualified individual for heterotrophic plate count (HPC) and volatile organic carbon (VOCs) shall be completed and recorded on forms as required by the State of Connecticut.
4. Contractor shall forward to the Engineer all sampling and analysis forms to the State of Connecticut as required.
5. Disinfection and final water quality results shall be consistent with the existing water quality in the Owner's water system in accordance with the Owner's Construction Standards and Specifications.

Special disinfecting procedures shall be used in connections to existing pipelines and where the method outlined above is not practical. Special disinfection procedures shall be submitted to the Engineer in advance for approval.

The Owner shall be notified at least two days prior to chlorination and shall witness the procedure. If no one from the Owner is available, the procedure shall be rescheduled to accommodate the Owner.

Discharge of chlorinated water shall comply with all Federal, State and local standards, including in full accordance with the latest edition of the AWWA C655 standard. Provide sodium bisulfate or an approved equal method for dichlorination prior to discharge.

After final flushing and before pipeline is connected to existing system or placed in service, employ an approved independent testing laboratory to sample, test, and certify that water quality meets quality standards of authority having jurisdiction.

Method of Measurement:

Water Pipe Trench Excavation will not be measured for payment.

Bedding Material will not be measured for payment.

New Water Pipe, including pre-insulated and non-insulated pipe, will be measured for payment by the actual number of linear feet of pipe completed and accepted and measured along the horizontal centerline of the pipe. Gaskets, bolts, and other appurtenances related to bends, fittings and solid sleeves, related hardware and accessories, mechanical joint restraining glands and corporation stop valves will not be measured for payment. Cutting and capping and removing of existing water mains will not be measured for payment.

New Water Pipe Fittings, including all bends, tees, caps, and other fittings shown on the plans, and related gaskets, bolts, and other appurtenances related to new fittings will not be measured for payment.

Steel Pipe Sleeve/Casing for protection of above-ground water main bypass will be measured for payment by the actual number of linear feet of pipe completed and accepted and measured along the horizontal centerline of the pipe. Fittings, solid sleeves and other hardware or accessories will not be measured for payment.

Precast Concrete Thrust Blocks will not be measured for payment.

Test Pits will not be measured for payment.

Basis of Payment:

Water Pipe Trench Excavation for the installation of water main and bypass pipes will not be paid separately but shall be included in the Contract unit price for the respective water pipe or pipe item(s).

Bedding Material necessary for the installation of water pipe items described herein will be included in the Contract unit price for the respective water pipe or pipe item(s).

Insulated and Non-Insulated 16" Ductile Iron Water Main, and Insulated and Non-Insulated 8" Ductile Iron Water Main will be paid for at the Contract unit price per linear foot, complete in place, including all excavation, installation, chlorination, testing, backfill, materials, equipment, tools, labor, and necessary hardware. Bends, fittings, solid sleeves, related hardware and accessories, mechanical joint restraining glands and corporation stop valves and their installation will be paid for under the respective pay item for Insulated and Non-Insulated 16" Ductile Iron Water Main and Insulated and Non-Insulated 8" Ductile Iron Water Main. Cutting and capping, and removal of existing water mains will also be paid for under the same pay item.

20" Steel Sleeve/Casing Pipe necessary for the protection of the above-ground portion of water main bypass will be paid for at the Contract unit price per linear foot, complete in place, including installation, materials, equipment, tools, labor, and necessary hardware.

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Precast Concrete Thrust Blocks for the water mains will not be paid separately but shall be included in the Contract unit price for the respective water pipe or pipe item(s).

Test Pits for the water mains will not be paid separately but shall be included in the Contract unit price for the respective water pipe or pipe item(s).

Pay Item	Pay Unit
Insulated and Non-Insulated 16" Ductile Iron Water Main	l.f.
Insulated and Non-Insulated 8" Ductile Iron Water Main	l.f.
20" Steel Pipe Sleeve	l.f.

ITEM #1302004A – 8” GATE VALVE

ITEM #1302008A – 16” GATE VALVE

Description: This work shall consist of furnishing, preparing and installing Water Utility Valves of the types and sizes specified, valve boxes, and related hardware and appurtenances.

Materials:

1. Valves

- a. All Valves shall conform to the following:
 - i. All buried valves shall open clockwise (open right).
 - ii. Valves shall be of the size shown on the Drawings or as noted and as far as possible equipment of the same type shall be identical and from one manufacturer
 - iii. Valves shall have the name of the maker, nominal size, year of fabrication, flow directional arrows, working pressure for which they are designed and standard to which they are manufactured cast in raised letters on some appropriate part of the body.
 - iv. Unless otherwise noted, valves shall have a minimum working pressure of 250 psi or be of the same working pressure as the pipe they connect to, whichever is higher, and suitable for the pressures noted where they are installed.
 - v. Valves shall be of the same nominal diameter as the pipe or fittings they are connected to. Except as otherwise noted, joints shall be mechanical joints, with joint restraint.
 - vi. Valves shall be especially constructed for buried service.
 - vii. As shown on the Drawings, valves 16-inches and smaller shall be double disc gate valves.
 - viii. The interior ferrous metal surfaces, except finished or bearing surfaces, shall be blast cleaned in accordance with SSPC SP-10 and painted with two coats of an approved two-component epoxy coating specifically formulated for potable water use. The coating shall be NSF certified to Standard 61.
 - ix. Exterior ferrous metal surfaces of all buried valves shall be blast cleaned in accordance with SSPC SP-6 and given two shop coats of an approved two-component coal tar epoxy paint or fusion bonded epoxy coating.
- b. Double Disc Gate Valves shall conform to the following requirements:

- i. Shall be manufactured by one of the following or approved equal:
 - 1. Kennedy Valve Company; a division of McWane, Inc.
 - 2. Mueller Co.
 - 3. M&H Valve Company
- ii. Comply with AWWA C500 and NSF 61 and 372.
- iii. Valves shall be double disc-type with 150 psig working pressure rating with a minimum non-shock rating of 200 psig.
- iv. Buried valves shall have non-rising stems, mechanical joint ends and 2-in square operating nuts. Valves shall be furnished with O-ring seals.
- v. Materials:
 - 1. Body: Iron.
 - 2. Trim: Bronze.
 - 3. Gate: Double-disc parallel seat.
 - 4. Stem: Non-rising.
 - 5. Stem Seals: O-ring.
- vi. Operation:
 - 1. Square operating nut.
 - 2. Open clockwise unless otherwise indicated.
- vii. End Connections: Mechanical joint
- viii. Coatings:
 - 1. Comply with AWWA C550.
 - 2. Interior and exterior.
- ix. 16-inch (400-mm)-diameter valves and larger shall be furnished with bypass valves and gear operators.
- x. Pressure Rating:
 - 1. 12-inch (300-mm) Diameter and Smaller: 200 psig (1,380 kPa).
 - 2. 14-inch (350-mm) Diameter and Larger: 150 psig (1,030 kPa).

2. Valve Boxes:

- a. Shall be Manufactured by one of the following or approved equal:
 - i. Mueller
 - ii. U.S. Pipe
- b. Valve boxes for 12-inch Diameter Valves and Smaller shall be:
 - i. Material: Cast iron.
 - ii. Type: Two-piece, slide type.
- c. Valve boxes for Valves Larger than 12-inch Diameter shall be:
 - i. Material: Cast iron.
 - ii. Type: Three-piece, slide type.
 - iii. Base: Round.
- d. Shall have the lid inscription: WATER.

- e. Top of the operating nut shall be located two-inches below the rim of the valve box.
- f. Valve boxes shall be a heavy-pattern cast iron, three-piece, telescoping type box with dome base suitable for installation on the buried valves. Inside diameter shall be at least 4-1/2-in. Barrel length shall be adapted to the depth of cover, with a lap of at least 6-in when in the most extended position. Covers shall be cast iron with integrally-cast direction-to- open arrow, and the word "WATER" shall also be integrally cast. Aluminum or plastic are not acceptable.
- g. The upper section of each box shall have a top flange of sufficient bearing area to prevent settling. The bottom of the lower section shall enclose the stuffing box and operating nut of the valve and shall be oval.
- h. All fasteners shall be Type 316 stainless steel.
- i. Two tee handled gate wrenches of suitable length shall be furnished to operate all valves with valve boxes.

3. Accessories:

- a. Valve Box Aligner: High-strength plastic device designed to automatically center valve box base and to prevent it from shifting off center during backfilling.

Construction Methods:

1. Submittals: Prior to installation Contractor shall submit the following:

- a. Manufacturer's latest published literature, including illustrations, installation and maintenance instructions, and parts lists.
- b. Shop drawings including a description of proposed installation.
- c. Manufacturer's certificate certifying products meet or exceed specified requirements.
- d. Certified statement that inspection and all of the specified tests have been made and met.
- e. Manufacturer's instructions, detailing instructions on installation requirements, including storage and handling procedures.
- f. Field quality control submittals indicating results of Contractor-furnished tests and inspections.
- g. Qualifications Statements:
 - i. Shall include qualifications for manufacturer and installer.
 - 1. Manufacturer specializing in manufacturing products specified in this Provision shall have minimum three years' documented experience.
 - ii. Shall include manufacturer's approval of installer.

1. Company specializing in performing Work in this Provision shall have minimum three years' documented experience and approved by manufacturer.
- h. Certified compliance statements from manufacturers verifying compliance with the American Iron and Steel (AIS) and the Build America, Buy America Act requirements of this project, and in accordance with Section 1.20-1.06.01. of Form 819.
- i. Operations and maintenance data for valves
- j. Recorded actual locations of valves.

2. Valve Installation:

Valves and accessories shall be prepared for shipment according to applicable AWWA standards. Valves and ends shall be sealed to prevent entry of foreign matter. Contractor shall inspect materials on site in manufacturer's original packaging for damage.

Materials shall be stored in areas protected from weather, moisture, or other potential damages, and shall not be stored directly on the ground.

Products shall be handled carefully to prevent damage to interior or exterior surfaces. Threads and seats shall be protected from corrosion and damage. Rising stems and exposed stem valves shall be coated with a protective oil film which shall be maintained until time of use.

Contractor shall conduct operations to not interfere with, interrupt, damage, destroy, or endanger integrity of surface or subsurface structures, utilities, and landscape in immediate or adjacent areas.

Prior to installation, Contractor shall identify required lines, levels, contours, and datum locations. Contractor shall locate, identify, and protect from damage utilities to remain. Contractor shall not interrupt existing utilities without permission and without making arrangements to provide temporary utility services.

1. Contractor shall notify Engineer not less than one week in advance of proposed utility interruption.
2. Contractor shall not proceed without written permission from Engineer.

Trench excavation, backfilling, and compaction shall be performed in accordance with Special Provision Item No. 1301085A, 13010689A, 1300200A, "Insulated and Non-Insulated 16" Ductile Iron Water Main", "Insulated and Non-Insulated 8" Ductile Iron Water Main" and "20" Steel Casing Pipe (Water Main)."

Valves shall be installed in conjunction with pipe laying. Buried valves shall be cleaned and manually operated before installation. Buried valves and valve boxes shall be set with the stem vertically aligned in the center of the valve box. Valves shall be set on a firm foundation and supported by tamping pipe-bedding material under the sides of the valve. The valve box shall be supported during backfilling and maintained in vertical alignment with the top flush with finish grade. The valve box shall be set so as not to transmit traffic loads to the valve.

Valves shall be set plumb.

Prior to backfilling, all exposed portions of all bolts shall be coated with two coats of bituminous paint. Contractor shall provide buried valves with valve boxes installed flush with finished grade.

All items (including valve interiors) shall be cleaned and disinfected prior to installation, testing, and final acceptance in accordance with AWWA 651 standards. Contractor shall flush and disinfect system as specified in Special Provision Item No. 1301085A, 13010689A, 1300200A, "Insulated and Non-Insulated 16" Ductile Iron Water Main", "Insulated and Non-Insulated 8" Ductile Iron Water Main" and "20" Steel Casing Pipe (Water Main)."

Method of Measurement: Gate valves, including 8-inch and 16-inch sizes, will be measured for payment by the actual number of valves completed, accepted and measured in place as shown on the plans. Valve boxes, gaskets, bolts, mechanical joint restraining glands and other hardware, accessories and appurtenances will not be measured for payment.

Basis of Payment: Payment for this work will be made at the Contract unit price per each 16" Gate Valve and 8" Gate Valve, complete and accepted in place, which price shall include furnishing and installing all necessary materials including valve boxes, gaskets, bolts, mechanical joint restraining glands and other hardware, accessories and appurtenances, and equipment, and tools and labor incidental thereto.

Excavation required for installing valves, including bedding and backfill material, will be paid for separately under the respective ductile iron pipe Contract item(s) for Item No. 1301085A – 16" Ductile Iron Pipe (Water Main) and Item No. 1301069A – Insulated 8" Ductile Iron Water Main.

Pay Item	Pay Unit
8" Gate Valve	ea.
16" Gate Valve	ea.

ITEM #1302060A – ADJUST GATE BOXES

Description:

This work shall consist of removing and resetting, adjustment and re-installation of water or gas main main gate boxes as ordered by the Engineer to meet intermediate and final grades. The Town of Putnam Water Pollution Control Authority (WPCA) shall be notified prior to any work on or around the water facility. Eversource Energy – Gas shall be notified prior to any work on or around the gas facility.

Materials:

Contractor shall re-use existing stone from the project site. Mortar material shall conform to the requirements of Article M.11.04. The Contractor shall provide any additional stone material (if required) that resemble as close as possible the existing stone size and shape as approved by the Engineer. The Contractor shall furnish gate boxes and risers as required to adjust gate boxes to intermediate and final grades.

Construction Methods:

Gate boxes and any associated appurtenances shall be carefully removed, re-installed, reset and adjusted to the final grade. The contractor shall have the WPCA and Eversource Energy operate all valves to demonstrate the proper operation of any associated facilities to the satisfaction of the Engineer and the respective utilities. All gate boxes shall be left free of all debris or matter that may interfere with the proper operation of the associated gas or water facilities. Gate boxes shall be installed vertically, centered over the operating nut, and elevation of the top shall conform to the finished grade of roadway or other surrounding surface.

Any damage resulting from the Contractor's operations to the utility shall be corrected as ordered by the Engineer, without additional compensation to the Contractor.

Method of Measurement:

This work will be measured for payment by the actual number of gate boxes to be reset, accepted by the Engineer, by WPCA, and by Eversource. Adjustment of gate boxes to intermediate grades shall not be measured for payment, but shall be included in the cost for Maintenance and Protection of Traffic.

Basis of Payment:

This work will be paid for at the contract unit price each for "Adjust Gate Boxes", which price shall include all work, equipment, labor and incidentals required accomplishing the work required under this item.

Pay Item
Adjust Gate Boxes

Pay Unit
EA

ITEM #1303226A – FIRE SUPPRESSION SYSTEM

ITEM #1303238A – RESET FIRE SUPPRESSION SYSTEM

Description: The work under this item shall consist of removing existing, temporarily resetting, and installing permanent fire suppression system including FDC pipe, wall attachment, underground and above grade piping, bends, fittings, and appurtenances. Work under this item shall also include all necessary sawcutting, trenching, backfill, and temporary and permanent pavement repairs in connection with the work. All work and materials shall be in accordance with the Town of Putnam Water Pollution Control Authority (WPCA) standards and the Standard Specifications, and to the satisfaction of the Engineer. Included in this work shall be all required coordination with the WPCA, the Fire Department, and building owner.

Materials: Materials for this work shall consist of the following:

1. Backfill for trenching shall be Compacted Granular Fill meeting the requirements of Article M.02.01.
2. Bedding material shall be sand bedding meeting the requirements of Article M.11.04 Grading “A”.
3. Materials for driveway repairs shall conform to requirements for the item “Driveway (Commercial).
4. Cement-lined ductile iron pipe, bends, and fittings for FDC pipe and building lateral shall conform to ASTM A536 – Ductile Iron, pressure rating 350 psi working pressure, with pipe conforming to ANSI/AWWA C151/A21.51- Standard for Ductile Iron Pipe Centrifugally Cast for Water and gasketed joints conforming to ANSI/AWWA C111/A21.11 – Standard for Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings. Cement lining shall be in accordance with ANSI/AWWA C104/A21.4 – Cement Mortar Lining for Ductile Iron Pipe and Fittings.
5. Fittings shall conform to the requirements of ANSI AWWA C153/AWWA C153, UL Listed.
6. Steel mounting brackets for permanent reset of FDC pipe on new retaining wall shall be existing mounting brackets salvaged for reuse. The FDC pipe shall be mounted to the face of the wall with adhesive bonded anchors. Adhesive anchors shall meet the 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*. Anchor bolts shall meet the requirements of ASTM F1554 and be galvanized in accordance with ASTM F2329.
7. Existing NPT 2-1/2” hose connection shall be salvaged for reuse. Existing FDC pipe, bends, and fittings in good condition, as determined by the Engineer, may be reused for temporary FDC pipe relocation. All other pipe, bends, and fittings for permanent relocation shall be new.
8. Mechanical Joints: All ductile iron pipe connections shall include mechanical joints at the following locations:
 - Transitions between new and existing piping
 - At all bends, tees, and directional changes
 - At wall penetrations and vertical riser bases

- At hose connection assemblies Mechanical joints shall conform to ANSI/AWWA C111/A21.11 – Standard for Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings. Gaskets shall be of high-quality rubber suitable for potable water systems. Bolts and nuts shall be corrosion-resistant and installed per manufacturer's torque specifications.

9. **Temporary Bollards:** Temporary bollards shall be surface-mounted, free-standing units designed to protect the fire suppression system from vehicular and equipment impact during construction. Bollards shall meet the following minimum requirements:

- Constructed of steel or high-impact polymer
- Minimum height: 36 inches above grade
- Weighted base or surface-mounted with adhesive or mechanical anchors
- Painted safety yellow or equipped with reflective tape for visibility
- Capable of resisting tipping or displacement from construction equipment contact

Construction Methods: The Contractor shall notify the WPCA, Fire Department, and building owner two weeks prior to both temporary resetting and permanent installation of FDC pipe and shall coordinate the work. The Contractor shall carefully remove existing FDC pipe, fittings, and appurtenances, salvaging hose connection and wall brackets for reuse and without damage to existing building and foundation penetration. The site shall be prepared to minimize the duration of the FDC pipe outage as follows:

Trenching shall be advanced and all materials for temporary resetting existing FDC pipe shall be on-site prior to taking existing FDC pipe out of service. The work for the temporary resetting of FDC pipe shall be completed within a single workday.

Trenching shall be advanced and all materials for permanent installation of FDC pipe shall be on site and wall mounting hardware shall be installed prior to taking temporary FDC pipe out of service. The work for permanent installation of FDC pipe shall be completed within a single workday.

The existing FDC pipe shall be temporarily reset, installed on existing buried building lateral adjacent to building foundation, as directed by the Engineer. Temporary FDC pipe adjacent to building shall be installed vertical and plumb with hose connection 36-inches above grade and min. 18" clear to face of building. Hose connection shall face and be set parallel with roadway.

The permanent buried ductile iron pipe lateral shall follow the alignment of existing pipe. The permanent FDC pipe shall be set vertical and plumb, restrained tight to the precast concrete modular retaining wall and to the satisfaction of the Engineer.

Mechanical joints shall be installed at all pipe-to-pipe connections, bends, tees, and transitions between temporary and permanent piping. These joints shall be properly restrained where required to prevent movement due to thrust forces.

At wall penetrations and vertical riser bases, mechanical joints shall be used to facilitate alignment and future maintenance access.

All mechanical joints shall be pressure-tested in accordance with AWWA standards prior to backfill and final acceptance

Temporary bollards shall be installed prior to any excavation or pipe reset work and remain in place until permanent fire suppression system installation is complete.

Bollards shall be positioned to effectively shield the FDC pipe from accidental damage due to construction activities, as directed by the Engineer.

Bollards shall be installed in a manner that does not require excavation or below-grade embedment and shall be removed upon completion of the work.

All bollards shall maintain a minimum 36-inch clear horizontal distance from the FDC pipe to ensure accessibility and compliance with fire department standards.

Method of Measurement: This work will be measured for payment and paid for by the actual number of each “Fire Suppression FDC pipe System” and “Reset Fire Suppression System”, installed completed and accepted by the Engineer.

Basis of Payment: This work will be paid for at the Contract unit price each for “Fire Suppression FDC pipe System” and “Reset Fire Suppression System”, complete and accepted in place, which price shall include all equipment, tools, materials, and labor incidental to temporarily resetting and permanently installing fire suppression FDC pipe.

The cost of furnishing and installing mechanical joints, including all gaskets, bolts, nuts, and restraint systems, shall be included in the unit price for “Fire Suppression FDC pipe System” and “Reset Fire Suppression System.” No separate payment will be made for mechanical joints.

The unit price shall also include furnishing and installing temporary bollards to protect the fire suppression system from damage during construction. This includes all labor, materials, excavation, backfill, and removal upon completion of the work.

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.

Pay Items	Pay Unit
Fire Suppression System	ea.
Reset Fire Suppression System	ea.

