

**CHURCH STREET SOUTH EXTENSION
OVER NEW HAVEN RAIL YARD**

PROJECT NO. 92-526
F.A.P. NOS. STPA-IBR-STPN-MGS-1092(110)
TOWN OF NEW HAVEN

BID SET

**FINAL CONTRACT
SPECIAL PROVISIONS**

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PB PROJECT NO. 18703

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- DO NOT
ACTER!!

September 6, 2000
State Project No. 92-526
Federal Aid Project No.: STPA-IBR-STPN-MGS-1092(110)
Town: New Haven

INDEX TO SPECIAL PROVISIONS

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

<u>PAGE NO.</u>	<u>ITEM</u>
1	Contract Time and Liquidated Damages
1A	Notice to Contractor - General Permit for Stormwater Discharge
2-5	Notice to Contractor - Work on Railroad Property
6	Notice to Contractor - Connecticut Department of Transportation Disclaimer
7, 8	Notice to Contractor - Allowable Track and Power Outages
9-11A	Notice to Contractor - Erection of Structural Steel Truss (Segment 2)
12	Vacant
13	Notice to Contractor - Bidders Submission of Financial Information
14-18	Notice to Contractor - Protection of Existing Utilities
19	Notice to Contractor - Procurement of Materials
20	Vacant
21	Notice to Contractor - Progress Photographs
22	Notice to Contractor - Sargent Manufacturing
23	Notice to Contractor - Use of State Property
24,25	Notice to Contractor - Handling Water
26, 27	Notice to Contractor - Environmental Site Investigation
28	Notice to Contractor - Lightweight Channelizing Devices
29	Notice to Contractor - Applicable Documents, Standards and Codes
30	Notice to Contractor - Verification of Plan Dimensions and Field Measurements
31	Notice to Contractor - Storage and Staging Areas
32	Notice to Contractor - Public Utility Plans
33	Notice to Contractor - Steel Transportation Plan
34-39	Notice to Contractor - Archaeological Investigation
40-42	Notice to Contractor - Grounding and Bonding Systems
43-49	Notice to Contractor - Basic Electrical Materials and Methods
50-52	Notice to Contractor - Uninsulated Wires
53, 54	Notice to Contractor - Galvanized Steel Wire, Alumoweld Strands and Wire Rope

<u>PAGE NO.</u>	<u>ITEM</u>
55-59	Notice to Contractor - Insulators
60	Notice To Contractor - Railroad Feeder Relocation
61	Notice to Contractor - MRI Van Access
62-64	Cold Weather Paving Policy
65	Year 2000 Date Data Processing Representation and Warranty
66	Section 1.03 - Award and Execution of Contract
67-97	Section 1.05 - Control of the Work
98-104	Section 1.06 - Control of Materials
105	Section 1.07 - Legal Relations and Responsibilities
106-111	Section 1.08 - Prosecution and Progress
112, 113	Section 1.10 - Environmental
114-118	Section 6.01 - Concrete for Structures
119, 128	Section 6.03 - Structural Steel
129	Section 7.02 - Piles
130	Section 10.00 - General Clauses for Highway Illumination and Traffic Signal projects
131-133	Section M.06 - Metals
134, 135	Price Adjustment of Asphalt
136-138	Code of Ethics
139	Bidrigging and/or Frauds
140	Requirements of Title 49, Code of Federal Regulations - Part 26
141-148E	Disadvantaged Business Enterprises As Subcontractors and Material Suppliers or Manufacturers
149	Voluntary Partnering
150-152	Item #0000465A - 600V Copper Wire No. 1 AWG
150-152	Item #0000543A - 600V Aluminum Wire No. 4/0 AWG
153-159	Item #0000565A - 15 KV Fused Cutouts (1-Phase)
153-159	Item #0000566A - 15 KV NO. 4/0 ACSR XLPE
153-159	Item #0000568A - 15 KV NO. 4/0 CU, EPR
153-159	Item #0000574A - 5 KV NO. 4/0 CU, EPR
160-164	Item #0090044A - Signal Power Feeder
160-164	Item #0090085A -Aerial Ground Wire
160-164	Item #1012212A - Wire and Cable 4/0 AWG Cable
160-164	Item #1012223A - Wire and Cable 500 KCMIL Cable
165-166	Item #0090037A - Down Guys
167-169	Item #0090075A - Guy Assemblies
170-172	Item #0090080A - Remove 15 KV Raceway Conductor
170-172	Item #0090081A - Remove Signals and Communications Cable
170-172	Item #0090082A - Remove 15 KDV Overhead Conductor
173	Item #0090104A - Screw Anchor
174, 175	Item #0096063A - Special Foundation

<u>PAGE NO.</u>	<u>ITEM</u>
174, 175	Item #0104073A - Snowmelter Unit Substation
176	Item #0096069A - Removal of Catenary Pole Structure
176	Item #0096070A - Removal of Catenary Structure Foundation
170-172	Item #0090671A - Remove Guy and Guy Anchor Rod
177-181	Item #0100283A - Power Cables and Terminations
177-181	Item #1008472A - 6" Rigid Metal Conduit
177-181	Item #1008510A - 4" Rigid Metal Conduit (Aluminum)
153-159	Item #0100294A - 15 KV Class Insulators
182-188	Item #0100780A - Cranes
189-198	Item #0101000A - Environmental Health and Safety
199-203	Item #0101107A - Contaminated Material Excavation
204, 205	Item #0101130A - Environmental Work - Solidification
206-210	Item #0101133A - Disposal of Contaminated Railroad Ties
211	Item #0202003A - Earth Excavation
212-216	Item #0202315A - Disposal of Controlled Materials
217-219	Item #0202318A - Management of Reusable Controlled Material
220, 221	Item #0202528A - Removal of Railroad Tracks
222, 223	Item #0202636A - Vibrating Wire Piezometer
224	Item #0203004A - Structure Excavation - Earth (Complete)
225-230	Item #0204210A - Handling Contaminated Groundwater
231	Item #0205001A - Trench Excavation 0' - 4' Deep
231	Item #0205003A - Trench Excavation 0' - 10' Deep
231	Item #0205005A - Trench Excavation 0'- 15' Deep
232	Item #0207150A - Lightweight Fill
233	Item #0406999A - Asphalt Adjustment Cost (Estimated Cost)
234, 235	Item #0507026A - Type "C" Catch Basin (4' Sump)
234, 235	Item #0507027A - Type "C" Catch Basin Over 10' Deep (4' Sump)
234, 235	Item #0507048A - Type "C" C. B. Without Sump
234, 235	Item #0507070A - Type "C" Catch Basin Double Grate Type I Over 10' Deep (4' Sump)
234, 235	Item #0507079A - Type "C" Catch Basin Double Grate Type 1 (4' Sump)
236	Item #0507602A - Special Manhole
237, 238	Item #0507640A - Manhole Modifications
234-235	Item #0507649A - Manhole Riser
234-235	Item #0507656A - Standard Storm Manhole
234-235	Item #0507686A - Manhole - 6' Diameter Over 10' Deep
234-235	Item #0507688A - Manhole - 5' Diameter Over 10' Deep
234-235	Item #0507697A - Manhole 10' Diameter
239, 240	Item #0507706A - Gutter Inlet
234, 235	Item #0507707A - Type "C" Catch Basin Double Grate Type 11 Over 10' Deep (4' Sump)
241, 242	Item #0507989A - Junction Chamber No. 1
241, 242	Item #0507990A - Junction Chamber No.2
241, 242	Item #0507991A - Junction Chamber No.3

<u>PAGE NO.</u>	<u>ITEM</u>
243, 244	Item #0511031A - Bridge Scupper - Type A
243-244	Item #0511032A - Bridge Scupper - Type B
245-247	Item #0512024A - 12" Pipe For Bridge Drainage - (Fiberglass)
248-250	Item #0520020A - Elastomeric Concrete Expansion Joint System
251-253	Item #0521001A - Elastomeric Bearing Pads
254-262	Item #0522280A - Isolation Bearing Assembly
263-267	Item #0601057A - High Performance Concrete
268-269	Item #0601082A - 5'x 4' Precast Concrete Box Culvert
268, 269	Item #0601154A - 12'x 4' Precast Concrete Box Culvert
270-273	Item #0601604A - Asphaltic Plug Expansion Joint System
274	Item #0601700A - Stain Protection
275	Item #0602034A - Deformed Steel Bars - Cladded Stainless Steel
276	Item #0602936A - Drilling and Grouting Reinforcing Bars
277, 278	Item #0603272A - Decontamination Facility
279, 280	Item #0603273A - Portable Hand Wash Facility
281, 282	Item #0603345A - Inspection Walkway (Type 1)
281, 282	Item #0603346A - Inspection Walkway (Type 11)
281, 282	Item #0603347A - Inspection Walkway (Type 111)
283-288	Item #0603353A - Structural Steel (Segment 1 and 3)
289-292	Item #0603354A - Structural Steel (Segment 2)
293, 294	Item #0603431A - Steel (Miscellaneous)
293, 294	Item #0603801A - Structural Steel
295, 296	Item #0651970A - Fill Existing Pipe
297	Item #0702896A - Removal of Existing Timber Piles
298	Item #0707001A - Membrane Waterproofing (Woven Glass Fabric)
299	Item #0714020A - Temporary Sheet Piling
300, 301	Item #0714026A - Temporary Sheet Piling (Railroad)
302	Item #0821163A - Concrete Cap
303-305	Item #0822001A - Temporary Precast Concrete Barrier Curb
303-305	Item #0822002A - Relocated Temporary Precast Concrete Barrier Curb
306-308	Item #0904042A - Metal Bridge Rail (Combination) (Extruded Aluminum)
309-311	Item #0904885A - Metal Bridge Rail Protective Fence (5'-0" High) (Chain Link)
312-314	Item #0904908A - Metal Bridge Rail Protective Fence - Type "C"
315-318	Item #0904950A - Metal Bddge Rail (Solid Panel) (Type A)
315-318	Item #0904951A - Metal Bridge Rail (Solid Panel) (Type B)
319, 320	Item #0913045A - 8' Chain Link Fence With Barbed Wire
321	Item #0913827A - Remove and Relocate Fence and Gate
319, 320	Item #0913853A - 8'Chain Link Cantilevered Gate (45'Wide)
322-329	Item #0969000A - Project Coordinator
330-338	Item #0969010A - Installation of Construction Field Office (Type C)
330-338	Item #0969011A - Removal of Construction Field Office (Type C)
330-338	Item #0969012A - Maintenance of Construction Field Office (Type C)
339-360	Item #0971001A - Maintenance and Protection of Traffic
361	Item #0974001A - Removal of Existing Masonry

PAGE NO.