ITEM #1400201A – CURED IN PLACE PIPE LINING 8" (SANITARY SEWER)

Description: This work shall consist of furnishing, preparing and installing cured-in-place pipe lining of the size and type specified, at locations as shown on the plans or as directed by the Engineer, including CCTV inspections and cleaning of gravity sewer pipes and submission of inspection data and records, and handling of wastewater flow during installation.

Materials:

1. CIPP Liner:

- a. CIPP Liner shall be composed of tubing material consisting of one or more layers of a flexible non-woven polyester felt with or without additives such as woven fiberglass or other fibers and meet the requirements of ASTM F 1216, ASTM F 1743, and ASTM D 5813. Felt content of CIPP liner shall be determined by Contractor but shall not exceed 15 percent of the total impregnated liner volume. Fabric tube shall be capable of absorbing and carrying resins, constructed to withstand installation pressures, and curing temperatures and stretch to fit irregular pipe sections. Submit certified information from felt manufacturer on normal void volume in the felt fabric that will be filled with resin.
- b. Actual cured liner thickness shall be -5/+10 percent of approved design thickness and shall not include thickness of any non-structural membrane (inner/pre- liner). CIPP liner shall be designed in accordance with applicable provisions of ASTM F 1216 for “fully deteriorated gravity pipe conditions”, unless Engineer agrees, in writing, prior to installation that “partially deteriorated gravity pipe conditions” shall apply based upon review of CCTV video. CIPP liner shall meet the following design conditions, unless approved by the Engineer, in writing, of their change:
 - i. AASHTO H 20 Live Load.
 - ii. Constrained soil modulus of native soil in the pipe zone of 1000 psi (6.89 MPa).
 - iii. Soil weight of 120 pounds per cubic foot and a coefficient of friction of $K_u=0.130$ or shall be used for the installed depths.
 - iv. Long-term flexural modulus used in design calculations shall be estimated by multiplying lowest short-term flexural modulus used in design calculations by a retention factor of 0.50 (i.e., long-term retention of mechanical properties equal to 50 percent.)
 - v. Design safety factor of 2.0.
 - vi. Groundwater depth used in calculations shall be from estimated maximum groundwater level from surface.
 - vii. Service temperature range shall be 40 to 100 degrees F (4.4 to 37.8 degrees C).
 - viii. Minimum ovality of host pipe of two (2) percent.
 - ix. Thickness to be used for CIPP liner shall be largest thickness as determined by calculations for deflection, bending, buckling and minimum stiffness.

- x. CIPP liner thickness for non-round pipes or circular pipes with greater than 10% ovality shall be designed on accordance with WRC Sewerage Rehabilitation Manual, Type II Design, Section 5.3.2.iii.
- xi. Minimum liner thickness after installation and curing for all pipes 12 inches (305 mm) in diameter and larger shall be 6 mm or as designed, whichever is greater. Thicknesses following installation and curing shall be based on design calculations provided by Contractor.
- xii. CIPP liner shall provide a minimum service life of 50 years and, for design purposes, shall have the following minimum initial and long-term properties:

Property	Test Method	Initial	Long Term (psi)
Flexural Strength	ASTM D 790	4500 psi (31.0 MPa)	2250 psi (15.5 MPa)
Flexural Modulus of Elasticity	ASTM D 790	350,000 psi (2413 MPa)	175,000 psi (1207 MPa)

- xiii. The CIPP shall be designed to withstand all imposed loads, including dead and live loads and, if applicable, hydrostatic pressure. The liner shall have sufficient wall thickness to withstand all anticipated external pressures and loads that may be imposed after installation.
- c. Contractor shall provide one of the following or an approved equal:
 - i. Inliner by Layne Inliner, Inc.
 - ii. Insituform by Insituform Technologies, Inc.
 - iii. National Liner by National EnviroTech Group LLC.
 - iv. SteamCure by Applied Felts
 - v. SAK Liner by SAK Construction LLC.
 - vi. Sancon CIPP by Sancon Engineering Inc.
 - vii. Improved Technologies Group.
- d. CIPP Liner tube shall:
 - i. Be single or multiple layer construction, with any layer not less than 1.5 mm thick, unless the tube is made of fiberglass material. Wet-out fabric tube shall have a uniform thickness and void space for resin distribution that when compressed at installation pressures will produce a predictable finished thickness that meets or exceeds the design thickness after cure.
 - 1. No material shall be included in fabric tube that may cause delamination in cured CIPP.
 - 2. No dry or unsaturated layers shall be acceptable upon visual inspection as evident by color contrast between felt fabric and activated resin containing a colorant.
 - ii. Be manufactured or fabricated to a size that will tightly fit the internal circumference of sewer being rehabilitated after being installed and cured. CIPP liner shall be capable of fitting into irregularly shaped pipe sections and through bends and dips within the pipeline.

- iii. Allow longitudinal and circumferential expansion into account when sizing and installing CIPP liner.
- iv. Be properly sized to diameter of existing pipe and length to be rehabilitated and be able to stretch to fit irregular pipe sections and negotiate bends.
- e. Wall color of the interior pipe shall be:
 - i. A light reflective color so that a clear detailed examination with closed circuit television inspection equipment may be made.
 - ii. A hue dark enough to distinguish a contrast between fully resin saturated felt fabric and dry or resin lean areas.
- f. Seams in fabric tube (If Applicable) shall meet the requirements of ASTM D5813.
- g. Outside layer of the tube shall be coated with an impermeable material compatible with the resin and fabric.
- h. Exterior of manufactured tube shall have distance markings along its length at regular intervals not to exceed 5 feet. Use these marks as a gauge to measure elongation during insertion. Should overall elongation of a reach exceed 5 percent, liner tube shall be rejected and replaced.
- i. When cured, CIPP liner shall form a continuous, tight-fitting, hard, impermeable liner that is chemically resistant to any chemicals normally found in domestic sewage per Table 2.1 in ASTM F 1216. CIPP liner shall be chemically resistant to trace amounts of gasoline and other oil products commonly found in municipal sewerage and soils adjacent to sewer pipe to be lined.
- j. Contractor shall submit product test reports for each cured-in-place pipe liner or pre-liner system. Tests shall be performed by manufacturer and witnessed by a qualified testing agency.
- k. Pressure gauges for the ends shall be digital pressure/vacuum gauges with a pressure range of 0 to 50 psi (0 to 344 kpa) and $\pm 0.25\%$ test gauge accuracy.
- l. CIPP linings shall be from a single manufacturer. Suppliers shall be responsible for provisions of all test requirements specified herein as applicable. In addition, CIPP lining to be installed under this Contract may be inspected at the plant for compliance with these specifications by an independent testing laboratory provided by Owner. Contractor shall ensure that the manufacturer will cooperate with these inspections.
- m. Inspections of CIPP lining may also be made by Engineer or other representatives of Owner after delivery. CIPP lining shall be subject to rejection at any time on account of failure to meet any of the requirements specified, even though sample CIPP lining may have been accepted as satisfactory at the place of manufacture. CIPP lining rejected after delivery shall be marked for identification and shall be removed from the job site.
- n. Manufacturer and Installer shall agree to repair or replace components of cured-in-place pipe liner or pre-liner system that fail(s) in materials or workmanship within specified warranty period, and as covered in Section 1.06.08 in Form 819.

2. Resin:

- a. Shall be corrosion resistant polyester or vinyl ester resin and catalyst system or epoxy and hardener system manufactured specifically for sewer rehabilitation, that, and when properly cured within the tube composite, meets the requirements of ASTM F 1216, ASTM F 1743 or ASTM F 2019, the physical properties herein, and those, which are to be utilized in the design of CIPP for this project.
- b. Resin shall produce CIPP that will comply with or exceed structural and chemical resistance requirements of this specification.
- c. Liner material and resin shall be completely compatible.
- d. Acceptable resin fillers shall meet the following requirements:
 - i. Viscosity control: Up to 5 percent by mass, a thixotropic agent for viscosity control, which will not interfere with visual inspection.
 - ii. Fire retardance.
 - iii. Increase strength.
 - iv. Facilitate better heat transfer and retention during installation.
- e. Resins may contain pigments, dyes, or colorants, which shall not interfere with visual inspection of cured liner.
- f. CIPP felt and resin manufacturer(s) shall have successfully supplied a minimum of 500,000 feet of proposed liner and one million pounds of resin as documented by verifiable references.

3. Seals:

- a. End seals shall be:
 - i. Hydrophilic rubber, molded as a one-piece, three-inch wide cylinder which when installed will form a 360-degree seal between the host pipe and the newly installed liner.
 - ii. Acceptable end seals are Insignia™ End Seals by LMK Enterprises or approved equal.
- b. Use of caulking, rope or band type of an end seal shall not be allowed.
- c. Acceptable epoxy resins are Sikadur 31 or approved equal.

4. CCTV:

- a. CCTV Software and related equipment shall conform to the following:
 - i. External hard drives shall be a portable storage device that can be attached to a computer through a USB connection.
 - 1. External hard drive shall be a solid state data storage device when possible
 - ii. CCTV software shall be:
 - 1. Capable of providing complete survey reports in compliance with the most recent version of NASSCO PACP.
 - 2. Pre-programmed with the PACP defect and construction codes and shall be grouped by PACP Groups.
 - iii. Software and Databases shall adhere to the following:
 - 1. Be fully compliant with PACP.

2. Be capable of customization with the ability to modify or add to the pipeline condition and group them for ease of use.
3. Assessment and reporting software program shall be menu-driven and shall have a complete on-screen help file.
4. NASSCO PACP mandatory fields and any additional available field requested by the Owner or Engineer shall be setup in the software prior to the assessment, and all fields shall be populated with information collected during the assessment. Any general and pipe segment information that is already known prior to the assessment shall be entered into the appropriate fields in advance of performing the physical assessment.
5. A database of underground pipe and manhole assets shall be maintained. The asset database shall be structured similar to the one referencing pipe usage (i.e., sanitary, storm, drainage, etc.) sections (i.e., projects, areas, quadrants).
6. Surveys shall include a method of pipe segment numbering and a chronological survey set-up numbering system.
7. Capacity to import and export survey results in the most recent NASSCO PACP exchange format.

b. CCTV equipment shall conform to the following requirements:

- i. Contractor shall provide a mobile vehicle large enough to accommodate at least three people with video monitoring equipment specifically compatible with the camera equipment being used. Owner and Engineer shall have unrestricted access to observe the television screen and all other operations.
- ii. CCTV Camera shall:
 1. Be designed and constructed for such assessment and shall be capable of producing digital still photos of all sewer observations and service connections.
 2. Have an adjustable light source that generates an even distribution of lighting for the camera that results in a clear color picture of the entire periphery of the pipe.
 3. Be operable in 100 percent humidity conditions and in a hazardous and corrosive environment.
 4. Be capable of panning 360 degrees and tilting 270 degrees and with minimum optical zoom ratio of 10:1 plus a minimum digital zoom ratio of 4:1 to facilitate the assessment of all laterals and defects with optimum picture quality provided by focus and iris adjustment.
- iii. The camera, television monitor and other components of the video system shall be capable of a minimum 500-line resolution video picture. Picture quality shall be to the satisfaction of the Engineer. The Lighting System shall minimize reflective glare.
- iv. When usage of standard CCTV equipment is not feasible due to access issues, pipe condition, and/or depth of water flow, floating camera equipment may be used.

1. Floating HD camera shall be capable of recording 360-degree view using a fisheye lens without tilting or panning.
- v. Camera, television monitor, and other components of the video system shall be capable of producing picture quality to the satisfaction of the Owner and/or Engineer. Picture resolution shall be a minimum of 460 television lines (TVL).
- vi. Lighting system shall be adequate for quality pictures. A reflector in front of the camera may be required to enhance the lighting in black pipe.
- vii. Shall include accurate footage counter to display on the monitor the exact distance of the camera from the centerline of the starting manhole.
- viii. Shall be compatible with the version of NASSCO PACP used by the CCTV software and the reports and submittals generated from the software.

5. Sewer Cleaning:

- a. Hydraulic Sewer Cleaning Equipment:
 - i. Shall be moveable dam type constructed so that a portion of the dam may be collapsed at any time during cleaning operation to protect against flooding of sewer.
 - ii. Movable dam shall be same diameter as pipe being cleaned and shall provide flexible scraper around outer periphery to ensure total removal of grease. If sewer cleaning balls or other such equipment which cannot be collapsed instantly are used, Contractor shall take special precautions against flooding of sewers and public or private property.
- b. High Velocity Jet (Hydrocleaning) Equipment shall:
 - i. Have a minimum of 500 feet of high-pressure hose.
 - ii. Have a selection of two or more velocity nozzles that are capable of producing a scouring action from 15 to 45 degrees in all size lines to be cleaned. Shall also include a high velocity gun for washing and scouring manhole walls and floor.
 - iii. Be capable of producing a minimum of 80 gallons per minute flows from a fine spray to a long distance solid stream and delivering up to 1000 psi. Be able to carry its own water tank, auxiliary engines, pumps, and hydraulically driven hose reel. Controls shall be located so equipment can be operated above ground. Contractor shall select flowrates and pressures as required for each size of sewer, type of debris, and amount of debris, and as recommended by nozzle manufacturers.
 - iv. Have a water tank, auxiliary engines and pumps, and a hydraulically driven hose reel.
 - v. Have root cutting blades that are hydraulically spun.
- c. Mechanical Cleaning Equipment:
 - i. Bucket machines shall be in pairs and with sufficient power to perform the work in an efficient manner. Machines shall be belt operated or have an overload device. Machines with direct drive that could cause damage to the pipe shall not be acceptable.

- ii. Power rodding machines shall be either sectional or continuous type capable of holding a minimum of 750 feet of rod. Rod shall be specifically treated steel. To ensure safe operation, machine shall have a fully enclosed body and an automatic safety release clutch or relief valve.

Construction Methods:

1. Submittals:

CIPP Submittals

Contractor shall submit procedures and plans for CIPP installation which shall include the following:

1. CIPP Installation Procedures: Contractor shall provide detailed information on the CIPP installation procedures (wet-out, heating, curing, and cool down, if applicable) and all tools and equipment required for a complete installation. Identify which tools and equipment will be redundant on job site in the event of equipment breakdown. Equipment to be furnished for the project, including proposed back-up equipment, shall be clearly described.
2. Contractor shall outline the mitigation procedure to be implemented in the event of key equipment failure during the installation process.
3. CIPP Lining Schedules: Contractor shall provide CIPP lining schedules including field-verified lengths and diameters of all CIPP lining and appurtenances required. Plans should include map(s) that show insertion points for all CIPP installations.
4. Identification of materials of construction (including resins, catalysts, felt, etc.), felt manufacturer, location of the felt manufacturing facility, location of the wet-out facility, etc., flexible membrane (coating) material (including recommended repair/patching procedure, if applicable).
5. Material certificates for each type of cured-in-place pipe liner or pre-liner system as covered in Section 1.06.07 in Form 819.
6. Manufacturers' shipping, storage and handling recommendations for all components of the CIPP System.
7. Detailed sample collection, laboratory testing and quality control procedures, including schedule and shipping and storage requirements.
8. Written description and/or plan for odor control that will ensure that project specific odors such as styrene will be minimized at the project site and surrounding area.

Contractor shall submit design submittals before, during, and upon completion of the CIPP installation. The following submittals and their respective requirements shall be included:

1. CIPP Design Submittal:
 - a. Data on the maximum allowable stresses and elongation of the tube during installation and the means in which the Contractor will monitor stress and elongation (i.e., ideal inversion head and maximum cold head, minimum inversion head, maximum hot head).

- b. A complete description of the proposed wet-out procedure for the proposed technology.
2. Design data and specification data sheets:
 - a. List all parameters used in the CIPP liner design and thickness calculations based on ASTM F 1216 for "fully deteriorated gravity pipe conditions." Thickness of liners for oval and egg-shaped pipe shall be calculated in accordance with the "Sewerage Rehabilitation Manual" published by the Water Research Center (WRC).
 - b. All calculations shall be prepared under the supervision of and stamped by a professional engineer registered in the State of CT.
3. Submittals prior to CIPP Installation shall include:
 - a. Prior to each shipment of CIPP lining, contractor shall submit certified test reports that the CIPP lining for this Contract was manufactured and tested in accordance with all ASTM Standards specified and referenced herein.
 - b. CIPP lining schedules including field-verified lengths and diameters of all CIPP lining and appurtenances required to show that the contractor has physically measured every pipe to be rehabilitated. Plans should include map(s) that show insertion points for all CIPP installations.
 - c. Detailed installation procedures and manufacturer's recommended cure method for each diameter and thickness of CIPP liner to be installed, including CIPP lining production schedule, acceptable inversion heads and pressures, inversion or winching procedures, curing and cool-down procedures detailing the curing rate of temperature increases and cool down and the method of application, and times for each stage of the process.
 - d. Pre-rehabilitation closed-circuit television (CCTV) inspection data as further defined herein.
 - e. Samples of installed liner(s) for testing to be performed by an ASTM-certified independent testing laboratory, as described further herein.
 - f. Information on any grouts, epoxy, or cements the Contractor is proposing to use for sealing at manholes or for other uses.
 - g. Specific repair or replacement procedures for potential defects that may occur in the installed CIPP for review and approval by the Engineer. Repair/replacement procedures shall be as recommended by the CIPP system manufacturer and shall be submitted to also include the following:
 - i. Defects in the installed CIPP that will not affect the operation and long-term life of the product shall be identified and defined.
 - ii. Repairable defects that may occur in the installed CIPP shall be specifically defined by the Contractor based on manufacturer's recommendations, including a detailed step-by-step repair procedure, resulting in a finished product meeting the requirements of these contract specifications. Repairable defects may include but are not limited to blisters, wrinkles, fins, pinholes, over- or undercut lateral connections, and any voids found between liner and the host pipe.

- iii. Un-repairable defects that may occur to the CIPP shall be clearly defined by the Contractor based on the manufacturer's recommendations, including a recommended procedure for the removal and replacement of the CIPP. Un-repairable defects may include but are not limited to thickness below required minimum thickness, structural strength below required limits, lifts, shrinkage, folds, bulges, and delamination.
- h. Detailed written plan of the method of flow maintenance (Bypass Pumping plan) and noise prevention measures.
- i. A detailed description of the Contractor's proposed procedures for removal of any existing blockages in the pipeline that may be encountered during the cleaning process.
- j. A detailed written traffic-control plan that details every street that will be impacted and how impacts will be mitigated.

4. During CIPP Installation contractor shall submit:

- a. Wet-out forms/reports for each CIPP segment with detailed information including but not limited to: date and time of wet-out, wet-out facility address, volumes and/or weights of resin, length and diameter of CIPP liner (both wet-tube and dry-tube), roller gap settings, start times, finish times, resin used (product name and batch/shipment number) and quantity, gel times, resin injection locations, thickness of CIPP liner (dry and wet), catalyst(s) name and quantity used, and any other pertinent data documenting the wet-out for each section of CIPP liner manufactured. The wet-out forms shall be submitted prior to CIPP liner installation and shall be provided without delay or claim to any confidentiality. Wet out forms shall be submitted to the Owner/Engineer field representative on the day of delivery. Wet-out facilities location shall be provided by Contractor. Multiple wet-out facilities shall not be allowed.
- b. CIPP liner field curing reports documenting the liner installation for all sewer segments. The CIPP liner reports shall document all details of liner installation, including manhole numbers, street names/sewer location, project number, date, time, ambient temperature, heads used during the inversion process, pressures and/or heads (minimum inversion pressure, ideal head, maximum hot head and maximum cold head) used during curing (including cool down if applicable), curing temperature, curing time, rate of cool down, CIPP liner thickness, etc. A sample report shall be submitted to the Owner/Engineer for approval prior to the installation of any CIPP lining. The reports shall be submitted prior to requesting payment and shall be provided without delay or claim to any confidentiality.
- c. Daily production reports to the Engineer and/or field representative at the end of each workday.

5. After CIPP has been installed Contractor shall submit:

- a. Complete certified copies of the report(s) output(s) of the continuous temperature monitoring systems used in the control of the curing, printed and in electronic format. The reports shall be submitted prior to requesting

payment and shall be provided without delay or claim to any confidentiality. Provide the Owner and Engineer with access to the website where the secure reports can be obtained.

- b. Post-rehabilitation closed-circuit television (CCTV) inspection data as further defined herein. Post-rehabilitation CCTV inspection data shall be submitted within one week after the CIPP segment is installed.
- c. A list of all service laterals (with distances and clock position) that were abandoned or reconnected as part of the work as further defined herein.
- d. Contractor shall retain and submit field quality-control reports.

Along with the physical properties testing and post installation CCTV survey, the Contractor shall deliver a certified copy of the curing report output from the temperature monitoring system used in the control of the curing process for pipes; or provide the Owner/Engineer with access to the website where the secure report can be obtained.

If in the opinion of CIPP liner manufacturer and/or the Owner/Engineer, rate of infiltration in sewer segment is high enough to risk washout of resin, perform measures, as required, to minimize infiltration prior to installation, including pre-liners, grouting, etc. If during pre-lining CCTV inspection, any infiltration runners or gushers (per NASSCO PACP®) are observed, Contractor shall submit, in writing for approval by Owner/Engineer, methods and materials for mitigating any adverse impacts from the infiltration.

Prior to commencing work, Contractor shall submit a detailed Public Notification Plan, Safety Plan, and Quality Control Plan. The Public Notification Plan shall include detailed staged notification to residences affected by the CIPP installation. Including but not limited to:

1. Initial letter describing the work to be done approximately one (1) week before lining
2. Door hanger to be placed 72 hours prior to any lining work to be completed with specifics on when the liner will be installed.
3. The submitted Safety Plan shall identify all competent persons and include description of a daily safety program for the job site and all emergency procedures to be implemented in the event of a safety incident. All work shall be conducted in accordance with the Contractor's submitted Safety Plan.

Contractor shall provide a detailed quality control plan (QCP) that fully represents and conforms to the requirements of these specifications. At a minimum the QCP shall include the following:

1. A detailed discussion of the proposed quality controls to be performed by the Contractor.
2. Defined responsibilities of the Contractor's personnel for assuring that all quality requirements for this contract are met. These shall be assigned by the Contractor, to specific personnel.
3. Proposed procedures for quality control including those pertaining to fit and finish, and product sampling and testing shall be defined and submitted as part of the plan.

4. Proposed methods for product performance controls, including method of and frequency of product sampling and testing both in raw material form and cured product form.
5. A schedule for performance and product test result reviews between the Contractor and Owner/Engineer at a regularly scheduled job meeting.
6. Inspection forms and guidelines for quality control inspections shall be prepared in accordance with the standards specified in this contract and submitted with the QCP.

Contractor shall submit letter to certify that the CIPP will conform to the project requirements as outlined in the Scope of Work and as delineated in these specifications and that the Contractor's personnel have successfully installed a minimum of 250,000 feet (total) of proposed CIPP liner for a continuous period of at least three years installing CIPP liners in pipe of a similar size, length and configuration as contained in this contract as documented by verifiable references.

Contractor shall submit information in the following items for review and approval before any CIPP lining work is performed:

1. Number of years of Contractor's experience in installing CIPP lining.
2. Names and product information of the CIPP felt tubes and resin materials to be utilized for this project and their suppliers.
3. A certified statement from manufacturer that Contractor is an approved installer as certified and/or licensed by the CIPP liner manufacturer.
4. Documentation and a sufficient number of references to meet qualifications requirements as listed in this Provision.

Contractor performing CIPP lining work shall be fully qualified, experienced, and equipped to complete this work expeditiously and in a satisfactory manner and shall be certified and/or licensed as an installer by CIPP lining manufacturer. Contractor's personnel shall have successfully installed a minimum of 250,000 feet (total) of proposed CIPP liner for a continuous period of at least three years installing CIPP liners in pipe of a similar size, length and configuration as contained in this contract as documented by verifiable references. Submit name and experience of each lead individual performing work on this Contract. Personnel replaced by Contractor shall have similar verifiable experience as personnel originally submitted for project.

1. Lead personnel including superintendent, foreman and lead crew personnel each shall have a minimum of three years of total experience with CIPP technology proposed and shall have demonstrated competency and experience to perform the scope of work as documented by verifiable references.
2. The lateral cutter operator is required to have at least 6 months of experience reinstating the connection between the sewer main and lateral lining as documented by verifiable references.
3. Owner and/or Engineer shall reserve the right to approve or disapprove Contractor, Superintendent, and/or manufacturer based on submitted qualifications and a follow-up interview.

Contractor shall submit a list of a minimum of five municipal clients that CIPP Contractor has performed this type of work for without defects or performance problems for a period of five years after installation. The list shall contain the following:

1. Names and telephone numbers of persons to be called to verify previous satisfactory performance.
2. A full description of the actual work performed.
3. Name of CIPP lining manufacturer and supplier for each referenced project.

Contractor shall submit five (5) reports from projects within past two years from independent testing laboratory analysis of liner materials showing: Modulus of elasticity as determined by appropriate ASTM standard and flexural stress as determined by ASTM D790 standard. Lining shall be of same resin system and felt tube materials as proposed for this project.

Contractor performing sewer main or lateral cleaning shall have a minimum of five years' experience in sewer line and underground structure cleaning. Submit a list of at least three customers who have had similar work complete. Furnish trained and qualified technicians with proper experience operating equipment that is being used on this project.

Contractor shall submit one complete set of documentation regarding inspections and work performed. Based on work scope, Contractor shall submit written reports, photographs taken, and DVD's that incorporated color video recordings. Video inspections shall be recorded in color on external hard drive. Original recordings and inspection reports shall become property of Owner. Inspections for cleaning purposes shall adhere to all requirements including CCTV Inspections in this Provision.

Testing performed as part of this Provision shall be performed by an independent testing laboratory certified by the American Association for Laboratory Accreditation (A2LA). Contractor shall submit to Engineer the name and location of independent testing laboratory, a certified statement from laboratory indicating that they are independent from and not associated with Contractor in any way, and A2LA certification for independent testing laboratory.

CCTV Submittals

Contractor shall submit plans, qualifications, inspection data and reports and other materials from CCTV inspections performed in relation to work in this provision including:

1. Database structure and file naming plan.
2. External hard drives.
3. Pipeline assessment plan.
4. List of equipment to be used on the project, including project literature for all video equipment (including cabling, camera, footage counter, tilting device, and recorder).
5. Proposed door hanger for public notification.
6. Qualifications statement including documentation providing list of Project staff and proof of Contractor's qualifications as specified below:

- a. Contractor: Successfully performed work on at least ten other projects within the last five years that include at least 100,000 linear feet of CCTV video experience in NASSCO PACP format in gravity sewers 8- to 24-inch in diameter.
- b. CCTV Operator: Successfully performed work on at least three other projects within the last five years that includes at least 250,000 linear feet of CCTV video experience in gravity sewers using NASSCO PACP format.
- c. Crew Chief: Minimum of five years of experience on projects involving the assessment of gravity sewer measuring 8- to 24-inch in diameter or greater and experienced in using the proposed equipment

7. Traffic control plan for work in areas of vehicular travel.
8. Spill plan to address any spills that might occur.
9. Two copies of the NASSCO-issued “certified PACP user” identification card showing certification number for each CCTV operator that will be performing assessment work on the Project. Work shall not commence until such certification is provided.
10. Confined Space entry and hazardous atmosphere training certifications for all staff that will be involved in work located within or near manholes.
11. Sewer Assessment Reports shall be submitted with the following requirements:
 - a. All files shall be named in accordance with the requirements of the Owner and Engineer to allow direct linking of files to pipe assets using a common unique identifier.
 - i. Each manhole has been given a unique manhole identification (Asset ID) the file name for each pipeline assessed shall be that unique upstream manhole Asset ID followed by an underscore followed by the unique downstream manhole such as MH-1001_MH-1002.pdf.
 - ii. If an unnamed manhole is found, the letter “A” shall be added to the end of the upstream manhole’s Asset ID to form a new Asset ID. The data/video files shall then be renamed to include the new Asset ID and a new CCTV assessment shall be started from the new Asset ID.
 - iii. If more than one unnamed manhole is found between two named manholes, subsequent new manhole Asset IDs shall be formed using the letters “B”, “C”, etc.
 - iv. If an unnamed manhole is found, Contractor shall provide documentation showing the location of the unnamed manhole to the Owner and Engineer depicting the change in connectivity found in the field.
 - v. If the Contractor performs a reverse setup and televises an individual pipe segment from more than one direction (i.e., the camera is only able to teleview a portion of the entire segment heading downstream, and the remaining portion of the pipe segment was televised heading upstream) then two or more separate video files shall be allowed. The name of the additional database files etc. (i.e., unique manhole Asset ID followed by an underscore followed by the unique downstream Asset ID) shall be followed by “_1”, “_2” etc. at the end of the

filename so that it is clear there are multiple files and videos for the same pipe segment. If unnamed manhole(s) is (are) found the procedure previously described shall also apply. Examples:

1. Initial filename: MH-1001_MH-1002
2. Additional filenames: MH-1001_MH-1002_1
- vi. Contractor shall base the name of each digital still photo on the video/data filename of the specific sewer in which the photo was taken. Record the name as the video/data filename followed by the PACP code for the item pictured followed by the footage at which the observation was encountered. Examples:
 1. (Filename) (PACP Coded)@(footage).jpg
 2. MH-1001_MH-1002_HSV@37_2.JPG
 3. MH-1001_MH-1002_1_MCU@113_6.jpg (reverse setup example)
- b. Contractor shall provide CCTV assessment data contained on each portable external hard drive in the most recent version of PACP exchange format. Include video indexing for all observations. The following CCTV assessment data shall be submitted:
 - i. Database file.
 - ii. Still photos in JPEG file format for each observation.
 - iii. Video for each inspection in MPEG1 file format.
 - iv. Summary report for each pipe segment in PDF format.
- c. Digital video CCTV assessments shall be captured at a minimum video bit rate of 4,500 kbps.
- d. Individual survey results shall be indicated in tabular form and provide a sortable list of surveys based on a user-defined description field. Include the starting and ending manhole Asset IDs depths, pipe material, total survey length, and pipe diameter. All reports and and/or submittals shall comply with the most recent version of NASSCO PACP standards.
- e. Contractor shall submit assessment data to the Engineer on a weekly basis including digital videos, digital photos, and evaluation reports, all in electronic format on portable external hard drive. All hard drives and the information contained within shall be the property of the Owner after submittal.
- f. Contractor shall create separate folders for each inspection. Within each inspection folder Contractor shall include the video file, digital photos, evaluation reports, supporting documentation etc.
 - i. Each portable external hard drive shall be labelled clearly to indicate the date range of the assessments included on the hard drive, the name of the project, the Owner's project number, Contractor's name, and the index number of the hard drive. The index number for each hard drive shall be the sequential number followed by the area number.
 - ii. Each portable external hard drive submitted shall contain all sewer assessment data obtained to date. The database shall be comprehensive

for the entire project and additional data shall be added to the database each week.

- iii. On each hard drive, new data collected since the previous hard drive submittal shall be indicated as such to facilitate separation of the new data from the previously submitted data.
- iv. A typewritten summary in pdf format shall be provided for each portable external hard drive that lists the files contained on that hard drive.
- g. Contractor shall submit CCTV inspection videos, where reversal setups are not required, in one continuous video section from manhole to the immediately adjacent manhole and not in multiple files. If a reverse setup is required, two complete inspections and video are acceptable.
- h. Contractor shall review quality and accuracy of each submittal of CCTV assessment data and revise as needed to correct any inaccuracies prior to providing submittal to the Engineer.
- i. Engineer shall have a 30-day period to review sewer assessment data/videos after each submittal has been received.
 - i. Additional 30-day review periods shall apply to each resubmittal of data/videos determined to be unacceptable by the Engineer.

Bypass Pumping Submittals

Contractor shall submit to the Engineer, for approval, a detailed written plan of all methods of flow maintenance ten (10) days in advance of any flow interruption. All procedures for maintaining flow must meet the approval of the Engineer. All proposed noise prevention measures shall be outlined in detail in the submitted plan. No construction shall begin until all provisions and requirements have been reviewed and approved by the Engineer. Should at any time prior to or during the performance of said work, the Owner or Engineer determine that the noise prevention measures being used are not adequate, the Contractor shall at no additional cost to the Owner suspend all work until acceptable measures are incorporated.

Contractor shall provide the services of a professional bypass design company who can demonstrate to the Owner and Engineer that the company specializes in the design and operation of temporary by-pass pumping systems. The by-pass system shall meet the requirements of all codes and regulatory agencies having jurisdiction. Bypass plan shall be designed by a registered professional engineer in the State of Connecticut and submitted to the Owner and Engineer for review.

2. Cleaning of Sewers:

Cleaning shall include proper high-pressure water jetting, rodding, bucketing, brushing, and flushing of sewers and manholes prior to inspection by closed circuit television, pipeline rehabilitation or replacement, manhole preparation, and testing operations.

Contractor shall clean all sewers and manholes to remove debris, roots, intruding services, deposits, and other blockages to a minimum of 95 percent open. Sewer cleaning work shall be performed to an acceptable level as necessary to perform a thorough television inspection of sewer. If pipe condition is such that cleaning may cause a potential collapse, then pipe shall be televised without attempting to clean it to 95 percent condition, pending approval by Engineer.

Contractor shall select cleaning equipment to address conditions of manhole and sewer lines at the time the work commences to adequately remove dirt, grease, rocks, sand, and other materials and obstructions from sewer lines and manholes to allow performance of other work.

Contractor shall take satisfactory precautions to protect sewer lines from damage that might be caused by improper use of cleaning equipment. Whenever using hydraulically propelled cleaning tools that depend upon water pressure to provide their cleaning force, or any tools that retard flow of water in sewer line, take precautions to ensure that water does not cause damage or flooding to public or private property.

No fire hydrant shall be obstructed in case of a fire in area served by hydrant. Contractor shall remove water meters, piping, and related equipment from fire hydrants at end of each workday.

During sewer cleaning operations, satisfactory precautions shall be taken in use of cleaning equipment. When hydraulically propelled cleaning tools (which depend upon water pressure to provide their cleaning force) or tools which retard flow in sewer line are used, precautions shall be taken to ensure that water pressure created does not damage or cause flooding of public or private property being served by sewer. When possible, flow of sewage in sewer shall be utilized to provide necessary pressure for hydraulic cleaning devices. When additional water from fire hydrants is necessary to avoid delay in normal work procedures, water shall be conserved and not used unnecessarily.

No sewer cleaning shall take place in a particular sewer segment until upstream pipe segments have been cleaned. If cleaning is done in a downstream pipe segment in order to facilitate overall cleaning operations, segment shall be re-cleaned at no additional cost to Owner, after pipes upstream of that segment have been cleaned.

Sewer line walls shall be cleaned adequately to provide for proper installation of recommended rehabilitation, operation of joint testing and sealing equipment or internal inspection to discern structural defects, misalignment and infiltration/inflow sources. Cleaning shall be performed immediately prior to joint testing and sealing and internal inspection to preclude build-up of debris from infiltration/inflow sources and discharges from upstream pipeline sections.

Designated sewer manhole sections shall be cleaned using hydraulically propelled, high velocity jet, or mechanically powered equipment. Selection of equipment used shall be based

on conditions of lines at the time the work commences. Equipment and methods selected shall be satisfactory to Owner's Representative. If cleaning of an entire section cannot be successfully performed from one manhole, equipment shall be set up on other manhole and cleaning again attempted. If, again, successful cleaning cannot be performed or equipment fails to traverse entire manhole section, it will be assumed that a major blockage exists, and cleaning effort shall be repeated with other types of equipment. Contractor shall immediately report any blockages to Engineer.

The Contractor shall obtain prior approval from the Town for all water use activities and shall coordinate directly with the Town and the WPCA to finalize and implement the approved water use plan. Coordination with the Town and WPCA if anticipated water use exceeds 10,000 gallons. Fees may apply for such use. When utilizing a tanker for filling, Contractor shall obtain water from Highway Department at Church Street. Contractor shall be permitted to connect to the nearest hydrant by hose only with express authorization from the Town. Contractor shall be solely responsible for preventing cross contamination of any public or private water systems used for this purpose.

Contractor shall provide appropriate screening to stop passing of materials into downstream sewers. Sludge, dirt, sand, rocks, grease, and other solid or semisolid residue, debris, and material resulting from cleaning operations shall be removed at downstream manhole of section of sewer being cleaned. Passing material from manhole section to manhole section which could cause line stoppages, accumulations of sand in wet wells, or damage to pumping equipment shall not be permitted.

Debris, residue, and other materials resulting from cleaning operations shall become property of Contractor and shall be removed from site at end of each workday and shall be disposed of in an approved and lawful manner. Under no circumstances will accumulation of debris, residue, and other matter be permitted on site beyond stated time, unless prior written authorization is given for storage in totally enclosed containers.

Flushing of sanitary sewers to facilitate cleaning activities without the capture of solids and debris shall be expressly prohibited.

Retrieval of equipment lodged in pipes, or a wet well is Contractor's responsibility and shall be performed at Contractor's expense.

Acceptance of sewer line cleaning shall be contingent on satisfactory completion of television inspection. If television inspection shows cleaning to be unsatisfactory, Contractor shall re-clean sewer line and re-inspect until cleaning is shown to be satisfactory. Pipe must be clean enough to allow for rehabilitation efforts to occur.

If internal joint testing and sealing is to follow cleaning, Contractor shall give particular attention to adequacy of cleaning to ensure that proper seating of sealing packer can be achieved.

Inspection of cleaning operations shall be made on a daily basis by the Engineer.

Upon cleaning of underground sewer lines or structures, Contractor shall remove debris from finish grade and clean work areas so conditions at conclusion of the work are equal to or better than areas prior to work of this Provision.

3. CCTV Inspections

Preparation:

Contractor shall evaluate each segment of sewer to be assessed with respect to diameter, flowrate, velocity, upstream/downstream manhole diameter, debris levels, extent of pipe wall corrosion, and accessibility. Select and provide the most appropriate equipment and methods based on the condition of the specific sewer line segment and its access manhole(s) at the time the work commences.

1. All assessment work shall be attempted during periods of low flow in the sewer segments being assessed.
2. At all times during the assessment, the flow in the sewer line segment(s) being assessed shall be suitably controlled as needed to perform the assessment in accordance with the Bypass Pumping section of this provision.
3. If the depth of flow in the sewer segments to be assessed is above the maximum allowable for the use of standard CCTV equipment, use of floating inspection equipment shall be acceptable.
4. If the depth of flow in the sewer segments to be assessed is above the maximum allowable for the use of floating inspection equipment, off peak hours should be pursued to perform the assessment. If flow levels are not sufficient during off peak hours, the flow level shall be lowered by either:
 - a. Using flow through plugs.
 - b. Performing bypass pumping as approved by the Engineer and outline in this provision.
5. When flow in a sewer line is plugged, blocked, or bypassed, Contractor shall take the following precautions:
 - a. Protect the sewer lines from damage that might result from sewer surcharging.
 - b. Ensure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewer involved.

The equipment and methods used for each sewer pipe and the setup location shall conform to the submitted and reviewed plan.

1. Standard CCTV equipment shall be appropriate for sewer segments that:
 - a. Have a depth of flow less than 25 percent of the pipe diameter.
 - b. Do not have signs of corrosion.
 - c. Do not appear to have significant debris accumulation below the water surface.
2. Floating HD Image equipment shall be appropriate for sewer segments that:
 - a. Do not meet the previously listed conditions for using standard and CCTV equipment.

- b. Require longer continuous lengths of assessment due to the difficulty of the manhole access or connection to a buried manhole or manholes.
3. Contractor shall perform sewer line cleaning as required in accordance with this Provision to provide a thorough assessment of the sewer condition.

Field Quality Control:

The following measurements shall be collected for each accessible manhole and included in the PACP exchange database:

1. Contractor shall utilize GPS equipment to obtain X and Y state plane coordinates with a submeter accuracy.
2. Contractor shall field-measure the vertical distance from the top of the manhole frame to the invert in accordance with NASSCO PACP standards.

Contractor shall assess each sewer section from the upstream manhole to the downstream manhole if possible and shall consist of the following requirements:

1. For the upstream and downstream manholes on each segment of pipe that is assessed, pan and tilt from the invert and take digital still photos that clearly depict the entirety of the manhole interior, including cone section.
2. Assess the full length of each sewer between access points. When the camera is unable to pass an obstruction even though flow is continuing, perform a reverse setup of the CCTV equipment from the opposite access point.
3. All CCTV assessments shall be performed using personnel who are trained and certified (current standing) in the use of NASSCO's PACP.
4. Multiple upstream and/or downstream sewer segments may be televised from a single manhole setup location as long as each manhole to manhole video section restarts its footage counter at zero and a separate video file for each assessment is submitted.
5. The CCTV camera shall travel through the lines using its own power unless a tethered floating unit is used. The pictures taken of the entire inside periphery of the pipe shall be clear and visible. Picture quality and definition shall be to the satisfaction of the Engineer. In no case will the television camera be pulled at a speed greater than 30 fpm.
6. Contractor shall stop the camera at all service laterals and pan at such an angle that an internal view of the service lateral is available to determine if the lateral is active, inactive, or plugged. Contractor shall take photos with the following requirements:
 - a. A brief description of the subject of the photo directly on the photo.
 - b. Catalogue and link in the CCTV database so the photos correspond with the length along the sewer line where the photo of the recorded observation was taken.
 - c. JPEG format and at least 50 kilobytes in size.
7. Camera height shall be adjusted such that the camera lens is always centered in the pipe being televised.
8. Contractor shall retrieve camera equipment that becomes stuck within a sewer.

The footage reading from the camera equipment shall be automatically entered into the survey log and shall directly correspond to the noted observation location throughout the pipe graphical and tabular reports generated.

Contractor shall calibrate camera footage on a weekly basis in the presence of the Owner or Engineer with an above ground tape measure and simultaneous CCTV footage number.