ITEM

362	Item #1002907A - 30' Light Standard (Anchor Base)
363-365	Item #1003884A - Decorative Pilaster Light Fixture
170-172	Item #1003917A - Remove Wood Pole
366-368	Item #1008462A - 1 " Rigid Metal Conduit
366-368	Item #1008468A - 4" Rigid Metal Conduit
369-372	Item #1010001A - Concrete Handhole
170-172	Item #1010902A - Remove Concrete Handhole
373-381	Item #1012232A - Cable Testing
170-172	Item #1014902A - 2400 Volt Cable Removal
170-172	Item #1014909A - Secondary Overhead Cable Removal
382	Item #1015034A - Grounding and Bonding
153-159	Item #1015039A - Pole Line Grounding
366-368	Item #1015045A - Pull Box Rehabilitation
383, 384	Item #1017032A - Service (Metered)
385, 386	Item #1017200A - Surge Arrestors
385, 386	Item #1017201A - Surge Arrestors - Signal Power Systems
387-391	Item #1020001A - Wood Pole
387-391	Item #1020021A - Pole Hardware
392	Item #1104072A - 60' Steel Mast Arm Assembly (18' Mounting Height)
392	Item #1104074A - 60'Steel Mast Arm Assembly (32'Mounting Height)
393	Item #1104254A - 6'C.C.T.V. Camera Pole Mounting Bracket
393	Item #1104255A - 25'C.C.T.V. Camera Pole Mounting Bracket
394, 395	Item #1105105A - 1 way, 5 Section Mast Arm Traffic Signal
394, 395	Item #1105107A - 2 way, 3 Section Mast Arm Traffic Signal
394, 395	Item #1105125A - 2 way, 3 - 5 Section Mast Arm Traffic Signal
396, 397	Item #1106002A - 2 Way Pedestrian Signal Pole Mounted
396, 397	Item #1106004A - 2 Way Pedestrian Signal Pedestal Mounted
398	Item #1108187A - System Integration
399-406	Item #1108214A - Remote Communications Unit Termination Panel and Harness In New Cabinet
407, 408	Item #1108215A - Remote Communications Unit
409-422	Item #1108578A - Full Actuated Controller 8 Phase (Modified)
423	Item #1108645A - Auxiliary Termination Cabinet
424-430	Item #1108706A - Fiber Optic Video/Data Transmitter/Receiver Pair
431-437	Item #1108724A - Phase Selector
438, 439	Item #1108809A - Documentation
440	Item #1111401A - Loop Vehicle Detector
441	Item #1111404A - Microwave Vehicle Detector
442, 443	Item #1111451A - Loop Detector Sawcut
444-448	Item #1112210A - Camera Assembly
449-452	Item #1112241A - Fiber Optic Cable Splice Enclosure
431-437	Item #1112410A - Detector (Type A)
431-437	Item #1112470A - Pre-emption System Chassis

<u>PAGE NO.</u>	<u>ITEM</u>
431-437	Item #1113550A - Detector Cable (Optical)
453-463	Item #1113601A - Optical FiberCable - Single Mode Loose Buffer Tube Cable, 2 Fiber
453-463	Item #1113606A - Optical FiberCable - Single Mode Loose Buffer Tube Cable, 12 Fiber
464	Item #1114201A - Auxiliary Equipment Cabinet
465	Item #1118012A - Removal and/or Relocation of Traffic Signal Equipment
466, 467	Item #1118101A - Temporary Signalization
468	Item #1204122A - Install City Furnished Signs
469, 470	Item #1206023A - Removal and Relocation of Existing Signing
471-478	Item #1301081A - 6" Ductile Iron Pipe (Water Main)
471-478	Item #1301082A - 8" Ductile Iron Pipe (Water Main)
471-478	Item #1301084A - 12" Ductile Iron Pipe (Water Main)
471-478	Item #1302003A - 6" Gate Valve
471-478	Item #1302004A - 8" Gate Valve
471-478	Item #1302006A - 12" Gate Valve
471-478	Item #1302159A - 12" Cap (Water Main)
471-478	Item #1302174A - 8" Cap (Water Main)
471-478	Item #1303198A - Hydrant (Water Main)
479-482	Item #1303230A - Fire Suppression Standpipe System
471-478	Item #1305000A -Vault
483-485	Item #1400104A - 12" Polyvinyl Chloride Pipe (Sanitary Sewer)
483-485	Item #1400108A - 24" Polyvinyl Chloride Pipe (Sanitary Sewer)
483-485	Item #1401984A - 18" PVC (Sanitary Sewer)
486, 487	Item #1403001A - Manhole (Sanitary Sewer)
486-487	Item #1403002A - Manhole Over 10'Deep (Sanitary Sewer)
486-487	Item #1403085A - Manhole With 6' Diameter - Over 10' Deep (Sanitary)
488, 489	Item #1403501A - Reset Manhole (Sanitary Sewer)
490-492	Item #1 500024A - 4" Fiberglass Conduit Fastened to Bridge
493-495	Item #1500123A - Concrete Ductbanks
496	Item #1700001 A - Service Connections (Estimated Cost)
497-499	Item #2999999A - Training

REQUIRED CONTRACT PROVISIONS

Form PR-1273 All Federal Aid Construction Contracts.
Sworn Statement by Successful Bidder.

Connecticut Required Contract Provisions, State of Connecticut

Specific Equal Employment Opportunity Responsibilities, Connecticut Required Contract/Agreement Provisions, April 1994.

Substitution of Securities for Retainage.

Nondiscrimination.

Construction, Alteration or Repair of Public Works Projects by the State or Political Subdivision.

Service of Process.

Listing All Employment Openings with the Office of the Connecticut State Employment Service.

Labor on State Bridges.

Rate of Wages for Work on State Highways.

Awarding of Contracts to Occupational Safety and Health Law Violators Prohibited.

Executive Order No. Three.

Guidelines and Rules of State Labor Commissioner Implementing Governor's Executive Order No. Three.

Executive Order No. Sixteen

Executive Order No. Seventeen.

A (76) Affirmative Action Requirements.

Education, Welfare and Public Health Tax.

Construction Safety and Health Standards.

Standard Federal Equal Employment Opportunity Construction Contract Specification (Executive Order 11246).

SUPPLEMENTAL SPECIFICATIONS TO THE STANDARD SPECIFICATIONS FORM 814A

The Supplemental Specification to the Standard Specification, Form 814A is included in this Contract.

STATE AND FEDERAL WAGE SCHEDULES.

Permits and Applications

Federal Aid Project No. STPA-IBR-STPN-MGS-1092(110)
State Project No. 92-526

CHURCH STREET SOUTH EXTENSION
OVER NEW HAVEN INTERLOCKING
AND RAIL YARD

The State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction, Form 814A, 1995, as revised by the Supplemental Specifications dated January, 2000 (otherwise referred to collectively as "ConnDOT Form 814A") is hereby made part of this contract, as modified by the Special Provisions contained herein. The Special Provisions relate in particular to the construction of the Church Street South Extension over the New Haven Interlocking and Rail Yard in the City of New Haven.

CONTRACT TIME AND LIQUIDATED DAMAGES

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

For this contract, an assessment per day for liquidated damages, at a rate of Five Thousand Three Hundred Dollars (\$5,300.00) per day shall be applied to each calendar day the work runs in excess of the Eleven Hundred Thirty One (1131) allowed calendar days for the contract.

NOTICE TO CONTRACTOR - GENERAL PERMIT FOR STORMWATER DISCHARGE

On October 1, 1997 the Connecticut Department of Environmental Protection's General Permit for Stormwater Discharges (GPSD) from Construction Activities went into effect. When construction activities will result in the disturbance of a total of 5 acres or more of land within the project limits, the Department must insure compliance with all conditions of this Permit (GPSD). 'Construction Activities' as defined in the GPSD include, but are not limited to, the following; clearing, grubbing, grading, excavation, placement of fill, and dewatering activities.

The Department has incorporated a 'Stormwater Pollution Control Plan' (SPCP) within the contract documents in order to insure compliance with the conditions of the GPSD. The SPCP addresses pollution caused by soil erosion and sedimentation during and after construction as well as the long term use of the facility after construction is completed. A copy of the GPSD is included in the contract special provisions. The Contractor will be required to comply with all applicable conditions of the GPSD.

The Contractor and all subcontractors must sign a certification as stated in the GPSD (see page 14 & 15 of the GPSD, item E. Contractors, ii. Certification Statement). There will be no additional payment for the Contractor to sign the certification and no additional payment for the Contractor to comply with the conditions of the GPSD.

The Engineer will be the registrant and Permittee for the purposes of filing the registration

If the Contractor proposes activities which require modifications to the Stormwater Pollution Control Plan prior to the start of construction, he must notify the Department in writing within 30 days of submitting the apparent low bid. The Department shall approve or reject the plan and notify the Contractor in writing as to any revisions required for approval, within 30 days of the date of the Contractor's submission. No damage for delays will be granted due to the Contractor's failure to provide a suitable plan and certification. Any modifications to the contract must also conform to the requirements of Section 1.10 - Environmental Compliance, of the Standard Specifications and any Supplements thereto. If the Contractor modifies his activities after the registration has been submitted and construction has begun, so that the SPCP is no longer in compliance with the GPSD, then the Contractor will be responsible for updating the Stormwater Pollution Control Plan. No additional payment will be made for revisions to the Stormwater Pollution Control Plan required as a result of the Contractor's modifications to the contract. The Contractor must submit all revisions in writing to the Engineer for approval. Under no circumstances can the Contractor proceed with activities which require revisions to the Stormwater Pollution Control Plan until approval is obtained from the Engineer.

NOTICE TO CONTRACTOR – WORK ON RAILROAD PROPERTY

The Contractor acknowledges that work to be accomplished under this contract is to be performed on Railroad territory, which consists of territory operated by either Metro-North or Amtrak (National Railroad Passenger Corporation). The Contractor's work must be accomplished simultaneously with ongoing daily railroad operations. Such operations include, but are not limited to, the passage of trains, flagging, inspection, repair, construction, reconstruction, and maintenance of the railroad right-of-way and facilities.

The Contractor is advised that the Railroad (Metro-North or Amtrak) controls all activity in their respective right-of-way, and the Department expects that these conditions will cause delays and possibly a complete suspension of construction activity. If the Contractor is delayed or suspended in the completion of the work by railroad operations, the Contractor will be entitled to a time extension for every day that he can demonstrate that the delays affected the completion date of the contract. This extension of time will be considered non-compensable and the Contractor will not be entitled to any additional compensation for damages incurred for all direct and indirect costs including, but not limited to, all delay and impact costs, and inefficiencies.

The limits of this project overlap Metro-North and Amtrak operating territory, within the New Haven Rail Yard.