Contractor shall provide a backup (spare) camera either on the Project site or at a nearby location so performance of the Work is not delayed.

Re-inspection shall be required when digital videos are inaccurate or of such poor quality that the Engineer is unable to evaluate the condition of the sewer or locate sewer service connections.

Contractor shall notify the Engineer and Owner immediately if:

1. A collapsed pipe or other significant pipe failure is discovered.
2. The conditions for CCTV assessment are found to be unsafe or impractical.
3. A manhole is buried, cannot be found, or cannot be accessed. Include a diagram in PDF file format that clearly indicates the location of the manhole, identifies its Asset ID, and lists the procedures that were used to attempt to locate the manhole.
4. Any defects that pose immediate danger to the public are observed (i.e. missing or broken manhole covers, sinkholes, etc.).
5. Any major pipe blockages, manhole surcharging, or potential overflow conditions are observed.
6. The pipe configuration in the field is different than shown on the Drawings. Include a diagram in PDF file format that clearly indicates the location of structures in relation to immediately adjacent structures.
7. Any significant obstructions are found within permanent sewer easement, even if these obstructions do not impact the Work.

For lines that require plugging or disruption of service to inspect Contractor shall provide 48-hour notice prior to the assessment of any pipe segment, distribute door-to-door a door hanger, approved by the Owner and Engineer, describing the work to be performed to notify the owner of every property, including residences and businesses, that may be affected. Door hangers shall be double-sided with the notification information in the English language on one side and in the Spanish language on the reverse side. Affected properties shall include, but not be limited to, properties on which:

1. A sewer to be accessed is located.
2. A manhole for accessing a sewer to be assessed is located.
3. An existing sewer easement that could be used to access the sewer is located.
4. A temporary right-of-entry agreement with the property owner and the Contractor for accessing a sewer or manhole on the property.
5. An existing sewer lateral serving the property directly connects to a sewer to be assessed or manhole to be accessed for the sewer assessment.

4. Bypass Pumping

Contractor shall furnish all labor, materials, equipment and incidentals required and maintain wastewater flow in all public and private pipes during construction. The method used shall be compatible with the work performed under this provision.

1. Bypass pumping of any large businesses or apartment buildings that cannot have their service interrupted shall require Contractor to coordinate with identified business or apartment buildings before work commences. Contractor shall submit a plan to deal with specific business or apartment buildings that require bypass pumping of their service connections.

Contractor shall supply pumps, conduits, power, and other equipment to divert and by-pass the flow of sewage around the section in which work is to be performed. The by-pass system shall be of sufficient capacity to handle existing flows plus additional flows that may occur during a rain event. Note that historical flow data for all sewer mains scheduled to be replaced or rehabilitated is not available. As a result, the by-pass system shall be of sufficient capacity to handle the pipe flowing full, as determined using Manning's Equation.

Contractor shall incorporate to the satisfaction of the Owner and Engineer, noise prevention measures for any and all equipment being used to ensure minimum noise impact on the surrounding areas. Such measures shall include but not be limited to insulated enclosures, hospital grade mufflers or silencers, equipment modifications, and special equipment as necessary. As an added noise prevention measure wherever and whenever possible, the Owner reserves the right to require the Contractor to use electrically powered pumps for any and all pumping required for work under this contract. If so, the power supply needed to operate such pumps shall be obtained through temporary power services installed, maintained and operated in strict accordance with all power company rules and regulations. Operating on-site power generating facilities outside of normal working hours shall not be allowed unless authorized by the Owner and Engineer as an emergency backup in the event of a power failure to prevent shutdown of the diversion system. Should the Owner exercise the above mentioned right, all associated costs including but not limited to installation, operation, and maintenance of both the pumping systems and related power services shall be totally at the Contractors expense and at no cost the Owner, and without basis for additional compensation for work under this contract.

The Contractor shall be required to repair at his own expense all damage to property, public or private caused by his operations.

Flows from existing facilities shall not be allowed to enter the new facilities until the new facilities have been cleaned and tested as required in the specifications.

Should damage of any kind occur to the existing sewers, the Contractor shall at his own expense make repairs to the satisfaction of the Engineer.

The Contractor shall not be permitted to overflow, bypass pump or by any other means convey drainage to any brook or water course without permission of the Engineer.

Contractor shall provide a backup pumping system on site in the event that the bypass pumping system being used fails or malfunctions.

Contractor shall maintain 24-hr on site personnel to monitor by-pass pumping efforts during normal work hours. Maintain temporary by-pass pumping systems so that they are completely functional throughout the required period of service. Temporary by-pass system shall not be permitted during non-work hours.

Following the required period of service, Contractor shall remove temporary by-pass pumping systems from the site and conduct site reconstruction to repair any damage caused resulting from system installation.

Contractor shall provide all maintenance including manufacturer recommended preventative maintenance and on-call repair services. Repair services and/or replacement equipment shall be available 24 hours per day, seven days per week within 4 hours of being called.

Should the Contractor elect to use diesel fuel for temporary bypass pumping, the total storage quantity of fuel allowable at the site to operate the temporary pumps shall not exceed the sum of the individual fuel tank capacities furnished with each pump's diesel engine drive. A refueling service to maintain continuous 24-hour per day, 7 day per week pumping system operation shall be provided.

Contractor shall be required to install by-pass piping within Town rights-of-way. Contractor shall coordinate with the Engineer and Town for the location of bypass pump piping during project. Road ramps for bypass pumping pipe can be used when requested by the Contractor. Piping can also be buried. Contractor shall not block cross streets, driveways, or intersections with piping installed above grade unless road ramp usage has been approved. Piping shall be installed in the roadway shoulder when possible. Contractor will be responsible for all restoration of driveways, sidewalks, and ADA/AAB compliant wheelchair ramps and driveway aprons.

Contractor shall provide field testing and inspections as required to demonstrate 24 hours of continuous operation and the ability of the pumps to automatically start and stop in response to changing flow conditions.

5. CIPP Installation:

Summary:

A summary of the work Contractor shall perform and requirements of the work as part of the Cured In Place Pipe Lining is as follows:

1. Contractor shall furnish all labor, materials, equipment and incidentals required to install and test the cured-in-place pipe (CIPP) lining and appurtenances complete as

shown on the Drawings, and as specified in this Provision and Contract, including, but not limited to services necessary for traffic control, bypass pumping and/or diversion of sewage flows, cleaning and television inspection of sewers to be lined, liner installation, reinstatement of service connections, quality control, providing samples for performance of required material tests, final television inspection, testing of lined pipe system and warranty work, all as specified herein.

2. Contractor shall perform an initial inspection to determine that sewer line does not have any obstructions prevent the pipe from being lined. Contractor will perform a pre-rehabilitation inspection prior to CIPP installation and after all rehabilitation efforts to enable CIPP liner to be installed. Lastly, Contractor will perform a post rehabilitation inspection after CIPP liner is installed per this Provision.
3. Contractor shall remove obstructions and protruding service connections to complete the CIPP rehabilitation. Removal of all pipeline obstructions and protruding service connections required for sewer rehabilitation using cured-in-place pipe lining shall be completed prior to the CCTV inspection performed right before CIPP is installed.
4. Neither the CIPP system, nor its installation, shall cause adverse effects to any of the Owner's processes or facilities. The use of the product shall not result in the formation or production of any detrimental compounds or by-products in the system or at the wastewater treatment plant. Contractor shall notify the Owner and identify any by-products produced as a result of the installation operations, test and monitor the levels, and comply with any and all local waste discharge requirements. Contractor shall clean up, restore existing surface conditions and structures, and repair any of the CIPP system determined to be defective, and conduct installation operations and schedule cleanup in a manner to minimize inconvenience to traffic, pedestrians, businesses, and property Owners or tenants.
5. Contractor shall not change any material, design values or procedural matters stated or approved herein, without informing the Owner/Engineer and receiving written approval of the change. Such changes constitute a breach of contract and shall result in rejection and removal of work performed with the unapproved materials or processes at no cost to the Owner.
6. Maintenance and Protection of Traffic, confined space entry, and work site protection shall be the responsibility of the Contractor. Notify Police, Fire, Ambulance agencies, and residents/businesses in advance of any and all road closures. Comply with applicable OSHA trench safety rules and confined space and sewer system entry.
7. After CIPP lining is complete, all active service connections shall be tested and lined.

Delivery, Storage, and Handling

All materials shall be shipped, stored and handled in accordance with Sections 1.06.03 "Facilities Construction – Storage" and 1.06.05 "Facilities Construction – Shipping Material" in Form 819. In addition, contractor shall comply with the following for the storage, handling and shipping of materials:

1. Ship and handle CIPP liner in a manner to avoid damaging. CIPP liner damaged beyond repair in shipment shall be replaced as directed by Owner/Engineer.

2. Any CIPP liner showing a visible split, tear, or defect, shall be repaired per manufacturer's recommendations and to the satisfaction of the Engineer or, if not possible, shall be removed at once from the project site.
3. While stored, CIPP shall be adequately supported and protected in a manner as recommended by manufacturer.
4. CIPP liner shall be maintained at a proper temperature in refrigerated facilities to prevent premature curing at all times prior to installation. CIPP liner shall be protected from UV light. CIPP liner showing evidence of premature curing will be rejected for use and shall be immediately removed from the site.

Preparation

1. Examine Owner's CCTV video of each pipe segment before starting work, if CCTV is available.
2. Notify all property owners or businesses that discharge sewage directly to sewer being lined and whose service lateral will be affected by lining work, that their service will be temporarily interrupted during installation of CIPP liner.
 - a. Deliver written notification to each such resident or business with a week in advance followed by a 24 hour in advance, giving the date, start time and estimated completion time for the work being conducted, and any restrictions on use of sewage system facilities including exact days and hours when sewer system cannot be used. Method of notification, and the text included in the notification, shall be approved by Owner.
3. Clean each length of pipe to be lined and dispose of all resulting residual material offsite in a manner acceptable to Owner/Engineer and as specified in this Provision.
4. Conduct a pre-rehabilitation CCTV inspection of all sewers to be rehabilitated by CIPP lining methods in accordance with the requirements related to CCTV work included in this Provision. Inspection shall be for purpose of identifying defects in pipe, to document location of all service lateral connections. The Contractor's project manager and/or superintendent shall review the pre-rehabilitation inspection videos to confirm the quality of the videos, locations of lateral connections; only after the Contractor has confirmed that the quality of the videos is adequate for a clear review of pipeline, shall be submitted to the Engineer. If an Inspector or Engineer is on site or immediately available, Contractor shall allow the Inspector or Engineer to view the pre-installation video to verify the pipe is ready for CIPP installation which includes proper cleaning, trimming protruding taps and mitigating and significant infiltration.
5. If the data is available, Owner/Engineer shall provide Contractor information on location of known active laterals and cleanouts; however, this list may not be interpreted as all-inclusive. Contractor shall be responsible for verifying active customer service connection prior to rehabilitation including performing dye testing. Contractor shall compare service connections from CCTV video and compare with above ground measurements at approximate location of center of each house or building. Any discrepancies between CCTV data and above ground measurements of laterals shall be brought to attention of Owner/Engineer for a determination of lateral reinstatements. If Contractor discovers an error or addition to the list provided,

Contractor shall immediately notify Engineer for additional investigation. Upon completion of rehabilitation work, a list of all service laterals abandoned or reconnected as part of the work shall be submitted to Owner. Compiled list can be in the form of post-inspection installation inspection logs and shall include the following information:

- a. Location of each service lateral based on CCTV inspection logs. Location shall include both accurate distances measured from centerline of starting manhole as well as a notation (by clock-reference) of where on circumference of pipe, the service lateral connects.
- b. Status (Active or Inactive).
- c. Address of each customer and associated active lateral location.
6. During pre-rehabilitation CCTV inspection and prior to installation of CIPP lining, internally cut or grind down flush with pipe wall all service lateral connections protruding into main line by 1/2 inch (12.7 mm) or more, with a robotic cutter specifically designed for this purpose. Internal cutter shall be capable of cutting unreinforced concrete pipe (CP), cast iron pipe, PVC, vitrified clay pipe (VCP), AC pipe, ductile iron pipe, and Orangeburg pipe. All materials / cuttings shall be removed from sewer and properly disposed of.
7. Stop infiltration runners or gushers as defined by NASSCO PACP that are observed during the pre-rehabilitation CCTV by injecting a chemical hydrophilic grouting using a remote packer, unless otherwise approved by the Engineer. If the pipe is larger than 36", man-entry with hand-applied fast-setting epoxy can be performed to stop the infiltration.
8. Ensure the maximum amount of time any home or business shall be without sanitary sewer service is 4 hours and not between 6:00 PM and 8:00 AM. Any service out longer than 10 hours shall be bypassed to a sanitary sewer at no cost to Owner. Contractor shall also bypass any service that has been identified and approved by Engineer.
9. Provide bypass pumping of sewage flows in accordance with the requirements for bypass pumping as outline in this Provision. Service connection effluent may be plugged only after proper notification to affected residence and may not remain plugged overnight. Installation of liner shall not begin until Contractor has installed required plugs or a sewage by-pass system and all pumping facilities have been installed and tested under full operating conditions including bypass of mainline and side sewer flows. Once lining process has begun, existing sewage flows shall be maintained, until resin/felt tube composite is fully cured, cooled down, fully televised and CIPP ends finished.
10. Ensure wastewater flows from existing sewers will not enter the new or rehabilitated facilities until the new or rehabilitated facilities have been cleaned and tested as required in the Contract Documents.
11. Provide CIPP liner in full length of sewer as shown on Contract Drawings. Installation of CIPP liner shall be in complete accordance with applicable provisions of ASTM F 1216 or ASTM F 1743 and manufacturer's recommendations.
12. Install hydrophilic end seals at face of each manhole at all manhole penetrations prior to inverting or pulling in uncured CIPP liner.

- a. Use of caulking, rope or band type of an end seal shall not be allowed.
13. Install epoxy at the end of each lined pipe to cover any piece of existing pipe that are exposed at the manhole wall.

Contractor shall conduct application of resin to felt tubing (wet-out) under factory conditions using vacuum impregnation and materials shall be fully protected against UV light, excessive heat and contamination at all times. If on-site wet out is required, Contractor shall be required to maintain ambient conditions similar to those encountered during factory wet outs.

1. Quantity of resin used for tube impregnation shall be sufficient to fill volume of air voids in tube with additional allowances for polymerization shrinkage and loss of resin through cracks and irregularities in original pipe wall.
2. Contractor shall use serial vacuum impregnation or pressure impregnation process (or equal) to provide maximum resin impregnation throughout the tube.

Liners that are impregnated at the factory and transported to the project site in refrigerated trucks shall be installed no more than two (2) weeks after the date of impregnation at the factory or sooner according to manufacturer's recommendations.

Contractor shall:

1. Determine minimum tube length necessary to effectively span designated run between manholes.
2. Verify lengths in field prior to ordering and prior to impregnation of tube with resin, to ensure that tube will have sufficient length to extend entire length of the run,
 - a. Run shall be defined as the length of the existing host pipe measured from the interior walls of the manholes, and/or from the ends of the pipe when/if the pipe extends into the manholes.
 - b. Contractor shall measure inside diameter and circumference of existing pipelines at face of each manhole in field prior to ordering liner so that liner can be installed in a tight-fitted condition with little or no wrinkling.

Length of CIPP liner shall be as deemed necessary by Contractor to effectively carry out insertion of CIPP liner and sealing of CIPP liner at outlet and inlet manholes.

1. Required diameter and length of each pipe segment shall be measured in advance of wet-out and a list of these measurements shall be submitted to Engineer at least one week prior to installation of each CIPP liner.

Contractor shall ensure correct liner is installed in each sewer reach being rehabilitated.

Installation

CIPP liner shall be installed via inversion using hydrostatic head or air pressure in accordance with ASTM F 1216 or ASTM F 1743 and manufacturer's recommendations or inserted through a manhole by means and methods required by the manufacturer. Hydrostatic head and/or steam pressure used during installation process shall be sufficient to hold liner tight to pipe wall; producing dimples at all service connections, and flared ends at two access manholes. Contractor shall closely follow the requirements in the submitted liner field curing

reports, including the minimum inversion pressure, ideal head, maximum hot head and maximum cold head for each installation.

1. Prior to inversion, if applicable, outside and/or inside layer of tube (before inversion/pull-in as applicable) shall be coated with an impermeable, flexible membrane that will contain the resin and facilitate, if applicable, vacuum impregnation and monitoring of resin saturation during the resin impregnation (wet out) procedure.

If CIPP does not fit tightly against original pipe at its termination points, at no additional cost to Owner, the full circumference of CIPP exiting host pipe shall be filled with a resin mixture compatible with CIPP, approved by CIPP manufacturer and Owner/Engineer. There shall be no significant leakage of groundwater between existing pipe and CIPP at manhole connection or service lateral connections. Any leakage shall be removed and/or eliminated by Contractor at no additional cost to Owner. Any infiltration found at manhole and/or service connections shall be eliminated by Contractor at no additional cost to Owner. Any infiltration runners or gushers as defined by NASSCO PACP shall be stopped with chemical hydrophilic grouting as required in Section 330130.73 "Chemical Sealing of Sewer Pipelines."

Contractor shall fit heat source with monitors to accurately gauge temperature of incoming and outgoing water or steam supply. Another such gauge shall be placed between CIPP liner and pipe invert at downstream end to determine temperature during curing process.

Temperature in CIPP during curing process shall be as recommended by resin manufacturer. Length of time for allowing curing process to be completed shall be of duration recommended by manufacturer, during which time Contractor shall maintain required temperature throughout CIPP. Provide a written temperature data chart/curing log to Owner's Representative for review to ensure that curing temperatures for resin meet manufacturer's recommendations.

The full length from manhole to manhole of the installed resin-impregnated flexible felt tube CIPP liner shall be cured using circulating heated water or steam in accordance with ASTM F 1216 and manufacturer's recommendations to affect desired cure throughout length of the tube, extending full length from manhole to manhole(s). Resin shall be cured into a hard impermeable pipe with minimum specified thickness, providing a structurally sound, uniformly smooth interior and tight-fitting liner within existing pipe. Cool-down procedures shall be in accordance with ASTM F 1216 and manufacturer's recommendations. The cool-down shall follow manufacturer's guidelines, be measured digitally to allow inspector to inspect or record, be linear, and be gradual; no super cooled air shall be allowed to be injected. UV cured CIPP shall not be permitted without written approval from Owner/Engineer and after documentation has been reviewed that liner is compatible with all specifications and other related work including any lateral lining systems.

Contractor may install CIPP lining in multiple sewer segments at one time where possible. When installing CIPP lining in multiple sewer segments at one time, the top one-half of CIPP liner in intermediate manhole shall be neatly removed, leaving the invert in place, and void

between CIPP liner and existing channel shall be filled with non-shrink grout. Manhole bench shall be reconstructed as required to provide a smooth transition to new CIPP liner.

All cutting and sealing of CIPP liner at manhole connections shall provide watertight pipe and manhole seals. All cut edges of cured liner shall be thoroughly sealed with same resin as was used in liner. Catalyst or hardener used shall be compatible with resin/catalyst used in liner previously but shall not require an external heat source to begin exothermic reaction (curing). There shall be no leakage of groundwater into manhole between CIPP liner and existing sewer pipe and between existing sewer pipe and manhole wall.

If cool-down is to be accomplished by introduction of cool water into an inversion standpipe to replace water being drained from a small hole made in downstream end, the hardened liner shall be cooled down to a temperature below 100 degree F (38 degrees C), or ambient temperature, whichever is smaller, before relieving static head in inversion standpipe. Take measures to ensure that, in release of static head, a vacuum will not be produced that could damage the newly installed CIPP liner.

Contractor shall incorporate mitigation measures to control styrene odors during installation and curing of the liner, as specified earlier. If any styrene odor complaints occur on the jobsite, the Contractor shall have additional means and methods to immediately mitigate the issue.

Contractor shall vent and/or exhaust noxious fumes or odors generated during and remaining after curing process is completed. This process shall remain in place at all manholes, laterals, etc., until noxious odors have dissipated to an acceptable level in accordance with OSHA requirements for materials used and there is no more air pollution or potential health hazard left to general public or construction workers.

Water used for the purpose of pipe curing may be discharged downstream subject to WPCA requirements for discharge water.

Contractor shall provide piping, pumps, valves, and other equipment to discharge curing water.

After the installation of the 20% of the total linear feet of CIPP lining, no additional CIPP lining shall be installed until acceptance testing demonstrates that the product meets all thickness and strength properties specified herein. Once the Engineer has reviewed and approved the test results, the remainder of the lining installation may resume.

Reinstatement of Service Connections

After new CIPP has been cured and completely cooled down, if applicable, Contractor shall reconnect existing service laterals as designated by pre-installation television inspection report generated by Contractor. This shall be done without excavation but from interior of pipeline by means of a television camera and a remote cutting device that reestablishes

service connection to not less than 95 percent or better of original diameter and to a maximum of 100 percent of original diameter; overcut connections are not acceptable. All openings shall be clean and neatly cut and the cut shall be buffed with a wire brush to remove rough edges and provide a smooth finish. Bottom of openings shall be flush with bottom of lateral pipe and shall have smooth edges with no protruding material capable of hindering flow or catching debris. All service lateral connections shall be lined per Special Provision Item No. 1404534A "Lateral Service Reconnection."