Coordination of Work

There is a need to coordinate demolition and construction work, construction field office locations, vehicular access, and material stockpiling and staging areas with the following adjacent projects within the New Haven Rail Yard:

- New Haven Rail Yard, Diesel Shop Reconstruction, Project No. 301-023
- New Haven Catenary Replacement, Project No. 301-025
- New Haven Interlocking Track Reconstruction (Metro-North)
- New Haven Interlocking Signal Reconstruction (Metro-North)
- New Haven Substation Construction, Project No. 301-041
- State Street Railroad Station, Project No. 92-H087
- Grand Avenue Bridge, Project No. 92-412
- Route 34 Overpass Painting and Access Platform, Project No. 92-527
- Galleria At Long Wharf construction (Private Development)
- New Haven Interlocking Reconfiguration, Project No. 301-0001
- New Haven Rail Yard Complex Facilities Improvements, Project No. 301-0039

The Contractor's activities may overlap with activities of other contractors engaged in the execution of the above projects. There is a potential for limitations on track outages, and extraordinary requirements for vehicular access coordination. The Contractor must conduct his work within such limitations. This may require night work, premium time (weekend work), or double shifts. The Contractor is fully responsible to complete the contract work.

The Contractor shall be responsible for the coordination of the work of his various subcontractors. The Contractor shall coordinate his operations with those of the Railroad Company in carrying out railroad force account work.

The Contractor's employees, and the employees of all subcontractors, who will be entering the jobsite within Railroad territory, must undergo a Railroad safety training class, of approximately one hour, offered by each Railroad. The Engineer will arrange for the class, however, the Contractor is responsible for insuring that all employees on the jobsite have been trained. No additional compensation will be allowed to the Contractor for employees time for attending these classes. Refer to the special provision entitled "Coordination with Utilities, including Railroads."

The Contractor must make his own arrangements with the Railroad Company for the use of Railroad equipment or changes in Railroad facilities made solely to facilitate the Contractor's operations. The expense incurred by making such arrangements shall not be a part of this contract.

Signal Cables

The Contractor is hereby advised that Metro-North Railroad signal cable may exist within or adjacent to the project work area. The Contractor shall contract Mr. David W. Jacobs of Metro-North at (203) 786-8204, prior to any below ground excavation to assist in the identification and disposition of these cables. The signal cables are generally direct burial or in conduit, 18-72 inches below grade. Any cables or conduits which conflict with the contract work will be relocated by the Railroad prior to commencement of the work.

Contractor Requirements for Work Affecting the Railroad

The Contractor shall be governed by the terms of the Contract, and the referenced sections of the document entitled "State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges, and Incidental Construction, Form 814A," dated 1995, and supplemental specifications thereto dated January, 2000, with the following additions:

1. All matters requiring Railroad Company approval or coordination shall be directed to:

In Metro-North Territory: Mr. David W. Jacobs, P.E.
 Metro-North Commuter Railroad
 Union Station – 4th Floor – West End
 50 Union Avenue
 New Haven, CT 06519

In Amtrak Territory: Mr. James Turngren
 National Railroad Passenger Corp. (AMTRAK)
 Union Station – 2nd Floor – East End
 50 Union Avenue
 New Haven, CT 06519

2. In general, unless otherwise authorized by the Railroad, operations directly over or adjacent to operating right-of-way will be performed during the time periods as noted in the "Notice to Contractor – Allowable Track and Power Outages", elsewhere in this special provisions, supplemented as follows:

1. Single track outages will be considered as requests are submitted.
2. The outages are not guaranteed at all times.

3. The Contractor's plan for demolition and erection shall be submitted to the Engineer for Railroad approval, prior to start of work.
4. No full track and/or power outages will be permitted on weekends either immediately before or after major holidays, nor any weekend between Thanksgiving and New Years day.
5. The hours shown for track outages are not the actual time tracks will be out of service. Time should be allowed for de-energizing and re-energizing power facilities.

Temporary at-grade crossings across any tracks in the yard, or especially across the main New Haven Rail Line for vehicles and equipment for ANY purpose shall be approved by Metro-North Railroad. All vehicles, equipment and materials for demolition, stockpiling, and associated activities shall be delivered via existing at-grade crossings across yard tracks. The New Haven Rail Yard will be accessed via the Hallock Street or Brewery Street entrances, and the building construction, building demolition, field office trailer, material stockpiling, and soil stockpiling areas shall be accessed via the internal access roadways within the New Haven Rail Yard.

All work involving rail, ties, and other track components on active tracks, unless specifically designated otherwise within the contract, will be performed by Railroad employees. The Contractor may not remove abandoned track (out of service) unless given prior written approval from the Railroad and the Engineer.

Track Descriptions

All tracks within the New Haven Rail Yard are to be assumed to be operating/live, unless otherwise designated by the Engineer or the Railroad. Tracks within the New Haven Rail Yard are used for either rolling stock storage or movement.

Danger from Electrified Wires/Structures of the Railroad

Because the Contractor shall assume that the wires and rails of the Railroad will be energized at all times, the Contractor shall require all of his employees, subcontractors, and others, to sign a form similar to the following form, and furnish the Railroad with one original copy:

WARNING OF DANGER FROM ELECTRIFIED WIRES AND STRUCTURES
TO ALL PERSONS COMING NEAR ELECTRIFIED WIRES AND STRUCTURES

Notice is hereby given that contact, direct or indirect, with any of the electrified wires or structures of this Company is apt to result in serious injury or death and you are warned to avoid all such contact.

Dated: _____

Job AFE No. _____
Title _____

RECEIPT

I have, this day, received and carefully read the warning of danger from electrified wires and structures, issued by you, which was attached to this receipt.

Signed _____

Occupation _____

Date _____

In the presence of:

Witness

Job AFE No. _____

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

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

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

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

NOTICE TO CONTRACTOR – ALLOWABLE TRACK AND POWER OUTAGES

Metro-North Railroad

1. General

Unless otherwise authorized by the Railroad, operations directly over or adjacent to operating right-of-way will be performed as follows:

The Contractor's operations shall be planned and staged to avoid track usage unless absolutely essential. Track usage is granted by Metro-North Railroad based on need, not for the convenience of the Contractor.

Non-main line tracks may be made available, as railroad operations allow, between approximately 9 a.m. and 3 p.m. daily. Certain non-main line tracks may be made available only for short intermittent periods within the time frames given above.

Main line tracks may be made available for track and/or power outages dependent upon the work required and as railroad operating conditions allow. The hours of main line track availability are varied, limited and change depending on operating constraints and requirements of other projects. Every effort will be made to support the Contractor's requirements. However, because of the limited availability of track outage time the Contractor is advised to plan his/her operations to minimize required track and/or power outages.

Specifically for the removal of the temporary protective shielding used to allow for the placement and removal of the cantilever deck slab forms and overhang brackets, the main line tracks will be made available from the hours of approximately 2:30 a.m. to 5:30 a.m. on Saturday and Sunday, only for the duration of that work.

It is important to note that operations that require power outages may further limit track outage availability. This is because adjacent sections of track also lost to power outages, as well as the time required to deenergize, ground and reenergize the catenary system.

Every effort will be made to accommodate the Contractor's need. However, all decisions regarding track and/or power outages are subject to review by Metro-North Railroad. The final decision will be based on the specific circumstances and operating conditions.

Except as detailed below under "Truss Erection", it is anticipated that work by the Contractor over the main line tracks that require track and power outages will be required only to remove the protective shielding/work platforms used on the truss to allow for construction and removal of the cantilever support brackets and forms for the concrete deck overhangs.

Truss Erection

Erection (Lifting and Moving) of the structural steel truss (Segment 2) into its final position over the Interlocking and Mainline tracks will be limited to a Saturday morning between approximately 2:30 a.m. and 5:30 a.m. If the erection is cancelled by Metro-North Railroad at its discretion due to inclement weather, operational constraints or any other factor, the erection may take place the following Sunday morning between approximately 2:30 a.m. and 5:30 a.m.,

providing circumstances permit. Metro-North Railroad shall have the authority to postpone the erection for reasons of safety, weather, operations or any other reasonable consideration.

2. The indicated times are subject to change based on the operating needs of the Railroad. Any delays resulting from deviation from the indicated times will be considered excusable but non-compensable delays.
3. No full track and/or power outages will be permitted on weekends either immediately before or after major holidays, as defined elsewhere in these specifications, nor any weekend between Thanksgiving and New Year's day.
4. The hours shown for track outages may not be the actual time the tracks are out of service. Time should be allowed for de-energizing and re-energizing power facilities.

Amtrak

The Contractor's activities within the Parcel "G" and Parcel "B3" properties in the New Haven Rail Yard shall be coordinated with Amtrak.

Unless otherwise authorized by the Railroad, operations directly over or adjacent to operating right-of-way will be performed as follows:

1. Construction of Pier 1: 11 p.m. to 6 a.m., 7 days per week.
2. Construction of Abutment 1: unlimited.
3. Erection of Welded Girders (Segment 1) and other activities in Segment 1 requiring the use of Parcel "G": 11 p.m. to 6 a.m., 7 days per week.
4. During construction of Abutment 1: Amtrak requires that a fuel truck be able to access the new pit at Track S1. Depending on the timing of State Project No. 92-526 and the Amtrak project in Parcel "G", a temporary crossing may need to be constructed by the Contractor to allow access along Track 13 and then crossing Tracks S2 & S3.

The cost of the temporary crossing (s) as required by Amtrak shall be included in the general cost of the work.

5. It shall be noted that the Contractor shall not utilize the work areas at Abutment 1 and Pier 1 at the same time.

NOTICE TO CONTRACTOR – ERECTION OF STRUCTURAL STEEL TRUSS (SEGMENT 2)

General

The Contractor's attention is directed to the fact that a specific erection sequence has been developed for completing the erection of the structural steel truss (Segment 2) within the New Haven Interlocking and Rail Yard. See the Erection Drawings and the Special Provisions, "Cranes" and "Structural Steel (Segment 2)".

The erection sequence for the structural steel truss (Segment 2) includes the use of a single high capacity crane (hereinafter referred to as "the crane") with a sufficient load and movement capacity to lift and move the fully assembled truss segment from temporary supports south of Proposed Pier 2 to its final position over the Interlocking and Mainline Tracks. The fully assembled truss is the completed structure of Segment 2, including remain-in-place forms, inspection platforms, proposed utilities and drainage and protective shielding/work platforms, but exclusive of the concrete bridge deck, as indicated on the plans and in these specifications. Additional permanent and/or temporary components may be included in the lift as determined by the Contractor and approved by the Engineer, with the purpose being to minimize the work required over the tracks. No temporary bents or towers will be allowed between Proposed Piers 1 and 2.