Coupons shall be removed from laterals by any means possible including entering homes to flush the material via access from cleanout. Removed coupons should be captured at downstream manhole.

Excess resin that builds up and hardens in and around the lateral connections(s) shall be removed and/or ground down prior to acceptance of the re-instatement. Contractor will be required to supply an extended lateral cutter bit to reach resin buildup beyond standard length bits.

Inactive service laterals not identified on the Contract Drawings shall be abandoned by not reopening the service connection after installation of the cured-in-place pipe liner. If necessary, because of uncertainty of matching each tap in the sewer with each property, the Contractor shall dye test to verify if a service connection is active at the direction of the Engineer.

Service laterals that were determined to be inactive during CCTV inspection shall be abandoned by not reopening service connection after installation of cured-in-place pipe liner. All lateral connections shall be identified as repaired or abandoned in post rehabilitation CCTV. Contractor shall provide image files for all lateral locations along a given pipe segment. Contractor shall provide image file at location of lateral even if lateral connection has been abandoned.

Abandoned/capped service connections shall not be opened except at Engineer's direction. If an abandoned service connection is opened without Owner/Engineer's approval, Contractor shall perform an internal spot repair to close connection, at no additional cost to the Owner.

Contractor shall provide a fully operational backup device for reinstating service laterals. If there is any doubt about live vs. dead service based upon above property comparison with pipe connections, then verify with dye testing. If for any reason remote cutting device fails during reinstatement of a service lateral. Immediately deploy standby device to complete reinstatement. Backup equipment shall be onsite throughout reinstatement process.

All existing break-in and/or hammer-tap (break-in) laterals shall be lined as described in this Provision to provide a watertight connection between the lateral and the lined pipe. Contractor shall submit a method for lining of each lateral.

Field Testing and Acceptance

Field acceptance of CIPP lining shall be based on Owner's and Engineer's evaluation of installation, including a review of the CIPP liner curing data, review of post-rehabilitation CCTV inspection data, and review of certified test data for installed CIPP liner, including air testing. All CIPP sample testing, and repairs to installed CIPP as applicable, shall be completed before final acceptance, meeting requirements of these specifications and documented in written form.

For every 1,000 linear feet of CIPP liner installed for the first 5,000 linear feet, contractor shall perform sampling and testing to determine the installed CIPP liner flexural properties and CIPP liner thickness. After the test results have been collected and all have passed the minimum standards per the specification, the Owner may require collecting random samples for testing. Frequency of testing may be reduced as approved by Owner/Engineer after sufficient tests are performed to verify CIPP liner design, production and installation procedures. Likewise, frequency of testing may be increased by Engineer and performed by Contractor at no additional cost to Owner when required tests show that installed CIPP liner does not meet specifications. If a test is not passed, Contractor shall re-evaluate liner thickness design to determine if installed physical properties meet minimum design requirements; if it does not, liner shall be replaced or relined with approval from Engineer at no additional cost to Owner.

Sampling and testing of the installed CIPP liner shall conform to ASTM F 1216 and the following requirements:

1. Remove one restrained sample of installed CIPP liner at least 18 inches (457 mm) in length. Sample shall be captured by installing CIPP liner through a section of PVC pipe (same diameter as existing sewer diameter) within the most downstream manhole of installation and at all intermediate manholes if multiple sewer segments are lined at same time. Contractor may elect to cut the sample longitudinally and provide 1/2 the sample to Owner's representative or inspector for direct shipping to laboratory and keep other half of sample for additional testing if necessary.
2. CIPP liner thickness shall be measured in accordance with ASTM D 5813. Flexural properties shall be determined in accordance with ASTM D 790. Contractor shall label and date all samples and provide to inspector or Owner's representative same day of installation for shipping to independent testing laboratory. Engineer shall be copied on all transmittals to independent testing laboratory. Testing results shall be submitted to Engineer or Owner within 30 days after installation of CIPP liner or payment will be withheld.
3. After recalculations performed in accordance with Paragraph 3.4, B above, any CIPP lining that does not meet new calculated thickness requirements shall be corrected by Contractor in a manner approved by Engineer at no additional cost to Owner. Owner's decision on how to correct deficient CIPP liner installations shall be final. Options for correcting deficient CIPP liner installations that will be considered by Owner include the following: removal of existing CIPP liner and re-lining the sewer,

open-cut replacement of sewer from manhole to manhole, re-lining sewer with existing CIPP liner in place.

Contractor shall perform a post-rehabilitation CCTV inspection of all sewers rehabilitated using CIPP lining methods in accordance with CCTV procedures outlined in this provision. Post-rehabilitation CCTV inspection shall be performed following installation of CIPP liner and reinstatement of all active service laterals. The Contractor's project manager and/or superintendent shall review the post-rehabilitation inspection videos to confirm the quality of the videos and of the installed CIPP; only after the Contractor has confirmed that the video is of good quality, the videos shall be submitted to the Owner. If it is determined that any repairs are needed at any segment, a new CCTV inspection shall be performed of the entire segment(s) after the repairs have been completed.

1. In the event that an installation is rejected based on review of the post-rehabilitation CCTV inspection, repair the sewer segment to the satisfaction of the Owner/Engineer at no additional cost to the Owner.

A visual inspection of the liner will be considered acceptable if liner shows no significant, wrinkles, lifts, ridges, splits, cracks, delaminations, flats, dry spots, pinholes, shrinkage, foreign inclusions, crazing, reverse curvatures, or other type of defects in the CIPP lining. Significant defects shall be defined as those listed in the Quality Assurance section of this specification; and/or any defect that may create a maintenance issue in future such as inhibiting CCTV cameras or allowing solids to get caught on defect, and/or any defect that appears to reduce long-term structural strength or stability of pipeline. Longitudinal wrinkles/fins in height up to a maximum of five percent of inside diameter of host pipe or 1 inch (25.4 mm), whichever is smaller, may be acceptable and shall be evaluated by Engineer for acceptance on a case-by-case basis. Defective lining shall be repaired or replaced at no additional cost to Owner. If during removal process, the pipe is damaged, Contractor shall perform a point repair at Contractor's own expense.

Contractor shall submit a digital CCTV of post-lined sewer within seven business days for each pipe segment. Engineer shall review and approve payment based upon satisfactory completion of a liner that is free of significant defects as defined in this Provision.

1. Removal of wrinkles or fins deemed significant at the discretion of the Owner, shall be removed using a milling head, relined or replaced by the Contractor as directed by the Owner at no additional cost. There shall be no evidence of other major defects in the CIPP lining.
2. Longitudinal shrinkage of the CIPP liner's length, of more than 3 inches (76.2 mm) from the face of the manhole shall be repaired with a fiberglass reinforced CIPP spot repair per as specified above at no cost to the Owner.
3. Circular shrinkage shall be measured by the Contractor via man entry to try to insert a 1/16 inch (1.59 mm) thick ruler or similar into any gap more than 8 inches (203 mm) past the MH wall. Document these measurements with digital photos that shall be submitted to the Owner/Engineer for approval. Circular shrinkage shall be repaired per manufacturer recommendations at no cost to the Owner.

The CIPP liner shall be watertight. Groundwater infiltration through the wall of the liner shall be zero.

All service connections shall be opened to a minimum of 95 percent and a maximum of 100 percent of opening so that a new lateral or lateral lining can be installed properly. Any overcuts more than 105 percent shall be repaired with hydrophilic topseal hat connection, CIPP liner or other approved method by Engineer.

All coupons and excess resin shall be removed from reinstated service laterals prior to acceptance of CIPP lining.

All pipe-to-manhole connections shall be watertight and free of infiltration.

Wrinkles in flow stream, blisters that may affect the longevity of CIPP liner, dry spots where liner tube has no resin saturation, or other defects that may affect the integrity or strength of the CIPP or the flow capacity of the pipe, are unacceptable.

After all installations are complete, inspected, post-construction CCTV has been reviewed and approved by the Owner/Engineer, and all work is satisfactory to Owner/Engineer, Contractor shall cut and trim the new liner at each manhole wall. Contractor shall seal liner to manhole wall with a sealant material per materials section of this Provision and the materials and construction methods in Special Provision Item No. 140453A "Lateral Service Reconnections".

Contractor shall remove and repair all defects in a manner that is satisfactory to the Owner/Engineer. Defects include but are not limited to the following:

1. Leakage through the liner or between liner and pipe.
2. Reduction of liner thickness of more than ten percent (10%) of the thickness designed and/or required. Final liner thickness shall be delivered by Contractor based on installed product physical properties and as specified in Contract requirements.
3. Separation of liner from host pipe where an annular space is clearly noticed, shrinkages (longitudinal and/or circumferential), dry spots, delamination of liner, cured lifts, dry spots, bulges due to external loading, reverse curvatures, splits, cracks, lifts, breaks, folds, major wrinkles (as defined further herein), flats, pinholes, crazing and any other defects that in the CIPP lining will compromise the longevity of the installed product.
4. Circumferential defects (wrinkle, fin, bulge, etc.) in the invert of pipe between 4:00 and 8:00 o'clock shall not exceed three percent of the host pipe diameter or 1/2-inches by visual measurement, whichever is smaller, at the discretion of the Owner.
5. Longitudinal wrinkles or fins shall not exceed maximum allowable height of five percent of equivalent host pipe diameter or 1-inch, whichever is smaller.
6. Structural strength below the required limits

Warranty:

The warranty period for CIPP lining placed shall be two (2) years from date of Substantial Completion. During this period, serious defects discovered in CIPP lining, as determined by Engineer and which may materially affect the integrity, strength, function and/or operation of pipe, shall be removed and replaced as recommended by the manufacturer in a satisfactory manner.

Owner may conduct an independent CCTV inspection, at its own expense, of CIPP lining work prior to completion of warranty period. Defects replaced at that time shall be fully warranted by Contractor and manufacturer for a period of two years from date the defect was repaired.

Method of Measurement: Cured-In-Place sewer pipe lining will be measured for payment by the actual number of linear feet of lining completed, accepted and measured in place along the invert from center of manhole to center of manhole. Bypass pumping, sewer cleaning, and CCTV inspections included as required to perform Cured-In-Place sewer pipe lining shall not be measured for payment separately and are included in the price to CIPP.

Basis of Payment: Payment for this work will be made at the Contract unit price per linear foot for "Cured In Place Pipe Lining 8" (Sanitary Sewer)", complete and accepted in place, which price shall include designing, furnishing, testing and installing all materials such as CIPP liner, resins, seals, and necessary hardware, and equipment and tools and labor incidental thereto. The price shall include necessary pre and post CCTV inspections and required cleaning and bypass pumping as outlined in the Contract.

Pay Item	Pay Unit
Cured In Place Pipe Lining 8" (Sanitary Sewer)	1.f.

ITEM #1403501A – RESET MANHOLE (SANITARY SEWER)

Description: The work under this item shall consist of resetting sanitary sewer manholes to final grade, as shown on the plans or as directed by the Engineer. It shall also include the legal, off-site disposal of existing sanitary appurtenances and all surplus material. All work and materials shall be in accordance with the Town of Putnam Water Pollution Control Authority (WPCA) standards and the Standard Specifications, and to the satisfaction of the Engineer.

Materials: Mortar, masonry units, grade rings, new frames and covers, resurfacing materials, any additional fill required and all other appurtenances shall comply with the WPCA standards and the Standard Specifications. Backfill materials within the proposed pavement section shall be in accordance with applicable roadway pavement details.

Construction Methods: For resetting of manholes, the Contractor shall carefully excavate around the manhole, remove the frame, cover, and any risers or sections as necessary, adjust the grade with masonry units, grade rings, precast concrete sections, and mortar as necessary, reinstall frame and cover to final grade and refill the excavation. If the existing frame and grate are not acceptable because of their poor condition, as determined by the Engineer, the Contractor shall install a new frame and cover.

Care shall be taken to prevent material from falling inside the manhole. Any debris or material which falls inside the manhole shall be removed by the Contractor. The excavated area around the manhole shall be filled with gravel or processed aggregate to conform to the plans and specifications, graded, compacted and prepared for paving.

Any damage done to sanitary sewer facilities by the Contractor shall be repaired or replaced by the Contractor at no extra cost to the project, the WPCA, or the State.

All work performed shall be in accordance with WPCA standards and the Standard Specifications, and to the satisfaction of the Engineer.

Method of Measurement: This work will be measured for payment and paid for by the actual number of each sanitary manhole reset, “Reset Manhole (Sanitary Sewer)”, completed and accepted by the Engineer.

Basis of Payment: The unit price bid per each “Reset Manhole (Sanitary Sewer)” shall include sawcutting, pavement removal, any additional fill materials required, grading, compaction, mortar, masonry units, grade rings, new frames and covers, and all materials, equipment, tools and labor incidental thereto.

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.

Pay Items	Pay Unit
Reset Manhole (Sanitary Sewer)	ea.

ITEM #1404534A – LATERAL SERVICE RECONNECTIONS

Description: This work shall consist of the inspection, testing, and rehabilitation of sewer lateral service connections on sewer lines that are called out for cured-in-place-pipe lining as shown on the Drawings. The work shall include the furnishing of all labor, materials, equipment, and incidentals required to perform this work, and shall include the performing of CCTV inspections and sewer cleaning prior to as required.

Summary:

- A. It is the intent of this specification to provide for the rehabilitation of service lateral connections (SLC) to rehabilitated (CIPP lined) without excavation, by installation of a resin-impregnated, flexible liner in the form of an internal sleeve, consisting of a full-wrap in the main and extending a minimum of 24-in up the lateral. Furnish all labor, materials, equipment and incidentals required to install and test the service lateral connection liner and appurtenances complete as shown on the Drawings and as specified herein.
- B. All SLC work will be performed on mainline sewers that have recently been lined with a CIPP product. Service laterals will have been reinstated and protruding taps removed to within 1/8 inch of the mainline sewer wall.
- C. Service lateral connections may be a combination of tee's, wyes or break-in taps of varying sizes (4"-6"). The length of the SLC liner in each lateral will be dependent upon the configuration of the individual lateral. If the configuration of the lateral does not limit the length of the liner, the liner shall extend a minimum of 24 inches into the lateral. The minimum length of the liner for each lateral will be determined from observation of the SLC during CCTV inspection, and in all cases shall extend beyond the first joint in the service lateral.
- D. In some instances, two (or more) services that require lateral lining could be next to or across from each other. In this case, only one of the lateral liners can be a full-wrap style. The other lateral liner(s) must be a brim style. If laterals are close enough such that overlapping of the liners partially blocks the service opening, a lateral reinstater must be used to cut the liners and ensure the connection is fully open.
- E. There will be no access to the service pipe from an upstream cleanout on or off private property. All work must take-place from the mainline sewer.

Materials:

- A. The SLC liner shall be a resin-impregnated, one-piece flexible polyester felt, non-woven textile tube, needle punched felt, circular knit or circular braid or equivalent material tube which is cured -in-place by an acceptable curing method. The synthetic resin shall be suitable for the design conditions as well as the curing process. The SLC

liner shall provide a service life of 50 years and shall have the minimum structural properties listed below.

<u>Mechanical Property</u>	<u>Minimum Standard</u>	
	<u>Polyester Resin</u>	<u>Vinylester/Epoxy</u>
Flexural Strength (ASTM D790)	4,500 psi	5,000 psi
Flexural Modulus of Elasticity (ASTM D790)	250,000 psi	400,000 psi

B. The SLC liner shall be designed, fabricated, and installed for the actual conditions encountered for this application including the material of the host pipe, in accordance with the applicable provisions of ASTM F1216, and shall meet the following minimum design conditions:

1. AASHTO H-20 live load with two trucks passing.
2. Soil Weight 120 pounds per cubic foot. Coefficient of friction $K_u = 0.130$.
3. Estimated maximum groundwater level at ground surface.
4. Fully deteriorated pipe with 2 percent (min.) ovality. If ovality of existing pipe is found to be worse, use actual percent up to 5 percent (max.).
5. Soil Modulus 1,000 psi.
6. Factor of Safety = 2
7. Soil Depth: Depth of Cover will be determined by field measurements.

C. The SLC liner shall be designed to withstand all imposed loads, including live loads and, if applicable, hydrostatic pressure. The SLC liner shall have sufficient wall thickness to withstand all anticipated external pressures and loads that may be imposed after installation. The design shall be performed and certified by a professional engineer licensed by the State of Connecticut.

D. The SLC liner shall be manufactured and installed by: DrainLCR by Epros, T-Liner Shorty by LMK, Service Connection Seal + Lateral by BLD Services, or approved equal. SLC liners cured by UV light will not be accepted for this project.

E. The SLC liner product shall extend from the mainline into the lateral connection in a continuous tight fitting, watertight pipe-within-a-pipe to eliminate any visible ground water leakage and future root growth at the lateral to mainline connection. The SLC liner product system shall be compatible with the mainline and/or lateral pipe or liner. The portion of the liner within the mainline pipe must be a full-wrap or circumferential style.

F. The finished SLC liner product, when cured, shall form a tight fitting, hard, impermeable liner which is chemically resistant to domestic sewage over the expected

lifetime of the rehabilitated pipe. The liner material and resin shall be completely compatible.

G. The insert must use a hydrophilic waterstop component or an adhesive sealant to form a sealing bond between the SLC lining product and the host lateral and mainline pipe walls. The insert shall be continuous over the entire length of the rehabilitated sewer service lateral (minimum 24") and a minimum of 16" of the mainline pipe (5" on either side of a 6" lateral or 6" on either side of a 4" lateral connection).

Resin

A. The resin system shall meet the requirements of ASTM F1216, Section 5.2 and/or ASTM D5813, Section 8.2.2. The resin installed SLC liner system shall produce an SLC liner that will comply with the structural requirements specified herein and shall provide chemical resistance for the flow media in the gravity pipe. The resin shall be compatible with the rehabilitation process, shall be able to cure in the presence or absence of water, and shall have an initiation temperature for cure as recommended by the resin manufacturer. Unless otherwise specified, provide a general purpose or enhanced strength unsaturated, thermosetting, polyester, vinylester, or epoxy or silicate resin and a catalyst system compatible with the installation process.

B. Submit documentation from the resin manufacturer specifically describing the chemical characteristics of the resin system, including allowable mixing, impregnation, and handling time, transportation and storage time, and recommended curing cycle including temperatures, pressures, and times. The resin manufacturer's documentation must also include maximum allowable time for handling the impregnated tube prior to insertion and the maximum allowable elapsed time from insertion to exotherm. If remedial measures are available to extend either of the maximum allowable times indicated above, without affecting the physical properties of the resin, the resin manufacturer should describe these measures and the time limits beyond which even these measures will not prevent alteration of the physical properties of the resin.

System Description

A. The SLC liner shall be a seamless, one-piece product affixed to the walls of the lateral pipe and at the junction between the pipe and main sewer, or a one piece, tight fitting, corrosion resistant and verifiable non-leaking, cured-in place pipe with hydrophilic water stop component to form a sealing bond between the Service Lateral Connection Lining product, the host lateral, and mainline pipe walls. The mainline portion of the lateral lining system that connects to the main/lateral interface shall be a full-wrap. In all cases, the junction between the full wrap and the lateral sleeve must be watertight. The wall thickness shall be uniform. The carrier packer shall be specifically designed for 4-inch to 6-inch diameter services connections. It shall be manufactured to conform to either a wye, tee or break-in type connection. The mainline portion of the carrier

packer will accommodate 8-in and 10-in pipe diameters. A corrosion resistant resin compatible with the installation process shall be used.

Construction Methods:

A. Submittals

1. Shop drawings and schedules of all SLC liner and appurtenances required. Design data and specification data sheets listing all parameters used in the liner design and thickness calculations based on ASTM F1216, Appendix XI for fully deteriorated pipe.
2. Thickness Calculations. Liner Thickness calculations shall be performed by a professional engineer in the State of Connecticut and submitted to the Engineer with supporting assumptions. Calculations shall be done after cleaning, televising, and other field inspections have been accomplished. Perform separate calculations for each of the following depth ranges: one range from 0-10 feet and separate ranges for each depth greater than 10 feet in one-foot increments. Identify the manufacturer's recommended design parameter used in calculations. The finished liner shall have a minimum thickness of 2 mm for 4-inch laterals and 3 mm for 6-inch laterals.
3. Detailed procedure for installing the SLC liner.
4. The name of the SLC liner manufacturer and the location of the facility where the SLC liner was manufactured.
5. Material Certifications. Written certification is required from the manufacturer that all materials used in the work were manufactured and tested in accordance with the appropriate ASTM specification and are being used or installed in conformance with the manufacturer's recommendations.
6. Resident Notifications. The Contractor shall submit a copy of the initial resident notification as described in Special Provisions Item No. 1400201A "Cured In Place Pipe Lining 8" (Sanitary Sewer).
7. Storage and Delivery Procedures. The Contractor shall provide the liner manufacturer's recommended storage and delivery procedures. This shall include storage and delivery temperatures, maximum time from wet-out to installation, and other pertinent information.
8. Material Safety Data Sheets. The Contractor shall submit Material Safety Data Sheets (MSDS) for each component of the SLC liner system.
9. Curing Cycle and Cooling Rate. The Contractor shall submit the resin manufacturer's recommended curing cycle as well as the recommended cooling rate. The Contractor shall submit a copy of the cure logs for each lateral installation.

B. **CCTV Inspection:** CCTV inspection required prior to performing of this work shall also be performed in accordance with Special Provision Item No. 1400201A "Cured In Place Pipe Lining 8" (Sanitary Sewer)", as well as the requirements in this Provision.

- C. **Cleaning of Sewers:** Cleaning of sewers as required to perform work in this section shall be in accordance with Special Provision Item No. 1400201A "Cured In Place Pipe Lining 8" (Sanitary Sewer)."
- D. **Bypass Pumping:** Bypass pumping, if required to perform work in this section shall be in accordance with the Special Provision Item No. 1400201A "Cured In Place Pipe Lining 8" (Sanitary Sewer)."
- E. **Line Preparation:** Prior to installing the SLC liner product, the area around the lateral sealing surface in both the main and lateral shall be inspected in accordance with Special Provision Item No. 1400201A "Cured In Place Pipe Lining 8" (Sanitary Sewer)."

Quality Assurance

- A. The purpose of the SLC liner is to provide for a permanent seal of the annular space of a lined sewer pipe after service lateral re-instatement, to lock the liner in place with the service connection, to provide a seal of the first joint or joints in the service lateral, and to provide for the repair of a tapped service in a lined sewer pipe.
- B. The Contractor performing the SLC lining work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner. See Special Provision Item No. 1400201A "Cured In Place Pipe Lining 8" (Sanitary Sewer)."
- C. The Contractor shall also be capable of providing crews as needed to complete the work without undue delay and within the contract time allotted.
- D. The Owner shall approve or disapprove the Contractor and/or manufacturer based on the submitted information and a follow up interview.
- E. The SLC liner shall be provided by a single manufacturer. The supplier shall be responsible for the provision of all test requirements specified herein as applicable.
- F. Inspection of the SLC liner may also be made by the Engineer or other representative of the Owner after delivery. The SLC liner shall be subject to rejection at any time on account of failure to meet any of the requirements specified, even though sample liner may have been accepted as satisfactory at the place of manufacture. Liner rejected after delivery shall be marked for identification and shall be removed from the job site at once.
- G. Final Installed Liner Thickness. The final installed liner thickness shall not be less than, nor more than ten (10) percent greater than, the required thickness specified in the Contract Documents. The final installed liner thickness measurement shall be determined from liner samples, coupons retrieved from the sewer, or as deemed necessary by the Engineer. It shall be the Contractor's responsibility to consider site conditions and their installation process to determine the liner thickness to install.

H. Any liner installation not meeting specified strengths shall have the defective sections of liner removed and replaced with a product acceptable to the Owner at the total expense of the contractor. The re-inspection requirements as listed above shall apply to this re-installed section of line.

Installation

- A. The SLC liner shall be vacuum-impregnated with resin (wet-out) under controlled conditions. The volume of resin used shall be sufficient to fill all voids in the textile lining material at nominal thickness and diameter. The volume shall be adjusted by adding 5% to 10% excess resin for the change in resin volume due to polymerization and to allow for any migration of resin into the cracks and joints in the original pipe. No dry or unsaturated area in the mainline sheet or lateral tube shall be acceptable upon visual inspection.
- B. The SLC liner product shall be loaded on the applicator apparatus, attached to a robotic manipulator device and positioned in the mainline pipe at the service connection that is to be rehabilitated. The robotic device, together with a television camera, will be used to align the repair product with the service connection opening. The inserted product will then be inspected using a TV camera to confirm the SLC liner product is correctly positioned and/or centered in the lateral opening prior to curing. The insertion pressure will be adjusted to fully deploy the SLC liner product into the lateral connection and hold the SLC product tight to the main and lateral pipe walls.
- C. The pressure apparatus shall include a bladder of sufficient length in both the main and lateral lines such that the inflated bladder extends beyond the ends of both the lateral tube and main line tube of the SLC liner product, pressing the end edges flat against the internal pipe wall, thus forming a smooth transition from SLC liner product to pipe diameters without a step, ridge or gap between the SLC product and the inner diameters of the lateral and mainline pipes.
- D. For SLC liners with hydrophilic gaskets, the main bladder shall be wrapped around the "T" launching device and held firmly by placing two (2) hydrophilic gaskets around the main liner with an additional gasket positioned at the terminal end of the liner that extends into the lateral. For system utilizing hydrophilic paste of adhesive sealant, a 2-inch-wide band is applied to the main/lateral interface as well as at the terminal end of the liner that extends into the lateral. The liner shall be inflated causing the main sheet to unwrap and expand, embedding the hydrophilic O-rings or paste between the main liner and the main pipe as the main liner is pressed tight against the main pipe.
- E. After insertion is completed, recommended pressure must be maintained on the impregnated SLC liner product, pressing the liner firmly against the inner pipe wall for the duration of the curing process. The liner is chemically cured at ambient temperatures or by a suitable heat source. In no instance will sewage be used to invert or cure liners or calibration tubes.

F. The finished SLC liner product shall be free of dry spots, lifts and delamination. The installed SLC product should not inhibit the post installation video inspection, using a closed-circuit television camera, of the mainline and service lateral pipes or future pipe cleaning operations. For SLC liners with a mechanical seal, the CIPP shall taper at each end providing a smooth transition for accommodating video equipment and maintaining proper flow in the mainline. In all cases, the finished product must provide an airtight/watertight verifiable non-leaking connection between the main sewer and sewer service lateral. During the warranty period any defects with the SLC that affect the performance or cleaning of the lateral connection shall be repaired at the contractor's expense in a manner acceptable to the customer.

Field Testing and Acceptance

- A. Field acceptance of the liner shall be based on the Engineer's evaluation of the installation including TV videotapes and a review of certified test data for the installed pipe samples.
- B. Groundwater infiltration of the liner shall be zero.
- C. All service connections shall be open, clear and watertight.
- D. There shall be no evidence of splits, cracks, breaks, lifts, kinks, delaminations or crazing in the liner.
- E. If any defective liner is discovered after it has been installed, it shall be removed and replaced with either a sound liner or a new pipe at no additional cost to the Owner.

Method of Measurement:

Lateral Service Reconstructions will be measured for payment by the actual number of laterals reinstated, accepted and measured in place on sewer lines that are called out for cured-in-place pipe lining as shown on the Drawings. Bypass pumping, CCTV, and sewer cleaning, and all materials, hardware, chemicals, and other appurtenances shall not be measured for payment.

Basis of Payment:

Payment for this work will be made at the Contract unit price per unit for "Lateral Service Reconstructions", complete and accepted in place, which price shall include designing, furnishing, and installing all materials such as chemicals, equipment, tools and other necessary hardware, and labor incidental thereto. The price shall include necessary pre and post CCTV inspections, cleaning, bypass, and testing as outlined in the Contract.

Pay Item
Lateral Service Reconstructions

Pay Unit
ea.

ITEM #1507000A – PROTECTION AND SUPPORT OF EXISTING UTILITIES

Description: Work under this item shall consist of the design, construction, maintenance and removal of temporary protection and temporary support for existing utilities.

Contractors are cautioned that it is their responsibility to verify locations, conditions and field dimensions of all existing features, as actual conditions may differ from information indicated on the plans or contained in these specifications. Utility contacts within the project limits can be found within the special provision “Section 1.07 Legal Relations and Responsibilities”.

Materials: The materials for this work shall be of satisfactory quality for the purpose intended and shall be approved by the Engineer. The material shall be intended for use in structures, trench or excavations and shall be sound and capable of safely carrying the specified loads.

Construction Methods: The Contractor is herein made aware that construction will require the installation of shoring or other lateral support work and will require construction beneath or adjacent to active conduits and duct banks.

The Contractor is advised that no service interruption resulting from their operations will be allowed, except as otherwise provided for in Section 1.05 – Control of the Work or Section 1.08 - Prosecution and Progress. Further attention shall be given to “Section 1.07 – Legal Relations and Responsibilities.”

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

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

Basis of Payment: The work will be paid for at the contract lump sum price for “Protection and Support of Existing Utilities,” which price shall include designing and detailing the temporary supports and furnishing and installing permanent supports, temporary plating or shields, periodic inspection and removing temporary supports and installing permanent supports, and all materials, equipment, tools, and labor incidental thereto.

Pay Item	Pay Unit
Protection and Support of Existing Utilities	l.s.

ITEM #1700001A – SERVICE CONNECTIONS (ESTIMATED COST)

Description: This work shall consist of disconnection, alteration and reconnection of those existing utility services owned by property owners at locations necessary to complete this project and as ordered by the Engineer. This work shall include the coordination with the affected utility companies and customers. Any damage caused by the Contractor or Subcontractors, as determined by the Engineer, shall be corrected by the Contractor in accordance with this specification.

Materials: All materials shall be provided by the Contractor and shall meet the current standards of the affected service.

Construction Methods: The Contractor shall perform all work in coordination with the Utility Company and affected property owner and as directed by the Engineer. Certain work may require use of a licensed and/or certified tradesman when such work is required by local and/or state codes.

Any utility customer's service interruption shall be done in a way that minimizes adverse impacts to the customer and affected utility.

Any work and materials supplied by the utility companies shall be on a billable basis to the Contractor.

Method of Measurement: The work and materials shall be measured for payment as provided for under Article 1.04.05 Extra Work.

The sum of money shown on the estimate and in the itemized proposal as "Estimated Cost" for this work 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 figure will be disregarded and the original price will be used to determine the total amount for the contract.

Corrective work required to repair damage caused by the Contractor or its Subcontractors shall not be measured for payment.

Basis of Payment: This work will be paid as Extra Work.

Pay Item
Service Connections (Estimated Cost)

Pay Unit
est.

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 (Contracts Funded by FHWA and State)**

Construction Contracts - Required Contract Provisions (FHWA and State Funded Contracts)

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- EXHIBIT E - State Wage Rates & Other Related Information (Attached at the end)
- EXHIBIT F - Federal Wage Rates (Attached at the end)

1. Federal Highway Administration (FHWA) Form 1273

The Contractor shall comply with the Federal Highway Administration (FHWA), Form 1273 attached at Exhibit A, as revised, which is hereby made part of this contract. The Contractor shall also require its subcontractors to comply with the FHWA – Form 1273 and include the FHWA – Form 1273 as an attachment to all subcontracts and purchase orders.

2. Title VI of the Civil Rights Act of 1964 / Nondiscrimination Requirements

The Contractor shall comply with Title VI of the Civil Rights Act of 1964 as amended (42 U.S.C. 2000 et seq.), all requirements imposed by the regulations of the United States Department of Transportation (49 CFR Part 21) issued in implementation thereof, and the Title VI Contractor Assurances attached hereto at Exhibit B, all of which are hereby made a part of this Contract.

3. 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.”

4. 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 819), 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.

5. 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.

6. 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.

7. 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).

8. Executive Orders and Other Enactments

- (a) All references in this Contract to any Federal, State, or local law, statute, public or special act, executive order, ordinance, regulation or code (collectively, "Enactments") shall mean Enactments that apply to the Contract at any time during its term, or that may be made applicable to the Contract during its term. This Contract shall always be read and interpreted in accordance with the latest applicable wording and requirements of the Enactments. Unless otherwise provided by Enactments, the Contractor is not relieved of its obligation to perform under this Contract if it chooses to contest the applicability of the Enactments or the Client Agency's authority to require compliance with the Enactments.
- (b) 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 this Contract as if they had been fully set forth in it.
- (c) This Contract may be subject to (1) Executive Order No. 14 of Governor M. Jodi Rell, promulgated April 17, 2006, concerning procurement of cleaning products and services; and (2) Executive Order No. 61 of Governor Dannel P. Malloy promulgated December 13, 2017, concerning the Policy for the Management of State Information Technology Projects, as issued by the Office of Policy and Management, Policy ID IT-SDLC-17-

04. If any of the Executive Orders referenced in this subsection is applicable, it is deemed to be incorporated into and made a part of this Contract as if fully set forth in it.

9. Non-Discrimination Requirement and Certification (pursuant to section 4a-60 and 4a-60a of the Connecticut General Statutes, as revised): References to "minority business enterprises" in this Section are not applicable to Federal-aid projects/contracts. Federal-aid projects/contracts are instead subject to the Federal Disadvantaged Business Enterprise Program.

- (a) For purposes of this Section, the following terms are defined as follows:
 - i. "Commission" means the Commission on Human Rights and Opportunities;
 - ii. "Contract" and "contract" include any extension or modification of the Contract or contract;
 - iii. "Contractor" and "contractor" include any successors or assigns of the Contractor or contractor;
 - iv. "Gender identity or expression" means a person's gender-related identity, appearance or behavior, whether or not that gender-related identity, appearance or behavior is different from that traditionally associated with the person's physiology or assigned sex at birth, which gender-related identity can be shown by providing evidence including, but not limited to, medical history, care or treatment of the gender-related identity, consistent and uniform assertion of the gender-related identity or any other evidence that the gender-related identity is sincerely held, part of a person's core identity or not being asserted for an improper purpose;
 - v. "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations;

- vi. "good faith efforts" includes, but is not limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements;
- vii. "marital status" means being single, married as recognized by the state of Connecticut, widowed, separated or divorced;
- viii. "mental disability" means one or more mental disorders, as defined in the most recent edition of the American Psychiatric Association's "Diagnostic and Statistical Manual of Mental Disorders", or a record of or regarding a person as having one or more such disorders;
- ix. "minority business enterprise" means any small contractor (1) fifty-one per cent or more of the capital stock, if any, or assets of which are owned by a person or persons who (a) exercise operational authority over the daily affairs of the enterprise, (b) have the power to direct the management and policies and receive the beneficial interest of the enterprise, (c) possess managerial and technical competence and experience directly related to the principal business activities of the enterprise, and (d) are members of a minority, as defined in C.G.S. § 32-9n, or are individuals with a disability, or (2) which is a nonprofit corporation in which fifty-one per cent or more of the persons who exercise operational authority over the enterprise, (a) possess managerial and technical competence and experience directly related to the principal business activities of the enterprise, (b) have the power to direct the management and policies of the enterprise, and (c) are member of a minority, as defined in C.G.S. § 32-9n, or are individuals with a disability; and
- x. "public works contract" means any agreement (A) for construction, rehabilitation, conversion, extension, demolition or repair of changes or improvements in real property, and (B) that is financed in whole or in part by the state, including, but not limited to, matching expenditures, grants, loans, insurance or guarantees where such funding equals one hundred fifty thousand dollars or more.

For purposes of this Section, the terms "Contract" and "contract" do not include a contract where each contractor is (1) a political subdivision of the state, including, but not limited to, a municipality, unless the contract is a public works contract, (2) any other state, including but not limited to any federally recognized Indian tribal governments, as defined in C.G.S. § 1-267, (3) the federal government, (4) a foreign government, or (5) an agency of a subdivision, state or government described in the immediately preceding enumerated items (1), (2), (3), or (4).

(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, sexual orientation, gender identity or expression, status as a veteran, status as a victim of domestic violence, status as a victim of sexual assault or status as a victim of trafficking in persons, 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 ensure 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, sexual orientation, status as a veteran, status as a victim of domestic violence, status as a victim of sexual assault or status as a victim of trafficking in persons,

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, 46a-68f and 46a-86; and

(5) the Contractor agrees to provide the Commission 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 or she 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; the timing and value of bids; 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 in every subcontract entered into in order to fulfill any obligation of a public works contract, 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) Pursuant to subsection (c) of section 4a-60 of the Connecticut General Statutes, the Contractor, for itself and its authorized signatory of this Contract, affirms that it understands the obligations of this Section and that it will maintain a policy for the duration of the Contract to assure that the Contract will be performed in compliance with the nondiscrimination requirements of such section. The Contractor and its authorized signatory of this Contract demonstrate their understanding of this obligation by (A) having provided an affirmative response in the required online bid or response to a proposal question which asks if the contractor understands its obligations under such sections, (B) signing this Contract, or (C) initialing this nondiscrimination affirmation in the following box:

10. 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.

11. 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 requestor 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.

12. 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.

13. Substitution of Securities for Retainages on State Contracts and Subcontracts

This Contract is subject to the provisions of Section 3-ll2a of the General Statutes of the State of Connecticut, as revised.

14. 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.

15. 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.

16. Summary of State Ethics Laws

Pursuant to the requirements of section 1-101qq of the Connecticut General Statutes (a) the State has provided to the Contractor the summary of State ethics laws developed by the Office of State Ethics pursuant to section 1-81b of the Connecticut General Statutes, which summary is incorporated by reference into and made a part of this Contract as if the summary had been fully set forth in this Contract; (b) the Contractor represents that the chief executive officer or authorized signatory of the Contract and all key employees of such officer or signatory have read and understood the summary and agree to comply with the provisions of state ethics law; (c) prior to entering into a contract with any subcontractors or consultants, the Contractor shall provide the summary to all subcontractors and consultants and each such contract entered into with a subcontractor or consultant on or after July 1, 2021, shall include a representation that each subcontractor or consultant and the key employees of such subcontractor or consultant have read and understood the summary and agree to comply with the provisions of state ethics law; (d) failure to include such representations in such contracts with subcontractors or consultants shall be cause for termination of the Contract; and (e) each contract with such contractor, subcontractor or consultant shall incorporate such summary by reference as a part of the contract terms.

17. 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.

18. Campaign Contribution Restriction

Campaign Contribution Restriction. For all State contracts, defined in section 9-612 of the Connecticut General Statutes as having a value of \$50,000 or more, or a combination or series of such agreements or contracts having a value of \$100,000 or more in a calendar year, the authorized signatory to this Agreement represents that they have received 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.

19. 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.

20. 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.

21. Consulting Agreement Representation

Pursuant to section 4a-81 of the Connecticut General Statutes, the person signing this Contract on behalf of the Contractor represents, to their best knowledge and belief and subject to the penalty of false statement as provided in section 53a-157b of the Connecticut General Statutes, that the Contractor has not entered into any consulting agreements in connection with this Contract, except for the agreements listed below or in an attachment to this Contract. "Consulting agreement" means any written or oral agreement to retain the services, for a fee, of a consultant for the purposes of

(A) providing counsel to a contractor, vendor, consultant or other entity seeking to conduct, or conducting, business with the State, (B) contacting, whether in writing or orally, any executive, judicial, or administrative office of the State, including any department, institution, bureau, board, commission, authority, official or employee for the purpose of solicitation, dispute resolution, introduction, requests for information, or (C) any other similar activity related to such contracts. "Consulting agreement" does not include any agreements entered into with a consultant who is registered under the provisions of chapter 10 of the Connecticut General Statutes as of the date such contract is executed in accordance with the provisions of section 4a-81 of the Connecticut General Statutes.

Consultant's Name and Title

Name of Firm (if applicable)

Start Date

End Date

Cost

The basic terms of the consulting agreement are: _____

Description of Services Provided: _____
_____Is the consultant a former State employee or former public official? YES NO If YES: _____

Name of Former State Agency

Termination Date of Employment

22. 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.

23. Sovereign Immunity

The parties acknowledge and agree that nothing in the Solicitation or the Contract shall be construed as a modification, compromise or waiver by the State of any rights or defenses of any immunities provided by Federal law or the laws of the State of Connecticut to the State or any of its officers and employees, which they may have had, now have or will have with respect to all matters arising out of the Contract. To the extent that this section conflicts with any other section, this section shall govern.

24. Large State Contract Representation for Contractor

Pursuant to section 4-252 of the Connecticut General Statutes and Acting Governor Susan Bysiewicz Executive Order No. 21-2, promulgated July 1, 2021, the Contractor, for itself and on behalf of all of its principals or key personnel who submitted a bid or proposal, represents:

- (1) That no gifts were made by (A) the Contractor, (B) any principals and key personnel of the Contractor, who participate substantially in preparing bids, proposals or negotiating State contracts, or (C) any agent of the Contractor or principals and key personnel, who participates substantially in preparing bids, proposals or negotiating State contracts, to (i) any public official or State employee of the State agency or quasi-public agency soliciting bids or proposals for State contracts, who participates substantially in the preparation of bid solicitations or requests for proposals for State contracts or the negotiation or award of State contracts, or (ii) any public official or State employee of any other State agency, who has supervisory or appointing authority over such State agency or quasi-public agency;
- (2) That no such principals and key personnel of the Contractor, or agent of the Contractor or of such principals and key personnel, knows of any action by the Contractor to circumvent such prohibition on gifts by providing for any other principals and key personnel, official, employee or agent of the Contractor to provide a gift to any such public official or State employee; and
- (3) That the Contractor is submitting bids or proposals without fraud or collusion with any person.