Crane

Three companies have determined that they can provide a crane that is capable of completing the erection of the fully assembled truss segment. The companies, that have identified themselves as having a crane model that can accomplish this work, are, in alphabetical order:

Davenport Mammoet, L.L.C. 20525 FM 521 Rosharon, TX 77583 Phone (281) 369 – 2200 Contact: Mr. Donni Davenport	Lampson International, Ltd. P.O. Box 6510 Kennewick, WA 99336 Phone (509) 586 – 0411 Contact: Mr. Bryan Pepin-Donat	Van Seumeren USA, Inc./ Marino Crane, JV. 13231 Champion Forest Drive Suite #104 Houston, TX 77069 Phone (281) 893-9337 Contact: Mr. John Nelson
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Each company has also acknowledged that they have a crane that can be made available to meet the Contractor's schedule for the project, provided that adequate advance notice is given. As a condition of availability, each company may require that a deposit be paid to secure the crane to meet the Contractor's schedule. The Contractor shall investigate the crane owner that he intends to use, to his full satisfaction, and shall be responsible for the successful completion of the work.

Condition of Bid Acceptance

As a condition of bid acceptance, the Contractor shall provide written proof that a crane capable of accomplishing this work is available and can be secured by him for use on the project. The Contractor's documentation from the crane company shall state that the crane is available to allow for the Contractor to complete the work within the available contract time for the project. The statement shall be signed by the Contractor and the owner of the crane, and shall be notarized.

Condition of Award

As a condition of award of the contract, the Contractor shall verify that he has secured the crane that he proposes to use to complete the erection of the proposed truss segment. The crane secured shall be capable of completing the erection without future modifications or waivers of the Metro-North Railroad requirement that the crane be capable of completing the operation using 150% of the load.

This verification shall indicate that the Contractor has met any and all of the requirements of the crane owner to secure the crane including placing a deposit, if required by the crane company, prior to the award of the contract.

The Contractor's verification shall include written proof that he has secured a crane that will allow him to complete the work within the available contract time for the project. The statement shall be signed by the Contractor and the owner of the crane, and shall be notarized.

Payment to Contractor for Securing the Crane

Immediately following the "Notice to Proceed" for the contract, and as part of the pay item for "Cranes", the Contractor may submit a request for payment for the full amount of the deposit that the Contractor has placed with the crane owner to secure the crane.

Metro-North Railroad Review and Requirements

The erection sequencing and methods developed for the truss segment, as shown on the plans and in the specifications, has been coordinated with and reviewed and endorsed by Metro-North Railroad. It was developed with consideration given to minimizing impacts to the rail operations within the New Haven Interlocking and Rail Yard.

All work within the New Haven Interlocking and Rail Yard is governed by the ConnDOT Department of Rails, Metro-North Railroad and Amtrak requirements, as applicable, and shall be coordinated by the Contractor. The coordination of the work with all affected parties is the complete responsibility of the Contractor. The Department will acknowledge no changes, claims or delays to the Contractor's work, due to insufficient coordination of the work.

Track and power outages are required for the Contractor's operations on and adjacent to the tracks, including but not limited to the erection of the truss segment. Metro-North Railroad and Amtrak will determine the allowable periods that this work can be accomplished.

Additional information regarding specific requirements governing the Contractor's work within the New Haven Interlocking and Rail Yard, is given on the plans and elsewhere in these specifications, including, the Special Provisions, "Notice to Contractor – Work on Railroad Property" and "Section 1.05.06 – Cooperation with Utilities (Including Railroads)".

Geotechnical/Crane Foundations

The Contractor shall note that limited subsurface investigations have been completed in the areas designated for the placement of the crane as shown on the erection sequence drawings. The crane foundations shown on the plans are schematic and for information only. Included in this work, is the requirement that the Contractor submit a foundation analysis and design for the crane. It shall be prepared by a Professional Engineer licensed in the State of Connecticut, and experienced in this type of work. Any and all foundations required to adequately support the crane

shall meet the requirements of the crane owner. The Contractor shall perform additional subsurface investigations that are required to complete the analysis and design.

Work Area

The Contractor shall note that a sizeable work area will be required to assemble, operate and disassemble the crane. Work areas as shown on the erection sequence drawings have been designated to complete this work. The work areas have been coordinated with Metro-North Railroad and Amtrak for use by the Contractor. If the Contractor requires the use of additional areas for his operations he shall be responsible for coordinating the use with the railroads. Refer to the plans and in the special provision "Notice to Contractor – Work on Railroad Property" for additional information pertaining to work on railroad property.

Relocation/protection of utilities within the crane work areas is the responsibility of the Contractor. The measures taken to relocate/protect the utilities shall be coordinated with and as required by the owner of the each utility. Coordination, design and construction of this work is the responsibility of the Contractor and shall be completed at no cost to the State. The work will be included in the cost for the item "Cranes".

Contractor Proposed Alternatives

The Contractor is hereby notified that the Department has determined that no feasible alternative erection methodology exists that will have equal or less disruption to railroad operations within the New Haven Interlocking and Rail Yard. Therefore, the Contractor is hereby advised that **No Alternative Erection Schemes** will be entertained for the erection of structural steel truss (Segment 2). This includes but is not limited to any Value Engineering Proposal the Contractor may consider appropriate.

The Contractor may consider the use of a crane company other than the three (3) mentioned within this Notice To Contractor, however should the footprint of any approved equal require more area for assembly and operation than that shown on the erection sequence drawings for the truss of Segment 2 then the Contractor shall be responsible for the following:

- Coordination with and approval from the appropriate rail company/property owner of any additional parcel of property required.
- Any time required to procure the use of the additional property.
- Any utility relocation resulting from the use of the additional property.
- Any restoration of additional property.

In no case shall any additional cost to the State be incurred for the Contractors attempt to secure the use of an alternative crane.

Note: If the Contractor chooses to pursue the use of an alternative crane company, the Contractor must submit a complete package that addresses all the requirements in the contract specifications and on the contract plans for the crane. This submission must be made to the Department within 30 days of the Contractor being deemed the apparent low bidder. The Department shall review and approve or comment on the Contractor's submission within 30 days of receipt of the submission. The Department must approve the submission as a condition of the award. No extension of the time frame for award will be issued due to the Contractor's failure to receive

approval of the alternative crane submission. Failure to receive approval of the alternative crane submission will result in the Contractor's bid being deemed a non-responsive bid.

V-A-C-A-N-T

NOTICE TO CONTRACTOR - BIDDERS SUBMISSION OF FINANCIAL INFORMATION

A bidder who has submitted a Part B Financial Statement with its Prequalification Statement (CON- 16) has the **option** of submitting a revised Part B statement (pages 7, 8, 9 and page 10 or 11, whichever is applicable) with the bid proposal for the purpose of establishing a revised bid capacity for the subject bid and subsequent bids. If a bidder submits a revised Part B with its bid, the bid must be accompanied by a separate audited or reviewed financial statement prepared by an independent Certified Public Accountant for the same fiscal period as the revised Part B (see page ii, Section 5 of the Prequalification Application). **If a bidder chooses not to submit its revised Part B with the bid proposal for the subject bid, the bidder will not be given an opportunity to do so after the bid opening.**

The Part C statement of outstanding work required when requesting a bid package for bids must still be submitted as a pre-bid requirement. **In addition, a current Part C must also be submitted with the bid proposal.** The information in the Part C submitted with the bid must have been gathered or produced no more than two (2) weeks prior to the submission of the bid proposal. It is understood that some contractor's recordkeeping and accounting systems may not generate, or be able to generate, reports of outstanding work frequently enough to produce "new", up-to-date information within that time frame, in which case the bidder should submit the most recent information or report that can be generated by its "system". The latter will be acceptable to the Department, however, only if the information submitted with the bid (a) was "pulled from the system within two weeks prior to submission of the bid, and (b) the underlying information was accurately updated by the bidder's "system" no more than one month before the bid submission. The Part C must be completed, notarized, sealed and signed by an individual authorized to sign legal documents and contracts on behalf of the bidder. **Failure to comply with this requirement will result in your bid being rejected as nonresponsive.**

NOTICE TO CONTRACTOR – PROTECTION OF EXISTING UTILITIES

The utilities within the limits of the New Haven Rail Yard are owned by The State of Connecticut/Metro-North Railroad, except for the gas service, which is owned up to the building connections by The Southern Connecticut Gas Company (SCG) and the communications cables at the base of the retaining wall along Union Avenue, which are owned by SNET. See also Section 1.07 – “Contractor’s Responsibility for Adjacent Property and Services”.

It should be noted that the work included under this contract requires the relocation of numerous utility installations, both within the limits of the New Haven Rail Yard and Interlocking, and outside the Rail Yard. The removal of previously abandoned utilities is also required. In general, the utility relocations and removals are required to allow for construction of the proposed substructure components of the bridge and the proposed drainage facilities. The required utility relocation work is to be completed under this project, as well as several concurrent projects, as noted on the plans and in these specifications or as directed by the Engineer. It is the responsibility of the Contractor to insure that the required utility relocations and/or removals that he is performing are completed prior to the proposed construction.

The Contractor shall be aware that before, during and after the completion of the project, there are several other ongoing independent projects adjacent to and within the project limits. These projects are as listed in Section 1.05.07 – “Coordination with Work by Other Parties”. These projects also include the relocation of existing utilities and the installation of new facilities. It should be noted that the Contractor’s activities may overlap the activities of the contractors engaged in the execution of the other projects, as well as, the activities of State of Connecticut, Metro-North, Amtrak and other railroad and utility company personnel.

The Contractor shall completely coordinate his operations with the affected utility companies and/or agencies, and to insure that his work is coordinated with that of the other contractors. The coordination of the work is the complete responsibility of the Contractor. When the work required under his contract is in conflict with work being carried out by another contractor or agency, it is the responsibility of the Contractor to notify the Engineer immediately of the conflict.

Existing utilities shall be maintained during construction except as specifically stated herein and/or noted on the plans and as coordinated with the utilities. The Contractor shall verify the location of underground, structure mounted and overhead utilities. Construction work within the vicinity of utilities shall be performed in accordance with current safety regulations.

The Contractor shall notify “Call Before You Dig”, telephone 1-800-922-4455 for the location of public utility, in accordance with Section 16-345 of the Regulations of the Department of Utility Control.

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

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 the information shown on the plans or contained elsewhere in the specifications.

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

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

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

The Contractor's attention is directed to the requirements of Section 1.07.13 – "Contractor's Responsibilities for Adjacent Property and Services".