25. Large State Contract Representation for Official or Employee of State Agency

Pursuant to section 4-252 of the Connecticut General Statutes and Acting Governor Susan Bysiewicz Executive Order No. 21-2, promulgated July 1, 2021, the State agency official or employee represents that the selection of the person, firm or corporation was not the result of collusion, the giving of a gift or the promise of a gift, compensation, fraud or inappropriate influence from any person.

26. Iran Investment Energy Certification

(a) Pursuant to section 4-252a of the Connecticut General Statutes, the Contractor certifies that it has not made a direct investment of twenty million dollars or more in the energy sector of Iran on or after October 1, 2013, as described in Section 202 of the Comprehensive Iran Sanctions, Accountability and Divestment Act of 2010, and has not increased or renewed such investment on or after said date.

(b) If the Contractor makes a good faith effort to determine whether it has made an investment described in subsection (a) of this section, then the Contractor shall not be deemed to be in breach of the Contract or in violation of this section.

A "good faith effort" for purposes of this subsection includes a determination that the Contractor is not on the list of persons who engage in certain investment activities in Iran created by the Department of General Services of the State of California pursuant to Division 2, Chapter 2.7 of the California Public Contract Code. Nothing in this subsection shall be construed to impair the ability of the State agency or quasi-public agency to pursue a breach of contract action for any violation of the provisions of the Contract.

27. Access to Contract and State Data

The Contractor shall provide to the Client Agency access to any data, as defined in Conn. Gen Stat. Sec. 4e-1, concerning the Contract and the Client Agency that are in the possession or control of the Contractor upon demand and shall provide the data to the Client Agency in a format prescribed by the Client Agency and the State Auditors of Public Accounts at no additional cost.

28. Affirmative Action Policy Statement

The Contractor shall comply with the Affirmative Action Policy Statement, as applicable, attached at Exhibit E and hereby made part of this Contract.

29. Compliance with Consumer Data Privacy and Online Monitoring

Pursuant to section 4e-72a of the Connecticut General Statutes, Contractor shall at all times comply with all applicable provisions of sections 42-515 to 42-525, inclusive, of the Connecticut General Statutes, as the same may be revised or modified.

EXHIBIT A

FHWA-1273 – Revised October 23, 2023

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Nondiscrimination
- III. Non-segregated 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. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
- XI. Certification Regarding Use of Contract Funds for Lobbying
- XII. Use of United States-Flag Vessels:

ATTACHMENTS

- A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under title 23, United States Code, as required in 23 CFR 633.102(b) (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). 23 CFR 633.102(e).

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. 23 CFR 633.102(e).

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) in accordance with 23 CFR 633.102. 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 solicitation-for-bids or request-for-proposals 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). 23 CFR 633.102(b).

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. 23 CFR 633.102(d).

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. 23 U.S.C. 114(b). The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors. 23 U.S.C. 101(a).

II. NONDISCRIMINATION (23 CFR 230.107(a); 23 CFR Part 230, Subpart A, Appendix A; EO 11246)

The provisions of this section related to 23 CFR Part 230, Subpart A, Appendix A 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 Part 60, 29 CFR Parts 1625-1627, 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), 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 Part 60, and 29 CFR Parts 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), 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 Part 230, Subpart A, 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 (see 28 CFR Part 35, 29 CFR Part 1630, 29 CFR Parts 1625-1627, 41 CFR Part 60 and 49 CFR Part 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 Part 35 and 29 CFR Part 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. 23 CFR 230.409 (g)(4) & (5).
- 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, sexual orientation, gender identity, 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 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 or other knowledgeable company official.
- 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, sexual orientation, gender identity, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure 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. 23 CFR 230.409. 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, sexual orientation, gender identity, 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, sexual orientation, gender identity, 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 thereunder. 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, sexual orientation, gender identity, 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, 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. Assurances Required:

a. The requirements of 49 CFR Part 26 and the State DOT's FHWA-approved Disadvantaged Business Enterprise (DBE) program are incorporated by reference.

b. The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of 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 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.

c. The Title VI and nondiscrimination provisions of U.S. DOT Order 1050.2A at Appendices A and E are incorporated by reference. 49 CFR Part 21.

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 more than \$10,000. 41 CFR 60-1.5.

As prescribed by 41 CFR 60-1.8, 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, sexual orientation, gender identity, 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), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway

Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

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 (29 CFR 5.5)

a. *Wage rates and fringe benefits.* All laborers and mechanics employed or working upon the site of the work (or otherwise working in construction or development of the project under a development statute), 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 basic hourly 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. As provided in paragraphs (d) and (e) of 29 CFR 5.5, the appropriate wage determinations are effective by operation of law even if they have not been attached to the contract. Contributions made or costs reasonably anticipated for bona fide fringe benefits under the Davis-Bacon Act ([40 U.S.C. 3141\(2\)\(B\)](#)) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.e. 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 must be paid the appropriate wage rate and fringe benefits on the wage determination for the classification(s) of work actually performed, without regard to skill, except as provided in paragraph 4. of this section. 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 classifications and wage rates conformed under paragraph 1.c. of this section) and the Davis-Bacon poster (WH-1321) must 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. *Frequently recurring classifications.* (1) In addition to wage and fringe benefit rates that have been determined to be prevailing under the procedures set forth in [29 CFR part 1](#), a wage determination may contain, pursuant to § 1.3(f), wage and fringe benefit rates for classifications of laborers and mechanics for which conformance requests are regularly submitted pursuant to paragraph 1.c. of this section, provided that:

- (i) The work performed by the classification is not performed by a classification in the wage determination for which a prevailing wage rate has been determined;

- (ii) The classification is used in the area by the construction industry; and
- (iii) The wage rate for the classification bears a reasonable relationship to the prevailing wage rates contained in the wage determination.

(2) The Administrator will establish wage rates for such classifications in accordance with paragraph 1.c.(1)(iii) of this section. Work performed in such a classification must be paid at no less than the wage and fringe benefit rate listed on the wage determination for such classification.

c. *Conformance.* (1) The contracting officer must 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 be classified in conformance with the wage determination. Conformance of an additional classification and wage rate and fringe benefits is appropriate 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 used 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) The conformance process may not be used to split, subdivide, or otherwise avoid application of classifications listed in the wage determination.

(3) 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 will be sent by the contracting officer by email to DBAconformance@dol.gov. 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.

(4) 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 will, by email to DBAconformance@dol.gov, refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The 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.

(5) The contracting officer must promptly notify the contractor of the action taken by the Wage and Hour Division

under paragraphs 1.c.(3) and (4) of this section. The contractor must furnish a written copy of such determination to each affected worker or it must be posted as a part of the wage determination. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 1.c.(3) or (4) of this section must 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.

d. *Fringe benefits not expressed as an hourly rate.*

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 may either pay the benefit as stated in the wage determination or may pay another bona fide fringe benefit or an hourly cash equivalent thereof.

e. *Unfunded plans.* 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, in accordance with the criteria set forth in § 5.28, 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.

f. *Interest.* In the event of a failure to pay all or part of the wages required by the contract, the contractor will be required to pay interest on any underpayment of wages.

2. Withholding (29 CFR 5.5)

a. *Withholding requirements.* The contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for the full amount of wages and monetary relief, including interest, required by the clauses set forth in this section for violations of this contract, or to satisfy any such liabilities required by any other Federal contract, or federally assisted contract subject to Davis-Bacon labor standards, that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to Davis-Bacon labor standards requirements and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld. In the event of a contractor's failure to pay any laborer or mechanic, including any apprentice or helper working on the site of the work all or part of the wages required by the contract, or upon the contractor's failure to submit the required records as discussed in paragraph 3.d. of this section, the contracting agency may on its own initiative and 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.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with paragraph

2.a. of this section or Section V, paragraph 3.a., or both, over claims to those funds by:

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its reprocurement costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901–3907](#).

3. Records and certified payrolls (29 CFR 5.5)

a. *Basic record requirements* (1) *Length of record retention.* All regular payrolls and other basic records must be maintained by the contractor and any subcontractor during the course of the work and preserved for all laborers and mechanics working at the site of the work (or otherwise working in construction or development of the project under a development statute) for a period of at least 3 years after all the work on the prime contract is completed.

(2) *Information required.* Such records must contain the name; Social Security number; last known address, telephone number, and email address of each such worker; each worker's correct classification(s) of work actually performed; 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 [40 U.S.C. 3141\(2\)\(B\)](#) of the Davis-Bacon Act); daily and weekly number of hours actually worked in total and on each covered contract; deductions made; and actual wages paid.

(3) *Additional records relating to fringe benefits.* Whenever the Secretary of Labor has found under paragraph 1.e. of this section 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 [40 U.S.C. 3141\(2\)\(B\)](#) of the Davis-Bacon Act, the contractor must 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.

(4) *Additional records relating to apprenticeship.* Contractors with apprentices working under approved programs must maintain written evidence of the registration of apprenticeship programs, the registration of the apprentices, and the ratios and wage rates prescribed in the applicable programs.

b. *Certified payroll requirements* (1) *Frequency and method of submission.* The contractor or subcontractor must submit weekly, for each week in which any DBA- or Related Acts-covered work is performed, certified payrolls to the contracting

agency. The prime contractor is responsible for the submission of all certified payrolls by all subcontractors. A contracting agency or prime contractor may permit or require contractors to submit certified payrolls through an electronic system, as long as the electronic system requires a legally valid electronic signature; the system allows the contractor, the contracting agency, and the Department of Labor to access the certified payrolls upon request for at least 3 years after the work on the prime contract has been completed; and the contracting agency or prime contractor permits other methods of submission in situations where the contractor is unable or limited in its ability to use or access the electronic system.

(2) *Information required.* The certified payrolls submitted must set out accurately and completely all of the information required to be maintained under paragraph 3.a.(2) of this section, except that full Social Security numbers and last known addresses, telephone numbers, and email addresses must not be included on weekly transmittals. Instead, the certified payrolls need only include an individually identifying number for each worker (e.g., the last four digits of the worker's Social Security number). The required weekly certified payroll information may be submitted using Optional Form WH-347 or in any other format desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division website at <https://www.dol.gov/sites/dolgov/files/WHD/legacy/files/wh347.pdf> or its successor website. It is not a violation of this section for a prime contractor to require a subcontractor to provide full Social Security numbers and last known addresses, telephone numbers, and email addresses to the prime contractor for its own records, without weekly submission by the subcontractor to the contracting agency.

(3) *Statement of Compliance.* Each certified payroll submitted must be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor, or the contractor's or subcontractor's agent who pays or supervises the payment of the persons working on the contract, and must certify the following:

(i) That the certified payroll for the payroll period contains the information required to be provided under paragraph 3.b. of this section, the appropriate information and basic records are being maintained under paragraph 3.a. of this section, and such information and records are correct and complete;

(ii) That each laborer or mechanic (including each helper and apprentice) working 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 [29 CFR part 3](#); and

(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(s) of work actually performed, as specified in the applicable wage determination incorporated into the contract.

(4) *Use of Optional Form WH-347.* The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 will satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(3) of this section.

(5) *Signature*. The signature by the contractor, subcontractor, or the contractor's or subcontractor's agent must be an original handwritten signature or a legally valid electronic signature.

(6) *Falsification*. The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under [18 U.S.C. 1001](#) and [31 U.S.C. 3729](#).

(7) *Length of certified payroll retention*. The contractor or subcontractor must preserve all certified payrolls during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

c. *Contracts, subcontracts, and related documents*. The contractor or subcontractor must maintain this contract or subcontract and related documents including, without limitation, bids, proposals, amendments, modifications, and extensions. The contractor or subcontractor must preserve these contracts, subcontracts, and related documents during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

d. *Required disclosures and access* (1) *Required record disclosures and access to workers*. The contractor or subcontractor must make the records required under paragraphs 3.a. through 3.c. of this section, and any other documents that the contracting agency, the State DOT, the FHWA, or the Department of Labor deems necessary to determine compliance with the labor standards provisions of any of the applicable statutes referenced by § 5.1, available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and must permit such representatives to interview workers during working hours on the job.

(2) *Sanctions for non-compliance with records and worker access requirements*. If the contractor or subcontractor fails to submit the required records or to make them available, or refuses to permit worker interviews during working hours on the job, the Federal agency may, after written notice to the contractor, sponsor, applicant, owner, or other entity, as the case may be, that maintains such records or that employs such workers, 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, or to permit worker interviews during working hours on the job, may be grounds for debarment action pursuant to § 5.12. In addition, any contractor or other person that fails to submit the required records or make those records available to WHD within the time WHD requests that the records be produced will be precluded from introducing as evidence in an administrative proceeding under [29 CFR part 6](#) any of the required records that were not provided or made available to WHD. WHD will take into consideration a reasonable request from the contractor or person for an extension of the time for submission of records. WHD will determine the reasonableness of the request and may consider, among other things, the location of the records and the volume of production.

(3) *Required information disclosures*. Contractors and subcontractors must maintain the full Social Security number and last known address, telephone number, and email address

of each covered worker, and must provide them upon request to the contracting agency, the State DOT, the FHWA, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or other compliance action.

4. Apprentices and equal employment opportunity (29 CFR 5.5)

a. *Apprentices* (1) *Rate of pay*. Apprentices will be permitted to work at less than the predetermined rate for the work they perform 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 (OA), or with a State Apprenticeship Agency recognized by the OA. A person who is not individually registered in the program, but who has been certified by the OA or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice, will be permitted to work at less than the predetermined rate for the work they perform in the first 90 days of probationary employment as an apprentice in such a program. In the event the OA or a State Apprenticeship Agency recognized by the OA withdraws approval of an apprenticeship program, the contractor will no longer be permitted to use apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(2) *Fringe benefits*. Apprentices must 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, fringe benefits must be paid in accordance with that determination.

(3) *Apprenticeship ratio*. The allowable ratio of apprentices to journeymen on the job site in any craft classification must not be greater than the ratio permitted to the contractor as to the entire work force under the registered program or the ratio applicable to the locality of the project pursuant to paragraph 4.a.(4) of this section. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in paragraph 4.a.(1) of this section, must 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 this section must be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(4) *Reciprocity of ratios and wage rates*. Where a contractor is performing construction on a project in a locality other than the locality in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyworker's hourly rate) applicable within the locality in which the construction is being performed must be observed. If there is no applicable ratio or wage rate for the locality of the project, the ratio and wage rate specified in the contractor's registered program must be observed.

b. *Equal employment opportunity*. The use of apprentices and journeymen under this part must be in conformity with

the equal employment opportunity requirements of Executive Order 11246, as amended, and [29 CFR part 30](#).

c. 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. 23 CFR 230.111(e)(2). 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 as provided in 29 CFR 5.5.

6. Subcontracts. The contractor or subcontractor must insert FHWA-1273 in any subcontracts, along with the applicable wage determination(s) and such other clauses or contract modifications as the contracting agency may by appropriate instructions require, and a clause requiring the subcontractors to include these clauses and wage determination(s) in any lower tier subcontracts. The prime contractor is responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this section. In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and may be subject to debarment, as appropriate. 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 as provided in 29 CFR 5.5.

9. Disputes concerning labor standards. As provided in 29 CFR 5.5, 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 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 [40 U.S.C. 3144\(b\)](#) or § 5.12(a).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of [40 U.S.C. 3144\(b\)](#) or § 5.12(a).

c. The penalty for making false statements is prescribed in the U.S. Code, Title 18 Crimes and Criminal Procedure, [18 U.S.C. 1001](#).

11. Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the DBA, Related Acts, this part, or [29 CFR part 1 or 3](#);

b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under the DBA, Related Acts, this part, or [29 CFR part 1 or 3](#);

c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under the DBA, Related Acts, this part, or [29 CFR part 1 or 3](#); or

d. Informing any other person about their rights under the DBA, Related Acts, this part, or [29 CFR part 1 or 3](#).

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Pursuant to 29 CFR 5.5(b), 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 watchpersons 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. 29 CFR 5.5.

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 and interest from the date of the underpayment. 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 watchpersons and guards, employed in violation of the clause set forth in paragraph 1. of this section, in the sum currently provided in 29 CFR 5.5(b)(2)* 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.

* \$31 as of January 15, 2023 (See 88 FR 88 FR 2210) as may be adjusted annually by the Department of Labor, pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990.

3. Withholding for unpaid wages and liquidated damages

a. *Withholding process.* The FHWA or the contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for any unpaid wages; monetary relief, including interest; and liquidated damages required by the clauses set forth in this section on this contract, 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 that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to the Contract Work Hours and Safety Standards Act and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with Section IV paragraph 2.a. or paragraph 3.a. of this section, or both, over claims to those funds by:

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its reprocurement costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901–3907](#).

4. Subcontracts. The contractor or subcontractor must insert in any subcontracts the clauses set forth in paragraphs 1. through 5. of this section and a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor is responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1. through 5. In the

event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

5. Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

- a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in this part;
- b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or this part;
- c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or this part; or
- d. Informing any other person about their rights under CWHSSA or this part.

VI. SUBLetting OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System pursuant to 23 CFR 635.116.

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" in paragraph 1 of Section VI 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: (based on longstanding interpretation)

- (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. 23 CFR 635.102.

2. Pursuant to 23 CFR 635.116(a), 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. Pursuant to 23 CFR 635.116(c), 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. (based on long-standing interpretation of 23 CFR 635.116).

5. The 30-percent self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements. 23 CFR 635.116(d).

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 Part 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. 23 CFR 635.108.

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 Part 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). 29 CFR 1926.10.

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 Part 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 11, 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 (42 U.S.C. 7606; 2 CFR 200.88; EO 11738)

This provision is applicable to all Federal-aid construction contracts in excess of \$150,000 and to all related subcontracts. 48 CFR 2.101; 2 CFR 200.327.

By submission of this bid/proposal or the execution of this contract or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, subcontractor, supplier, or vendor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal Highway Administration and the Regional Office of the Environmental Protection Agency. 2 CFR Part 200, Appendix II.

The contractor agrees to include or cause to be included the requirements of this Section in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements. 2 CFR 200.327.

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. 2 CFR 180.220 and 1200.220.

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. 2 CFR 180.320.
- 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. 2 CFR 180.325.
- 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. 2 CFR 180.345 and 180.350.

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, Subpart I, 180.900-180.1020, and 1200. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient 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 recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction. 2 CFR 180.330.

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. 2 CFR 180.220 and 180.300.

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. 2 CFR 180.300; 180.320, and 180.325. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. 2 CFR 180.335. 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 System for Award Management website (<https://www.sam.gov>). 2 CFR 180.300, 180.320, and 180.325.

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 CFR 180.325.

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 CFR 180.335;

(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, 2 CFR 180.800;

(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, 2 CFR 180.700 and 180.800; 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. 2 CFR 180.335(d).

(5) Are not a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(6) Are not a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability (USDOT Order 4200.6 implementing appropriations act requirements).

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal. 2 CFR 180.335 and 180.340.

3. 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). 2 CFR 180.220 and 1200.220.

a. By signing and submitting this proposal, the prospective lower tier participant 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. 2 CFR 180.365.

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, Subpart I, 180.900 – 180.1020, 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 recipient or subrecipient 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 recipient or subrecipient 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. 2 CFR 1200.220 and 1200.332.

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. 2 CFR 180.220 and 1200.220.

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 System for Award Management website (<https://www.sam.gov>), which is compiled by the General Services Administration. 2 CFR 180.300, 180.320, 180.330, and 180.335.

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. 2 CFR 180.325.

4. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

a. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals:

(1) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.355;

(2) is a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(3) is a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. (USDOT Order 4200.6 implementing appropriations act requirements)

b. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant should 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 Part 20, App. A.

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.

XII. USE OF UNITED STATES-FLAG VESSELS:

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, or any other covered transaction. 46 CFR Part 381.

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. 46 CFR 381.7. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

When oceanic shipments (or shipments across the Great Lakes) are necessary for materials or equipment acquired for a specific Federal-aid construction project, the bidder, proposer, contractor, subcontractor, or vendor 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. 46 CFR 381.7.

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 Office of Cargo and Commercial Sealift (MAR-620), Maritime Administration, Washington, DC 20590. (MARAD requires copies of the ocean carrier's (master) bills of lading, certified onboard, dated, with rates and charges. These bills of lading may contain business sensitive information and therefore may be submitted directly to MARAD by the Ocean Transportation Intermediary on behalf of the contractor). 46 CFR 381.7.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS
PREFERENCE FOR APPALACHIAN DEVELOPMENT
HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS
ROAD CONTRACTS** (23 CFR 633, Subpart B, Appendix B)
This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

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 non-compliance. 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.

APPENDIX B

TITLE VI CONTRACTOR ASSURANCES

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees 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

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 ensure 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 notification's requirements set forth above, including evidence demonstrating the necessity of a delay in notification to the Covered Entity.

(i) Permitted Uses and Disclosure by Business Associate.