Prior to opening an excavation, effort shall be made to determine whether underground installations, i.e., water, sanitary, gas, electric ducts, communication ducts, etc., will be encountered and, if so, where such underground installations are located. When the excavation approaches the estimated location of such an installation, the exact location shall be determined by careful probing or hand digging, and when it is uncovered, proper supports shall be provided for the existing installation. Utility companies shall be contacted and advised of proposed work prior to the start of actual excavation, as noted above. Note that test pits have been dug at several locations throughout the project. The test pit data is shown on the plans.

Railroad Protection

Railroad flagging that is required within the rail yard by the privately owned utilities to complete their work is the responsibility of the Contractor. The Contractor shall coordinate the scheduling of the protection with the railroad and the privately owned utility company requiring the flag.

Proposed UI and SNET Easement Within the Rail Yard.

The Contractor shall survey and stake out the proposed utility easement (UI and SNET) prior to the installation of the proposed utilities. The stakes shall sufficiently identify the easement.

Clearing and Grubbing

The Contractor shall complete all clearing and grubbing required by each of the utilities within the limits of their work as soon as possible.

Waste Stockpile Area (WSA)/Ground Water Treatment

The utilities are required to transport all excess and/or unsuitable excavated material and ground water to the WSA and Ground Water Treatment Facility, respectively. The utilities may not begin any excavation prior to the completion of the WSA and Ground Water Treatment Facility. Therefore, it is essential that the WSA and Ground Water Treatment Facility be established to allow for the utility relocations to begin. Each of the utility companies is responsible for dewatering their excavations and to adhere to the required environmental specifications.

Utility Installations on Segment 2

It shall be specifically noted that the water main and telephone conduit on the truss span of Segment 2 shall be installed prior to the lifting and moving of the completed truss into its final position on Piers 1 and 2. The section of the water main shall be completely pressure tested by the water company prior to lifting the truss (approximately 48 hours will be required for the water company to complete the testing). The Contractor shall be responsible for and completely coordinate this work with the utility companies so as not to delay the project.

It is the responsibility of each utility properly ground and bond their pipe/conduit over electrified wires within the yard. Metro-North Railroad and/or Amtrak will determine the need for the ground and bonding system.

It is anticipated that the installation of the proposed telephone conduits and water main on the proposed Church Street South will be completed in several stages depending on the actual sequencing of the work by the Contractor. The Contractor is responsible for the complete coordination of the work with each of the utilities.

Utility Installations Within the Project Limits

The utility installations being completed as part of this project, includes but is not limited to the following:

- The existing gas mains are being abandoned and the proposed gas mains are being placed by SCG. SCG will require approximately one month to complete this work.
- The existing overhead electric and telephone lines at the south end of the Rail Yard are being placed underground in concrete encased duct banks by UI and SNET, respectively. UI and SNET will require approximately six months to complete this work.
- The existing overhead electric, telephone and communications lines along the retaining wall at the south side of Union Avenue will be relocated to new poles along the north side by UI, SNET and AT&T Local Services. Approximately six months will be required to complete this work.
- The existing communications cables at the base of the Union Avenue retaining wall are to be relocated by SNET. Under this contract, the Contractor is required to provide surface mounted and underground conduit, conduit installed through the existing concrete retaining wall and connections to the existing manholes, etc. as shown on the plans to accommodate the communications wires by SNET. SNET will complete this work as part of the relocation of their underground duct bank in Union Avenue.
- Existing overhead, surface mounted and embedded electric wires are to be relocated by the Contractor, as shown on the plans.
- Existing overhead communications wires within the rail yard are being relocated underground or removed by Metro-North Railroad prior to the Contractors work under the project in this area.
- Existing water mains and sanitary sewers, as shown on the plans, are to be relocated by the Contractor.
- New water mains and sanitary sewers, as shown on the plans, are to be installed by the Contractor.

- The Contractor is required to relocate all existing utilities impacted due to the operation of the High Capacity Crane. The Contractor is responsible for the design and coordination of the relocations with the utility owners, as required.

Utility Sequencing/Details

The following utility sequencing and details are required to allow for the completion of the construction of the project. It does not necessarily include all of the relocation work required, the coordination of which shall be the complete responsibility of the Contractor. The listing includes work that is to be completed under other projects and by Metro-North Railroad.

- The Contractor shall complete all work required to allow each of the utilities to relocate their facilities. The Contractor shall completely coordinate the timing and sequencing of the relocation work with the work required under the contract. Delays to the project as a result of the Contractor's lack of coordination with the utilities is the complete responsibility of the Contractor.
- The existing gas mains are to be abandoned and removed prior to construction of Piers 6 and 7, Abutment 2, the retaining structure and the proposed drainage, box culvert and water mains at Church Street Extension. The Contractor shall take extreme caution at the crossing of the box culvert and proposed gas main at Church Street South. It is anticipated that the proposed box culvert will be installed under the proposed gas main.
- The existing overhead electric and telephone wires and poles and the south end of the rail yard shall be relocated prior to construction of Pier 7. It is anticipated that the proposed conduit duct banks will be installed above the existing and proposed drainage pipes to the west of the bridge at the south end of the rail yard.
- The existing fire protection main shall be relocated prior to construction of Pier 7.
- The existing overhead electric and telephone wires and poles along the Union Avenue retaining wall and the underground telephone duct bank at Union Avenue are to be relocated prior to reconstruction of the wall and construction of Abutment 1 and Wingwalls.
- The existing communications and electric wires in and adjacent to the Union Avenue retaining wall shall be relocated prior to construction of Abutment 1 and Wingwalls.
- The proposed drainage at Church Street South is to be installed prior to the relocation of the underground telephone duct bank.
- The Contractor shall take extreme caution in the vicinity of the Union Avenue retaining wall not to damage the existing underground electric duct bank to remain. The location of the duct bank shown on the plans is based on limited field investigations.
- The overhead electric feeder wires and poles and the overhead communications wire and poles in the rail yard shall be relocated prior to the construction of the Waste Stockpile Area and Pier 5.
- The guy wires for the existing railroad catenary system shall be relocated prior to construction of Pier 5.
- The existing abandoned communications wires and handhole shall be removed prior to construction of Pier 4.
- Existing drainage and water mains in the rail yard shall be relocated prior to construction of various proposed piers.
- In the vicinity of the Wheel Mill Building and the Train Masters Building, the overhead electric wires are to be relocated by the Contractor and the overhead communications wires are to be relocated by Metro-North Railroad, prior to assembly of the High Capacity Crane.

- The overhead power and signal feeder wires supported on TP #3 and TP #4 are to be removed under State Project No. 301-0039 prior to construction of proposed Piers 3 and 4, proposed superstructure of Segment 3 and the proposed truss of Segment 2.
- The Contractor shall coordinate the installation of the load center at Church Street South/Union Avenue with UI.

NOTICE TO CONTRACTOR - PROCUREMENT OF MATERIALS

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

V-A-C-A-N-T

NOTICE TO CONTRACTOR - PROGRESS PHOTOGRAPHS

The Contractor shall take color photographs at four (4) month intervals to record the general progress of the project. The photographer must be a commercial photographer. Resume must be submitted to the Engineer for approval. A sufficient number of views of the job site shall be photographed to provide an indication of the work accomplished to date.

At intervals of eight (8) months (alternate four month intervals), the photographs shall include aerial photographs taken from an airplane or helicopter. If in the opinion of the Engineer, the work progress does not justify the need for aerial photographs, the eight month interval may be increased. At no time will aerial photographs be required at intervals of less than eight months.

Copies of all photographs taken shall be submitted to the Engineer at each four month interval for selection of those photographs to be enlarged to 8 in. x 10 in. size. The Contractor shall provide two copies of the 8 in. x 10 in. photographs suitably titled and dated. The photographs shall be delivered to the Engineer.

There shall be no direct payment for the photographs or work associated in providing the photographs. The cost of this work shall be included in the general cost of the contract.

NOTICE TO CONTRACTOR – SARGENT MANUFACTURING

Sargent Manufacturing Company has indicated concerns with the impact of vibrations from pile driving on their facility. Pile driving is not anticipated to occur closer than 120 ft to their building. This distance should be sufficient to dampen out the majority of the pile driving vibrations. The maximum peak particle velocity shall not exceed 0.50 inches per second. Monitoring of vibrations will be required by the Contractor so that this velocity not be exceeded at the critical location.

Vibrating Wire Piezometers shall be installed between the Sargent Manufacturing facility as indicated on the plans and any excavations which are dewatered to assure that groundwater draw down is not adversely impacting Sargent Manufacturing's groundwater contamination removal system.

NOTICE TO CONTRACTOR - USE OF STATE PROPERTY

Use of State property by the Contractor for purposes other than the construction activities included in this contract requires advanced approval from the Engineer.

This applies to activities including, but not limited to: Staging and storage areas, screening/crushing operations, asphalt or concrete plants, gravel/borrow pits, and other manufacturing and/or mining operations.

The bulk storage of fuels and lubricants shall not be permitted on State property.

The storage of hazardous materials, other than those associated with the Contractor's project related operations, shall not be permitted on State property. The Contractor shall assume sole responsibility for the proper storage, handling, management, and disposal of hazardous materials. All remedial and punitive costs incurred by the Department as a result of the Contractor's failure to properly manage hazardous materials shall be borne by the Contractor.

The Contractor is cautioned that environmental testing of the site may be required at the Contractor's expense both prior to and upon completion of the use of the State property. The Contractor shall be responsible for restoring the site and removal of all contaminants which may have been deposited at the site during its use. The Contractor must conform to the Department's Best Management Practices, environmental permit conditions and other applicable State or Federal regulations. The use and restoration of the site will be at no cost to the State of Connecticut. The use of the site will be for this specific DOT Project only. In addition, approval or denial of such request shall not be used as a reason for any time extension or claim.

For staging and storage areas, the Contractor must submit all requests in writing to the District Construction Office. The following minimum information shall be included with the request(s): a description of the proposed operation or use of the site; a site plan detailing the location of the proposed operation/use, and sedimentation and erosion controls; an area plan detailing ingress and egress to the site and proximity to residential and/or occupied buildings; copies of any required environmental permits; and planned hours of operation. The submittal shall also include photo documentation (minimum of 12 each, 200 mm x 250 mm (8"x10") color photos) showing the preconstruction condition of the site and adjacent property at the site boundaries. If the site is State property outside of DOT right of way, authorization from other State Agencies will also be required for use of the property or site.

For uses other than construction staging and storage areas, the Contractor must submit all requests in writing to the District Construction Office. The request(s) shall include the same information required for storage and staging areas. In addition, the Contractor will be required to provide written confirmation that the municipality in which the site is located does not object to the proposed use of the State property. The Contractor will be required to execute a license agreement with the Department for use of State property for other than staging and storage areas.

For asphalt batching or continuous mix facilities, the Contractor shall also provide a map detailing the outer most perimeter of the facility showing all structures, land use, watercourses, wetlands, and areas of environmental concern within one-third mile of the facility perimeter. No such facility will be permitted on State property where any hospital, nursing home, school, area of critical environmental concern, watercourse, or residential housing exists within one-third mile of the perimeter of the facility (P.A. 98-216).

NOTICE TO CONTRACTOR - HANDLING WATER

DESCRIPTION:

This work shall consist of furnishing and installing labor, materials, and equipment in order to handle flows in the storm drain and sanitary sewer systems. This item includes flows from any source, including, but not limited to, storm drainage, sanitary sewer flows, tidal flows, and groundwater. The handling of water shall be in accordance with the requirements of Section 1.10

MATERIALS:

The Contractor shall furnish, install, operate, maintain, and remove material and equipment for the purpose of handling water, including, but not limited to, sandbags, temporary bulkheads, temporary pipe plugs, bypass piping, temporary piping, temporary manholes and catch basins, bypass pumps and hoses, pipe taps for pump discharges, and the like. The Contractor shall also provide on site sections of piping and incidental materials to install in order to handle storm flows during construction.

CONSTRUCTION METHODS:

The Plans indicate a suggested method for handling water. The Contractor may propose a different approach, provided the approach complies with the requirements specified herein.

Sanitary Sewer Flows: Sanitary sewer flows shall be maintained at all times. The Contractor shall provide bypass pumping during the tie-ins to the existing line. The Contractor shall provide pumping sufficient to handle the sewer pipe flowing full. Actual flow conditions may vary at the time of construction.

Tidal Flows: The Contractor shall handle tidal flows while constructing the new storm drainage system. The Contractor shall obtain tide charts to determine the times of high and low tides and estimated elevations of tides in New Haven Harbor. The Contractor's attention is directed to the existing flap valves at the downstream end of the twin 72-inch pipes. Currently, these valves do not completely close. The Contractor's plan for handling water should not rely on the use of the existing valves to control tidal flows. The Contractor may adjust his work hours to take advantage of low tide conditions.

Storm Drain Flows: The Contractor shall handle flows in the existing storm drain system while constructing the new storm drainage system. The Contractor shall provide temporary piping and structures, bypass pumping, temporary bulkheads or plugs, sandbags, temporary bypass piping, and other material and equipment in order to maintain flows. Existing dry weather flows in the storm drain system may include tidal flows in and out of the pipes (see description above) and groundwater.

Bypass Pumping Operations: Whenever bypass pumping is utilized, the Contractor shall provide labor to maintain and operate the pump on a 24-hour-a-day, 7-day-a-week basis. The Contractor is responsible for obtaining and paying for power if electric pumps are used.

Any pumped water must be discharged in accordance with the requirements of Section 1.10.

BASIS OF PAYMENT:

The cost of this work shall be included in the general cost of the contract.

**NOTICE TO CONTRACTOR
ENVIRONMENTAL SITE INVESTIGATION
PROJECT NO. 92-526
CHURCH STREET SOUTH EXTENSION BRIDGE
NEW HAVEN, CONNECTICUT**

The State of Connecticut Department of Transportation (ConnDOT) is proposing the construction of Church Street South Extension in New Haven, Connecticut.

Environmental site investigations have been conducted in the location of the proposed project site that involved soil and groundwater sampling and laboratory analysis from various locations and depths throughout the project area. The results of the investigations indicated that soil and groundwater within the project limits have been impacted by regulated compounds: semi-volatile organic compounds (SVOCs), specifically, polynuclear aromatic hydrocarbons (PAHs); Resource Conservation and Recovery Act (RCRA) metals; volatile organic compounds (VOCs); polychlorinated biphenyls (PCBs) and total petroleum hydrocarbons (TPH) in the soil within the construction limits. The Connecticut Department of Environmental Protection (CTDEP) groundwater classification beneath the site is GB. Based on these findings, the entire project site is considered to be an Area of Environmental Concern.

Additionally, numerous investigations have previously occurred in support of recent projects involving improvements to the New Haven Rail Yard. These reports may be obtained through the Environmental Compliance Division of ConnDOT.

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

In addition to all the activities normally associated with construction of this type, the Contractor will also be responsible for: construction, maintenance and dismantling of a waste stockpile area; the excavation, on-site management and disposal of controlled materials; management of reusable controlled materials; and design, installation, operation and maintenance of a Groundwater Treatment System (GWTS) for the treatment and disposal of contaminated groundwater. The work associated with the GWTS shall require the procurement of specialty services/vendors and shall be performed in accordance with the Standard Specifications, Supplemental Specifications and Special Provisions contained in these Contract Documents.

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

following:

- Section 1.10 - Environmental Compliance
- Item No. 101000A - Environmental Health and Safety
- Item No. 101107A - Contaminated Materials Excavation
- Item No. 101130A - Environmental Work - Solidification
- Item No. 101133A - Disposal of Contaminated Railroad Ties
- Item No. 202315A - Disposal of Controlled Materials
- Item No. 202318A - Management of Re-Useable Controlled Materials
- Item No. 204210A - Handling Contaminated Groundwater

The Contractor is alerted to the fact that a ConnDOT environmental consultant will be on site for excavation and dewatering activities, to collect soil and groundwater samples, and to observe site conditions for the State. **The waste stockpile area shown on the plans is to be used exclusively for temporary stockpiling of materials classified under the Controlled Materials Handling specification.**

Information pertaining to the results of the environmental investigations discussed can be found in the documents listed below. These documents shall be available at the Connecticut Department of Transportation Headquarters, Office of Contracts, 2800 Berlin Turnpike, Newington, Connecticut.

- Task 310 Remedial Management Plan. Church Street South Extension. New Haven, Connecticut. Maguire Group Inc. September 1999.
- Task 210 Surficial Site Investigation. Church Street South Extension. New Haven Connecticut. Maguire Group Inc. ConnDOT Project 92-520, ConnDOT Assignment No. 200-3575, July 1999

9/29/98

NOTICE TO CONTRACTOR - LIGHTWEIGHT CHANNELIZING DEVICES

In accordance with FHWA requirements, the traffic cones, traffic drums, delineators and tubular markers used in this contract shall require self certification by the manufacturer that their product is crashworthy (have virtually no potential to penetrate windshields, cause fire damage, or have a significant effect on the control or trajectory of an impacting vehicle). The Department's Division of Traffic Engineering will maintain a reference list of those products which have been previously self certified by developers. The Contractor will be required to furnish the developer's self-certification if the product is not existing on the Department's reference listing. Anyone wishing to receive a copy of the list or requesting that a product be placed on the list should contact:

Manager of Traffic Engineering
2800 Berlin Turnpike
Newington, CT 06131-7546

Telephone: 1-860-594-2710

NOTICE TO CONTRACTOR - APPLICABLE DOCUMENTS, STANDARDS AND CODES

The installed transmission media, electronics equipment and materials, and installation procedures shall conform to or otherwise be in compliance with all applicable laws and requirements of industry and public agency standards, codes, ordinances and documents.

Installation procedures and the materials provided shall also comply with all legal requirements, applicable laws, and applicable codes, standards, regulations, recommendations, and authorities including but not limited to those of the following entities:

- Standard Specifications of the Department of Transportation of the State of Connecticut (ConnDOT)
- Federal Highway Administration (FHWA)
- Federal Communications Commission (FCC)
- American National Standards Institute (ANSI)
- Electronic Industries Association (EIA)
- Institute of Electrical & Electronics Engineers (IEEE)
- National Television Standards Committee (NTSC)
- Telecommunications Industries Association (TIA)
- Underwriters Laboratories (UL)
- National Electrical Code (NEC)
- Insulated Cable Engineers Association (ICEA)
- National Electrical Manufacturers Association (NEMA)
- American Society for Testing and Materials (ASTM)
- National Fire Protection Association (NFPA)
- Occupational Safety and Health Administration (OSHA)

In the event of any conflict between the aforesaid laws, regulations, standards, codes, ordinances and documents, and the government's specifications, the Contractor shall immediately bring the conflict to the attention of the Engineer.

NOTICE TO CONTRACTOR – VERIFICATION OF PLAN DIMENSIONS AND FIELD MEASUREMENTS

The Contractor is responsible for verifying all dimensions before any work is begun. Dimensions of the existing structures shown on the plans are for general reference only; they are not guaranteed. The Contractor shall take all field measurements necessary to assure proper fit of the finished work and shall assume full responsibility for their accuracy. When shop drawings and/or working drawings based on field measurements are submitted for approval and/or review, the field measurements shall also be submitted for reference by the reviewer.

In the field, the Contractor shall examine and verify all existing and given conditions and dimensions with those shown on the plans. If field conditions and dimensions differ from those shown on the plans, the Contractor shall use the field conditions and dimensions and make the appropriate changes to those shown on the plans as approved by the Engineer. All field conditions and dimensions shall be so noted on the drawings submitted for approval.

There shall be no claim made against the Department by the Contractor for work pertaining to modifications required by any difference between actual field conditions and those shown by the details and dimensions on the contract plans. The Contractor will be paid at the unit price bid for the actual quantities of materials used or for the work performed, as indicated by the various items in the contract.

NOTICE TO CONTRACTOR – STORAGE AND STAGING AREAS

The Contractor's attention is directed to the fact that only limited stockpiling and storage within the New Haven Rail Yard are available for his use. It is required that the Contractor make arrangements to have available for his use sufficient storage and staging areas outside of the limits of the New Haven Rail Yard.

NOTICE TO CONTRACTOR – PUBLIC UTILITY PLANS

The Contractor's attention is hereby called to the fact that included in the plans are plan sheets furnished to the State by various utility companies affected by the proposed construction. These sheets are not intended to show all proposed work in utility installations to be done by the various utility companies or municipal authorities or both before, during or after the life of this contract. In addition to the work indicated on these plans, the utility companies and authorities may make adjustments to or removal of certain of their installations other than those indicated on the plans or may install facilities not indicated.

NOTICE TO CONTRACTOR - STEEL TRANSPORTATION PLAN

The Contractor shall submit a detailed Steel Transportation Plan to the Engineer for review and approval at least 60 days prior to shipment. The plan shall include a map showing the proposed shipping route in the State of Connecticut only.

NOTICE TO CONTRACTOR – ARCHAEOLOGICAL INVESTIGATION

The Contractor is hereby notified that part of the project area is of archaeological importance and will require special excavation techniques.

The special requirements are described in the Memorandum of Agreement (MOA) stipulation 6 for "The Reconstruction of the Rail Maintenance and Storage Facilities in the New Haven Rail Yard". This MOA is included in and shall be considered part of this specification.