(1) General Use and Disclosure Provisions Except as otherwise limited in this Section of the Contract, Business Associate may use or disclose PHI to perform functions, activities, or services for, or on behalf of, Covered Entity as specified in this Contract, provided that such use or disclosure would not violate the Privacy Rule if done by

Covered Entity or the minimum necessary policies and procedures of the Covered Entity.

(2) Specific Use and Disclosure Provisions

- (A) Except as otherwise limited in this Section of the Contract, Business Associate may use PHI for the proper management and administration of Business Associate or to carry out the legal responsibilities of Business Associate.
- (B) Except as otherwise limited in this Section of the Contract, Business Associate may disclose PHI for the proper management and administration of Business Associate, provided that disclosures are Required by Law, or Business Associate obtains reasonable assurances from the person to whom the information is disclosed that it will remain confidential and used or further disclosed only as Required by Law or for the purpose for which it was disclosed to the person, and the person notifies Business Associate of any instances of which it is aware in which the confidentiality of the information has been breached.
- (C) Except as otherwise limited in this Section of the Contract, Business Associate may use PHI to provide Data Aggregation services to Covered Entity as permitted by 45 C.F.R. § 164.504(e)(2)(i)(B).

(j) Obligations of Covered Entity.

- (1) Covered Entity shall notify Business Associate of any limitations in its notice of privacy practices of Covered Entity, in accordance with 45 C.F.R. § 164.520, or to the extent that such limitation may affect Business Associate's use or disclosure of PHI.
- (2) Covered Entity shall notify Business Associate of any changes in, or revocation of, permission by Individual to use or disclose PHI, to the extent that such changes may affect Business Associate's use or disclosure of PHI.
- (3) Covered Entity shall notify Business Associate of any restriction to the use or disclosure of PHI that Covered Entity has agreed to in accordance with 45 C.F.R. § 164.522, to the extent that such restriction may affect Business Associate's use or disclosure of PHI.
- (k) Permissible Requests by Covered Entity. Covered Entity shall not request Business Associate to use or disclose PHI in any manner that would not be permissible under the Privacy Rule if done by the Covered Entity, except that Business Associate may use and disclose PHI for data aggregation, and management and administrative activities of Business Associate, as permitted under this Section of the Contract.
- (l) Term and Termination.

- (1) Term. The Term of this Section of the Contract shall be effective as of the date the Contract is effective and shall terminate when the information collected in accordance with clause h. (10) of this Section of the Contract is provided to the Covered Entity and all of the PHI provided by Covered Entity to Business Associate, or created or received by Business Associate on behalf of Covered Entity, is destroyed or returned to Covered Entity, or, if it is infeasible to return or destroy PHI, protections are extended to such information, in accordance with the termination provisions in this Section.
- (2) Termination for Cause Upon Covered Entity's knowledge of a material breach by Business Associate, Covered Entity shall either:
 - (A) Provide an opportunity for Business Associate to cure the breach or end the violation and terminate the Contract if Business Associate does not cure the breach or end the violation within the time specified by the Covered Entity; or
 - (B) Immediately terminate the Contract if Business Associate has breached a material term of this Section of the Contract and cure is not possible; or
 - (C) If neither termination nor cure is feasible, Covered Entity shall report the violation to the Secretary.
- (3) Effect of Termination
 - (A) Except as provided in (l)(2) of this Section of the Contract, upon termination of this Contract, for any reason, Business Associate shall return or destroy all PHI received from Covered Entity or created or received by Business Associate on behalf of Covered Entity. Business Associate shall also provide the information collected in accordance with clause h. (10) of this Section of the Contract to the Covered Entity within ten business days of the notice of termination. This provision shall apply to PHI that is in the possession of subcontractors or agents of Business Associate. Business Associate shall retain no copies of the PHI.
 - (B) In the event that Business Associate determines that returning or destroying the PHI is infeasible, Business Associate shall provide to Covered Entity notification of the conditions that make return or destruction infeasible. Upon documentation by Business Associate that return or destruction of PHI is infeasible, Business Associate shall extend the protections of this Section of the Contract to such PHI and limit further uses and disclosures of PHI to those purposes that make return or destruction infeasible, for as long as Business Associate maintains such PHI. Infeasibility of the return or destruction of PHI includes, but is not limited to, requirements under state or federal law that the Business Associate maintains or preserves the PHI or copies thereof.

(m) Miscellaneous Provisions.

- (1) Regulatory References. A reference in this Section of the Contract to a section in the Privacy Rule means the section as in effect or as amended.
- (2) Amendment. The Parties agree to take such action as is necessary to amend this Section of the Contract from time to time as is necessary for Covered Entity to comply with requirements of the Privacy Rule and the Health Insurance Portability and Accountability Act of 1996, Pub. L. No. 104-191.
- (3) Survival. The respective rights and obligations of Business Associate shall survive the termination of this Contract.
- (4) Effect on Contract. Except as specifically required to implement the purposes of this Section of the Contract, all other terms of the Contract shall remain in force and effect.
- (5) Construction. This Section of the Contract shall be construed as broadly as necessary to implement and comply with the Privacy Standard. Any ambiguity in this Section of the Contract shall be resolved in favor of a meaning that complies, and is consistent with, the Privacy Standard.
- (6) Disclaimer. Covered Entity makes no warranty or representation that compliance with this Section of the Contract will be adequate or satisfactory for Business Associate's own purposes. Covered Entity shall not be liable to Business Associate for any claim, civil or criminal penalty, loss or damage related to or arising from the unauthorized use or disclosure of PHI by Business Associate or any of its officers, directors, employees, contractors or agents, or any third party to whom Business Associate has disclosed PHI contrary to the provisions of this Contract or applicable law. Business Associate is solely responsible for all decisions made, and actions taken, by Business Associate regarding the safeguarding, use and disclosure of PHI within its possession, custody or control.
- (7) Indemnification. The Business Associate shall indemnify and hold the Covered Entity harmless from and against any and all claims, liabilities, judgments, fines, assessments, penalties, awards and any statutory damages that may be imposed or assessed pursuant to HIPAA, as amended or the HITECH Act, including, without limitation, attorney's fees, expert witness fees, costs of investigation, litigation or dispute resolution, and costs awarded thereunder, relating to or arising out of any violation by the Business Associate and its agents, including subcontractors, of any obligation of Business Associate and its agents, including subcontractors, under this section of the contract, under HIPAA, the HITECH Act, the Privacy Rule and the Security Rule.

EXHIBIT D
AFFIRMATIVE ACTION POLICY STATEMENT (October 2023)

It is the policy of this firm to assure that applicants are employed, and that employees are treated during employment, without regard to an individual's race, color, religion, creed, sex, gender identity or expression, marital status, national origin, age, ancestry, status as a veteran, intellectual disability, mental disability, learning disability or physical disability, including but not limited to blindness, unless such disability prevents performance of the work involved and to promote the full realization of equal employment opportunity through positive and continuous affirmative efforts. Such action shall include employment, promotion, demotion or transfer, recruitment or recruitment advertising, layoff or terminations, rates of pay or other forms of compensation, selection for training/apprenticeship, pre-apprenticeship opportunities, and on-the-job training opportunities.

This firm will implement, monitor, enforce and achieve full compliance with this Affirmative Action Policy Statement in conjunction with the applicable Federal and State laws, regulations, executive orders, and contract provisions, including but not limited to those listed below:

Dissemination of Policy:

All members of the firm 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, this firm's Equal Employment Opportunity (EEO) policy and contractual responsibilities to provide EEO in each grade and classification of employment. These actions shall include:

1. 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 firm's EEO policy and its implementation will be reviewed and explained. These meetings will be conducted by the EEO officer.
2. 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.
3. All personnel who are engaged in direct recruitment for the firm will be instructed by the EEO Officer of the contractor's procedures for locating and hiring minority group employees.
4. Notices and posters setting forth the firm's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.
5. The firm'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.
6. Sexual Harassment Prevention Resources including training and remedies must be available to all employees. See Connecticut General Assembly Public Acts 19-16 and 19-93.

Recruitment:

When advertising for employees, the firm will include in all advertisements the notation; "An Affirmative Action/Equal Opportunity Employer." All such advertisements will be placed in

publications having a large circulation among minority groups in the area where the workforce would normally be derived.

1. The firm will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority and female applicants. To meet this requirement, the firm will identify referral sources and establish procedures for recruitment to obtain the referral of minority and female applicants.
2. In the event the firm has a valid bargaining agreement providing for exclusive hiring referrals, he/she is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The United States Department of Labor has held that where implementation of such agreements has had the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)
3. The firm will encourage his/her present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.

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 an individual's race, color, religion, creed, sex, gender identity or expression, marital status, national origin, age, ancestry, status as a veteran, intellectual disability, mental disability, learning disability or physical disability, including but not limited to blindness, unless such disability prevents performance of the work involved. The following procedures shall be followed:

1. The firm will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of personnel.
2. The firm 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 correction action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.
3. The firm shall periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.
4. The firm will promptly investigate all complaints of alleged discrimination made to the firm 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 actions shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of his avenues of appeal.

Training and Promotion:

The firm will assist in locating, qualifying, and increasing the skills of minorities and women. The firm will utilize the following tools to identify training and promotional opportunities in the firm:

1. The firm will advise employees and applicants for employment of available training programs and the entrance requirements.
2. The firm will periodically review the training and promotion of minority group and female employees and will encourage eligible employees to apply for such training and promotion.

Unions:

If the firm relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the firm either directly or through a contractor's association acting as agent will include the procedures set forth below:

1. The firm will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.
2. The firm will use best efforts to incorporate an EEO clause into each union agreement to the extent that such union will be contractually bound to refer applicants without regard to their to an individual's race, color, religion, creed, sex, gender identity or expression, marital status, national origin, age, ancestry, status as a veteran, intellectual disability, mental disability, learning disability or physical disability, including but not limited to blindness, unless such disability prevents performance of the work involved.
3. The firm is to obtain information as to the referral practices and policies of the labor union except that to the extent that such information is within the exclusive possession of the labor union and such labor union refuses to furnish the information to the contractor, the contractor shall notify the Connecticut Department of Transportation (CTDOT) of the efforts made to obtain the information.
4. In the event the union is unable to provide the firm with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies. (The United States Department of Labor has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting the obligations under Executive Order 11246 as amended, and in compliance with 23 CFR Part 230, the firm will notify CTDOT.

Selection of Subcontractors:

The firm will not discriminate on the grounds race, color, religion, sex, sexual orientation, gender identity or expression, marital status, national origin, ancestry, age, intellectual disability, learning disability, physical disability, including, but not limited to, blindness, or status as a veteran in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

1. The firm shall use his/her best efforts to ensure subcontractor/subconsultant compliance with Federal and State Equal Opportunity (EO) and EEO requirements.

Records and Reports:

The Contractor shall keep records as necessary to document compliance with EO/EEO requirements. Such reports shall be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of CTDOT and/or the United States Department of Transportation. The following records should be maintained:

6. The number of minority and non-minority group members and women employed in each work classification;
7. The progress and efforts being made in cooperation with unions, when applicable to increase the employment opportunities for minorities and women;
8. The documentation showing progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and
9. Complaints of Discrimination.

In implementing this policy and ensuring that affirmative action is being provided, each time a hiring opportunity occurs this firm will contact and request referrals from minority and female organizations, referral sources, and media sources. All advertising will emphasize that the firm is "An Affirmative Action/Equal Opportunity Employer."

In order to substantiate this firm's efforts and affirmative actions to provide equal opportunity, the firm will maintain and submit, as requested, documentation such as referral request correspondence, copies of advertisements utilized and follow-up documentation to substantiate that efforts were made in good faith. This firm will maintain the necessary internal audit procedures and record keeping systems to report the firm's affirmative action efforts.

It is understood by Owner/CEO/President of the firm and the firm's Equal Employment Opportunity Officer and supervisory and managerial personnel that failure to effectively implement, monitor and enforce this firm's affirmative action program and/or failure to adequately document and submit as required, the affirmative actions taken and efforts made to recruit and hire minority and female applicants in accordance with our affirmative action program in each instance of hire, will result in this firm being required to recommit itself to a modified and more stringent affirmative action program as a condition of approval. It is recognized that this policy is a contractual requirement and is a prerequisite for performing services for the contracting agency. This policy in addition to CTDOT's EO/EEO contract provisions and requirements, shall constitute the CTDOT Affirmative Program requirements.

The ultimate responsibility for the full implementation of this firm's Affirmative Action Program rests with the Chief Executive Officer of this firm.

EXHIBIT E

(Federal wage rate package will be inserted at the end after State wages for the final executed contract only. Refer to NTC – Federal Wage Determinations)

EXHIBIT F
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/fo/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 non-compliance;
- (12) Any such employee who is determined to be in noncompliance may continue to work on a public building construction project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;
- (13) The Labor Commissioner may make complaint to the prosecuting authorities regarding any employer or agent of the employer, or officer or agent of the corporation who files a false certified payroll with respect to the status of an employee who is performing manual labor on a public building construction project;
- (14) The statute provides the minimum standards required for the completion of a safety course by manual laborers on public construction contracts; any contractor can exceed these minimum requirements; and
- (15) Regulations clarifying the statute are currently in the regulatory process and shall be posted on the CTDOL website as soon as they are adopted in final form.
- (16) Any questions regarding this statute may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of <http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm>; or by telephone at (860)263-6790.

THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTIMATELY ARISE CONCERNING THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.

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.**

FORKLIFT 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 artwork 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 re-laid.)

□ SHEETMETAL WORKERS

Fabricate, assembles, installs and repairs sheet metal 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, sunshades, 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 required 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

EXHIBIT E

INSERT FEDERAL WAGES HERE
EXHIBIT F

Minimum Rates and Classifications for
Heavy/Highway Construction

ID#: 25-13309

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:

Project Town: Putnam

State#: 0115-0122

FAP#: 0044(166)

Project: Replacement of Retaining Wall Along Route 44

CLASSIFICATION	Hourly Rate	Benefits
1) Boilermaker	48.21	30.01
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	43.14	34.74
2) Carpenters, Piledrivermen	42.03	29.19
2a) Diver Tenders	42.03	29.19
2b) Divers Effluent	67.52	29.19
3) Divers	50.49	29.19
03a) Millwrights	43.25	29.13
03b) Carpenter-Welder	42.53	29.19
03c) Carpenter: Working with creosote lumber or acid	43.03	29.19

4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	59.7	26.65
4a) Painters: Brush and Roller	39.57	26.50
4b) Painters: Spray	42.57	26.50
4bc) Painters: Spray Helper	40.57	26.50
4c) Painters: Steel Only	41.57	26.50
4d) Painters: Blast	44.57	26.50
4de) Painter: Blast Helper	40.57	26.50
4e) Painters: Tanks, Tower and Swingstage etc.	41.57	26.50
4f) Elevated Tanks (60 feet and above)	48.57	26.50
5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	48.25	35.22+3% of gross wage
6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection	45.25	43.62 + 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)	50.58	36.30
----LABORERS---- -		
8) Group 1: General Laborers and concrete specialist	35.7	28.85

8) Group 1a: Acetylene Burners (Hours worked with a torch)	36.7	28.85
9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen	35.95	28.85
10) Group 3: Pipelayers	36.2	28.85
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	36.2	28.85
12) Group 5: Toxic waste removal (non-mechanical systems)	37.7	28.85
13) Group 6: Blasters	37.45	28.85
Group 7: Asbestos/lead removal, non-mechanical systems (does not include leaded joint pipe)	38.7	28.85
Group 8: Traffic control signalmen	21.42	28.85
Group 9: Hydraulic Drills	36.45	28.85
Group 10: Toxic Waste Removers A or B With PPE	38.7	28.85
----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	37.93	28.85 + a
13b) Brakemen, Trackmen, Miners' Helpers and all other men	36.96	28.85 + a

----CLEANING, CONCRETE AND CAULKING TUNNEL----

14) Concrete Workers, Form Movers, and Strippers 36.96 28.85 + a

15) Form Erectors 37.29 28.85 + a

---ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----

16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers, Miners Helpers 36.96 28.85 + a

17) Laborers Topside, Cage Tenders, Bellman 36.85 28.85 + a

18) Miners 37.93 28.85 + a

---TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ---

18a) Blaster 44.42 28.85 + a

19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders 44.22 28.85 + a

20) Change House Attendants, Powder Watchmen, Top on Iron Bolts 42.24 28.85 + a

21) Mucking Machine Operator, Grout Boss, Track Boss 45.01 28.85 + a

----TRUCK DRIVERS----(*see note below)

Block Truck 37.48 32.68 + a

2 Axle	36.16	32.68 + a
Helpers	34.66	32.68 + a
Three Axle Trucks; Two Axle Mixer	36.27	32.68 + a
Three Axle Mixer	36.33	32.68 + a
Four Axle Trucks	36.39	32.68 + a
Four Axle Mixer	37.19	32.68 + a
5 Axle	36.39	32.68 + a
5 Axle Mixer	37.19	32.68 + a
Heavy Duty Trailer (40 tons and over)	38.66	32.68 + a
Heavy Duty Trailer (up to 40 tons)	37.39	32.68 + a
Snorkle Truck	36.54	32.68 + a
Swivel Dump and Tack Truck	36.39	32.68 + a
Euclids and Semi Trailer	36.44	32.68 + a

----POWER EQUIPMENT OPERATORS----

Group 1: Crane Handling or Erecting Structural Steel or Stone, Hoisting Engineer (2 drums or over). (Trade License Required)	58.19	29.80 + a
Group 1a: Front End Loader (7 cubic yards or over); Work Boat 26 ft. and over.	53.33	29.80 + a
Group 2: Cranes (100 ton rate capacity and over); Bauer Drill/Caisson. (Trade License Required)	57.78	29.80 + a
Group 2a: Cranes (under 100 ton rated capacity).	56.79	29.80 + a
Group 2b: Excavator over 2 cubic yards; Pile Driver (\$3.00 premium when operator controls hammer).	52.92	29.80 + a
Group 3: Excavator; 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)	51.92	29.80 + a
Group 4: Trenching Machines; Lighter Derrick; CMI Machine or Similar; Koehring Loader (Skooper).	51.42	29.80 + a
Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" mandrel)	50.63	29.80 + a
Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	50.63	29.80 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	50.22	29.80 + a
Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and under Mandrel)	49.77	29.80 + a

Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	49.25	29.80 + a
Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder), Vacuum Excavation Truck and Hydrovac Excavation Truck (27 HG pressure or greater).	48.67	29.80 + a
Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	45.96	29.80 + a
Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	45.96	29.80 + a
Group 12: Wellpoint Operator.	45.87	29.80 + a
Group 13: Compressor Battery Operator.	45.12	29.80 + a
Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	43.6	29.80 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	43.06	29.80 + a
Group 16: Maintenance Engineer.	42.2	29.80 + a
Group 17: Portable Asphalt Plant Operator; Portable Crusher Plant Operator; Portable Concrete Plant Operator., Portable Grout Plant Operator, Portable Water Filtration Plant Operator.	47.91	29.80 + a
Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	44.7	29.80 + a
Surveyor: Chief of Party	48.16	29.80 + a
Surveyor: Assistant Chief of Party	44.41	29.80 + a

Surveyor: Instrument Man	42.73	29.80 + a
Surveyor: Rodman or Chairman	36.78	29.80 + a

**NOTE: SEE BELOW

----LINE CONSTRUCTION----(Railroad Construction and Maintenance)----

20) Lineman, Cable Splicer, Technician	59.91	34.00
21) Heavy Equipment Operator	53.92	31.88
22) Equipment Operator, Tractor Trailer Driver, Material Men	50.92	30.84
23) Driver Groundmen	44.93	28.47
23a) Groundman Experienced	32.95	13.99

----OUTSIDE LINE CONSTRUCTION----

24) Driver Groundmen	43.78	28.42
25) Groundmen	32.1	13.95
26) Heavy Equipment Operators	52.53	31.83
27) Linemen, Cable Splicers, Dynamite Men	58.37	33.94

28) Material Men, Tractor Trailer Drivers, Equipment Operators	49.61	30.79
29) Technician	56.12	32.85

----COMMUNICATION----

Sales & Service Technician: To include but not limited to: Installation, Repair, Splicing and Maintenance	48.84	18.07
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----DREDGING----

Class A1: Mechanical Dredge Operator	48.48	17.32+a+b
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Class B1: Maintenance Engineer	41.93	16.87+a+b
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Class C1: Mate/Welder	38.38	16.62+a+b
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Class D: Deckhand	30.86	16.09+a+b
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Welders: Rate for craft to which welding is incidental.

Surveyors: Hazardous material removal: \$3.00 per hour premium.

*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.

Truck Drivers: Trainers Premium: \$3.00 over wage rate.

Truck Drivers: Night Premium - Mixer Drivers: \$2.00 over wage rate.

Crane with 150 ft. boom (including jib) - \$1.50 extra
 Crane with 200 ft. boom (including jib) - \$2.50 extra
 Crane with 250 ft. boom (including jib) - \$5.00 extra
 Crane with 300 ft. boom (including jib) - \$7.00 extra
 Crane with 400 ft. boom (including jib) - \$10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyperson instructing and supervising the work of each apprentice in a specific trade.

--Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work

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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.

--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.