The Contractor shall adhere to all applicable recommendations of the MOA and shall plan and coordinate his construction activities to reflect these recommendations.

Should the investigations significantly change the character of the work beyond that which is described in the MOA, adjustments will be made in accordance with Section 1.04 of the Specifications.



STATE OF CONNECTICUT
CONNECTICUT HISTORICAL COMMISSION

October 14, 1998

Mr. Thomas A. Harley
 Consultant Design
 CONNDOT
 2800 Berlin Turnpike
 Newington, CT

Subject: Church Street Extension
 New Haven, CT
 CONNDOT #92-H078/H079

Dear Mr. Harley:

The State Historic Preservation Office has reviewed the above-named project. This office notes its prior coordination with CONNDOT and the Federal Railroad Administration concerning the proposed reconstruction of the historic rail maintenance and storage facilities of the New Haven Rail Yard and the New Haven interlocking facilities. However, we expect that the proposed undertaking will have no effect on historic, architectural, or archaeological resources listed on or eligible for the National Register of Historic Places. This comment is conditional upon all Church Street extension improvements being initiated only after professional implementation of the archaeological studies and documentation efforts stipulated within the Memorandum of Agreement (enclosure) ratified by the Advisory Council on Historic Preservation with respect to the New Haven Rail Yard.

This office appreciates the opportunity to have reviewed and commented upon the proposed undertaking.

We recommend that the responsible agency provide concerned citizens with the opportunity to review and comment upon the proposed undertaking in accordance with the National Historic Preservation Act of 1966 and the Connecticut Environmental Policy Act.

For further information please contact Dr. David A. Poirier, Staff Archaeologist.

Sincerely,

Dawn Maddox

Dawn Maddox
 Deputy State Historic
 Preservation Officer

FROM THE DESK OF THOMAS A. HARLEY			
NAME	FYI	PLS DO	PLS SEE ME
OCT 16 1998			
BT CUNNINGHAM			
J.F. GEORGES			
S.G. SCHOLZ			
M. WILSON			

cc: Mr. Ralph Steadham/CONNDOT

TEL: (203) 566-3005 FAX: (203) 566-5078
 59 SOUTH PROSPECT ST. - HARTFORD, CONN. 06106 - 1901
 AN EQUAL OPPORTUNITY EMPLOYER

MEMORANDUM OF AGREEMENT

AMONG

THE FEDERAL TRANSIT ADMINISTRATION
FEDERAL RAILROAD ADMINISTRATION
NATIONAL RAILROAD PASSENGER CORPORATION
CONNECTICUT DEPARTMENT OF TRANSPORTATION
CONNECTICUT STATE HISTORIC PRESERVATION OFFICE
AND ADVISORY COUNCIL ON HISTORIC PRESERVATION

FOR

THE RECONSTRUCTION OF THE RAIL MAINTENANCE
AND STORAGE FACILITIES
IN THE NEW HAVEN RAIL YARD

AND

THE RECONSTRUCTION OF THE NEW HAVEN INTERLOCKING
IN NEW HAVEN, CONNECTICUT

WHEREAS, the Federal Transit Administration (FTA) proposes reconstruction of the rail car storage and maintenance facilities in the New Haven Rail Yard in the City of New Haven, Connecticut, which includes demolition of ten existing buildings, excavation and removal, where necessary, of existing buried foundations of removed buildings, and construction of new rail car storage and maintenance facilities within the rail yard.

WHEREAS, the National Railroad Passenger Corporation (AMTRAK) proposes reconstruction of the New Haven Interlocking trackwork east and west of New Haven Station, with federal funds provided through the Federal Railroad Administration (FRA). The reconstruction includes removal of the existing Interlocking control building and corresponding apparatus contained within, and existing trackwork and site features.

WHEREAS, FTA, FRA, AMTRAK, the Connecticut Department of Transportation (ConnDOT), and the Connecticut State Historic Preservation Office (SHPO) have determined that the proposed demolition and reconstruction activities associated with these rail yard and interlocking improvements will have an adverse effect upon the historical and archaeological resources located within the yard and main line properties affected.

WHEREAS, SHPO, FTA, and FRA concur that the New Haven Rail Yard is a significant example of Connecticut's late 19th and early 20th century railroad related technology, which meets the eligibility criteria for the National Register of Historic Places. SHPO, FTA, and FRA have requested comments from the Advisory Council on Historic Preservation (ACHP), pursuant to Section 106 of the National Historic Preservation Act (16 U.S.C. 470f) and its implementing regulations, "Protection of Historic and Cultural Properties (36 CFR Part 800)."

NOW, THEREFORE, FTA, FRA, AMTRAK, SHPO and ACHP agree that the undertakings proposed by FTA and AMTRAK shall be implemented in accordance with the following stipulations, in order to take into account the effect of the proposed project on the historic rail yard:

Stipulations

FTA and FRA will insure that the following measures are carried out:

1. Prior to any demolition or construction activities in the New Haven Rail Yard, ConnDOT shall record the existing buildings and facilities in the rail yard, including the interlocking relay switches and control panel located in the existing control building, to the "Narrative Format" standards of the Historic American Engineering Record. Unless otherwise agreed to by NPS, ConnDOT shall ensure that all documentation is completed and accepted by HAER prior to demolition. Archival copies of the documentation shall be provided to HAER and SHPO.
2. ConnDOT shall contact the Smithsonian Institution regarding their potential acquisition and curation of the existing Interlocking relay switching and control panels, which are located in the existing control building.
3. ConnDOT shall contact all of Connecticut's trolley and railroad museums regarding the potential for salvage and adaptive use of any railroad-related structures and/or material from the New Haven Rail Yard, and offer them a reasonable time frame to investigate and acquire.
4. ConnDOT shall prepare a brief history of the New Haven Rail Yard and the proposed reconstruction program, including pertinent plans and photographs, and submit it to the Society For Industrial Archeology, New England Chapters Newsletter.

5. ConnDOT shall develop a public-oriented information program which focuses on the history and technology of the New Haven Rail Yard. This shall include, as a minimum, a public-oriented report, brochure, slide presentation, and/or interpretative exhibit.

6. ConnDOT shall, in coordination with the SHPO, develop an archaeological monitoring program for the New Haven Rail Yard. The monitoring program shall be put in place for the former roundhouse and turntable locations. The monitoring program shall be implemented for any underground exploration programs, such as boring programs for geotechnical or environmental investigations. Requirements for implementing the monitoring program, and conducting archaeological investigations where feasible, shall be included in the contract specifications for any demolition and/or construction contracts affecting the roundhouse/turntable areas. The monitoring program shall consist of an evaluation of the pertinent soil and groundwater contamination data, in consideration of health and safety concerns related to on-site archaeological investigations. The monitoring program shall consider and evaluate the application of alternate approaches for data collection, on a site-specific basis. Where feasible, the archaeological monitoring program shall be carried out in accordance with SHPO's Environmental Review Primer for Connecticut's Archaeological Resources.

Execution of this Memorandum of Agreement evidences that FTA and FRA have afforded ACHP a reasonable opportunity to comment on this project and its effects on the historic resource, and that FTA and FRA have taken into account the effects of their undertakings on the historic structures and facilities.

FEDERAL TRANSIT ADMINISTRATION:

By: _____ Date: _____


FEDERAL RAILROAD ADMINISTRATION:

By: _____ Date: _____
Jolene Molitoris, Administrator

NATIONAL RAILROAD PASSENGER CORPORATION:

By: _____ Date: _____

CONNECTICUT STATE HISTORIC PRESERVATION OFFICE:

By:  _____ Date: 8/6/96
John Shannahan
State Historic Preservation Officer

**Concurred:
CONNECTICUT DEPARTMENT OF TRANSPORTATION:**

By:  _____ Date: 7-22-96
Lawrence J. Forbes
Rail Administrator

**Accepted:
ADVISORY COUNCIL ON HISTORIC PRESERVATION:**

By: _____ Date: _____
Executive Director, ACHP

NOTICE TO CONTRACTOR - GROUNDING AND BONDING SYSTEMS

Description

The work of this Section consists of furnishing and installing the grounding and bonding systems as shown on the plans and specified herein. The grounding and bonding systems shall meet the requirements of National Electrical Code and the technical and safety recommendations of ANSI and IEEE.

The Contractor shall provide grounding and bonding for all new facilities:

Catenary poles shall be bonded to the aerial ground wire and/or grounded as shown on the plans.

Grounding and bonding of personnel ground mats, disconnect switch operating shaft, control box and the disconnect switch shall be provided at all disconnect switch locations as applicable.

All non-insulated, aerial wires which are not jumpered or connected to catenary or feeder circuits, are to be grounded. This includes all temporary installed wires for pull off assemblies, cross span assemblies, tail wire assemblies, and wires installed for other catenary construction purposes.

All wires and assemblies that are required to be grounded shall be grounded by approved ground wire connectors or clamps, and jumper wire. Turnbuckles, shackles, links, yoke plates, and other in-span assemblies in wires that are required to be grounded, are to have a ground jumper wire installed around them bonding the grounded wire on both sides of these assemblies together.

Applicable Standards

Pertinent provisions of the following listed standards (latest edition) shall apply to the work of this Section, except as they may be modified herein, and are hereby made a part of this Specification to the extent required.

<u>Organi- zation</u>	<u>Number</u>	<u>Title</u>
NFPA	70	National Electrical Code
NFPA	78	Lightning Protection Code
IEEE	81	Recommended Guide for Measuring Ground Resistance and Potential Gradients in the Earth
IEEE	142	Recommended Practice for Grounding of Industrial and Commercial Power Systems

<u>Organi- zation</u>	<u>Number</u>	<u>Title</u>
UL	467	Grounding and Equipment
ASTM	B8	Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

Submittals

Test Reports: Reports of all field tests shall be submitted to the Engineer as required by these Specifications and referenced standards.

Certified copies of the test results on cables and other materials, supplied under this Section, as per relevant standards.

The Contractor shall submit product data for all components in this Section, which shall include shop/working drawings, material/procurement specifications and other related information for each component. Component, small part steel or assembly drawings shall be prepared using AutoCAD 14.

Materials

All components shall conform to or be interchangeable with the Railroad's standard components.

Conductors for grounding and bonding shall be ASTM B8, Class B stranded annealed copper, and sized as indicated on the plans.

Connectors and Clamps: Bolts, washers and stop nuts shall be a high-copper-alloy, such as Everdur, Durium, Duronze or silicone bronze. Ferrous hardware will not be acceptable. Buried ground connections shall be exothermic welded.

Ground rods shall be copper, or copper-clad steel, not less than 3/4 inch in diameter, and in ten foot lengths, threaded at one or both ends as required for extension.

Ground wire imbedded in foundations and aerial ground wire shall be 4/0 AWG HD stranded copper conductor.

Personnel ground mats shall be fabricated with minimum #6 AWG bare copper wire on 6" X 6" spacing. Overall mat size shall be 4' X 6'.

Construction Methods

Ground rods shall be driven vertically to the depth indicated on the plans. Rod points shall be provided with a steel alloy cone and the driven end provided with removable driving stud. Ground rods shall be separated from adjacent buried metallic structure or pipe by a minimum of two feet.

The size and type of the buried ground conductor shall be as indicated on the plans. Conductor connections shall be made as shown on the plans.

Finish welds shall be cleaned and coated with an approved cold applied bituminous resin compound. Primer shall be as recommended by the coating manufacturer.

The work shall be arranged in such a manner that each part of the grounding system which is laid below finished grade shall be completed and inspected before backfilling is done. All precautions shall be taken to assure that no damage is done to the grounding and bonding conductors or connections during backfilling, compacting and concreting operations. Testing for ground resistance shall be performed in accordance with the requirements of this Specification before any finish surfacing is laid above the grounding and bonding conductors.

Ground tap connections from the equipment to the grounded structural members shall be provided, as required. All paint, scale, rust, oxidation, or other foreign material shall be thoroughly removed from the points of contact on all metal surfaces before any ground connections are made.

Aerial ground wire shall be connected to overhead bridge ground loops in at least two locations.

Any shortfall in the existing ground conductors, when connected to the new structures, shall be dealt with by splicing additional ground wire.

Bond all non-energized connections to structures so that there are no neutral or floating components (i.e., strap across any pin or clevis connection).

Field testing shall be thorough, continuing throughout the installation, and fully documented, with the following as a minimum:

Electrical resistance tests shall be made during installation to verify continuity of the grounding system.

Measure, record, and report the ground resistance at each location where grounding system is installed. The required ground resistance is five ohms or less. Corrective measures shall be taken by the Contractor to achieve the specified ground resistance.

Resistance-to-earth tests shall be witnessed by the Engineer and written results of these tests shall be submitted to the Engineer for evaluation.

Method of Measurement

No separate measurement will be made for the work in this Section.

Basis for Payment

No separate payment will be made for the work in this Section.

NOTICE TO CONTRACTOR - BASIC ELECTRICAL MATERIALS AND METHODS

Description

The Work of this Section consists of furnishing and installing basic electrical materials applicable to the electrical work specified in other sections except as modified in those sections.

Applicable Standards

Pertinent provisions of the following listed standards shall apply to the work of this Section, except as they may be modified herein, and are hereby made a part of this Specification to the extent required:

<u>Organi- zation</u>	<u>Number</u>	<u>Title</u>
ASTM	A153	Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM	A167	Specification for Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
ASTM	A386	Specification for Zinc Coating (Hot-Dip) on Assembled Steel Products
ASTM	A569	Specification for Steel, Carbon (0.15 Maximum, Percent) Hot-Rolled Sheet and Strip, Commercial Quality
ASTM	A575	Specification for Steel Bars, Carbon, Merchant Quality, M-Grades
ASTM	A576	Specification for Steel Bars, Carbon, Hot Wrought, Special Quality
ASTM	B3	Soft or Annealed Copper Wire
ASTM	B8	Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM	B187	Copper Bus Bar, Rod and Shapes
ASTM	B633	Specification for Electro-Deposited Coatings of Zinc on Iron or Steel

<u>Organi- zation</u>	<u>Number</u>	<u>Title</u>
ASTM	D149	Tests for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies
ASTM	D570	Test for Water Absorption of Plastics
ASTM	D635	Test for Rate of Burning and/or Extent and Time of Burning of Self-supporting Plastics in a Horizontal Position
ASTM	D638	Test for Tensile Properties of Plastics
ASTM	D695	Test for Compressive Properties of Rigid Plastics
ASTM	D790	Tests for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM	D2240	Test for Rubber Property-Durometer Hardness
ASTM	E84	Test for Surface Burning Characteristics of Building Materials
NEMA	TC 3	PVC Fittings for Use With Rigid PVC Conduit and Tubing
NEMA	WC 5	Thermoplastic-Insulated Wire and Cable
NEMA	WC 7	Cross-Linked-Thermosetting-Polyethylene-Insulated Wire and Cable
NEMA	WC 8	Ethylene-Propylene-Rubber-Insulated Wire and Cable
NFPA	70	National Electrical Code (NEC)
UL	6	Rigid Metal Conduit
UL	83	Thermoplastic-Insulated Wires and Cables
UL	467	Grounding and Bonding Equipment
UL	651	Schedule 40 and 80 Rigid PVC Conduit
UL	1059	Terminal Blocks

Submittals

Submit the following:

Manufacturer's description, shop/working drawings, material/procurement specifications, installation instructions, technical data and certificates for all materials and items supplied under this Section.

Component, small part steel or assembly drawings shall be prepared using AutoCAD 14. Equipment interconnection diagrams, wiring and circuit schedules.

Design and production test plan, test procedures and certified test reports.

Materials

Materials furnished shall be standard products of manufacturers regularly engaged in the production of materials specified.

PVC Conduits and Fittings - Conduits shall comply with NEMA TC 2 and UL 651, schedule 80 as required, and have the following properties:

Flammability - ASTM D635, self-extinguishing.

Tensile Strength - ASTM D638, 6,000 psi at 78 degrees F.

Flexural Strength - ASTM D790, 12,500 psi.

Compressive Strength - ASTM D695, 4,000 psi.

Hardness - ASTM D2240 (Durometer D), 77.

Water Absorption - ASTM D570, 0.03 percent maximum, in 24 hours at 72 degrees F.

Dielectric Strength - ASTM D149, 1,100V per mil.

Thermal Conductivity - 1.3 BTU per hour per square foot per degrees F per inch.

Conduit Cement - As recommended by conduit manufacturer.

Fittings - NEMA TC 3.

Spacers - Styrene, interlocking type.

Rigid Aluminum Conduit and Fittings - Conduits, couplings, elbows, bends and nipples shall meet the requirements of NEC, UL 6 and ANSI C80.5.

Conduit straps and clamps shall be hot-dip galvanized malleable iron. Aluminum may be used, if required, to be compatible with aluminum conduit.

Suitable conduit sealing bushings shall be provided for all conduits as required. All empty conduits shall be sealed with blank conduit sealing bushings.

Exposed Conduits - Pole riser conduit shall be of rigid aluminum or galvanized rigid steel as per the plans.

Single Channel Dimensions - 1-5/8 inch by 1-5/8 inch, 12 gauge.

Double Channel Dimensions - 1-5/8 inch by 3-1/4 inch, 12 gauge.

General Fittings Dimensions, for Flat, Angular and U Shapes - 1/4 inch thick by 1-5/8 inch wide, unless otherwise indicated.

Channel, Pipe Clamps, and General Fittings Finish - Hot-dip galvanized after fabrication, ASTM A386, as applicable.

Nuts, Bolts, and Screws Finish - Electro-deposited zinc coating, ASTM B633, Class FeZn 5, Type III.

Hangers and Supports

Hanger Rods - ASTM A575 or ASTM A576. Threaded, hot-rolled steel, 1/2 inch diameter minimum with electro-deposited zinc coating, conforming to ASTM B633, Fe/Zn 5, type III.

Trapeze, Multiple Conduit Hangers - Fabricated from two or more galvanized steel hanger rods, a steel channel horizontal member and U-bolts, clamps and other attachments necessary for securing hanger rods and conduits.

Horizontal Member - Continuous galvanized metal channel single or double, as required.

Dry Locations - Galvanized, 16 MSG minimum, sheet steel with welded seams and screw covers.

Wet Locations - NEMA Type 4, hot-dip galvanized cast iron complying with ASTM A48 and A153.

Insulated Wire, Cable and Accessories - UL listed for the intended purpose.

Conductors - Soft or annealed copper conductors shall comply with ASTM B3.

Power Circuits - Minimum wire size shall be No. 12 AWG, and may be solid conductor. Wire size No. 10 AWG and larger shall be ASTM B8, Class B stranded.

Terminals for No. 10 and smaller wire - Vinyl-insulated, electro-tin-plated, electrolytic copper locking spade.

Terminals for No. 4/0 and larger wire - Long-barrel, tin-plated copper, compression-type, with NEMA 2-hole pad, or as shown on drawings.

Terminals for No. 8 to 3/0 wire - Compression, tin-plated copper lugs.

Wire Identification Markers

Power Cable Identification Marker - Engraved water-resistant plastic or brass tag tied to cable with wire tie.

Wire Ties - Nylon strap with stainless steel locking barb and taper, black, ultraviolet ray resistant.

Construction Methods

Installation work shall be in accordance with applicable requirements of NFPA 70 and shall comply with the regulations of NEC, NESC and UBC.

Materials and equipment shall be applied, installed, and connected as recommended by the manufacturer.

Conduit, Fittings, and Accessories

Embedded Conduits - Embedded conduits shall be properly supported and spaced with spacers, prior to concrete placement or backfilling.

The ends of conduits shall be capped or covered prior to concrete placement or backfilling.

Conduits shall be pitched to provide moisture drainage to manholes, if installed.

Conduits shall be rodded, or wire brushed, and swabbed prior to cable installation, to remove foreign matter. After cleaning, conduit ends shall be recapped until cable pulling commences.

Conduit expansion fittings, as required, shall be installed to allow for expansion.

The ends of field cut conduits shall be reamed to remove rough edges. The ends of PVC conduits that are to be joined shall be coated with conduit cement for a length equal to the depth of the coupling or other fitting, to ensure a watertight connection.

Conduit runs shall be made with approved couplings and unions. Right angle bends shall be made with factory made elbows (long or short radius as required). Offsets and change- in-direction bends shall be made with factory fittings where possible. Conduit runs shall be straight and true; elbows, offsets, and bends shall be uniform and symmetrical. Bends shall be made without kinking or deforming the cross-sectional contour of the conduit. The radius of factory bends shall be greater than the manufacturer recommended minimum for cables being installed.

Conduits entering outlet boxes, pullboxes, panelboard enclosures, terminal cabinets, and similar equipment enclosures shall be attached to the box or enclosure with a locknut outside and a locknut inside tightened against the box or enclosure. Conduit shall be provided with end bushings. Where required by Code, conduit shall be provided with grounding bushings with copper jumper to the box or enclosure ground lug or bus. Conduits 1-1/4 inch trade size or larger shall be provided with insulating bushings.

To ensure ground continuity, unleaded, conductive antiseize compound shall be applied to conduit threads, couplings, and hubs before assembly.

Trapeze hangers or wall mounted metal framing shall be used to support runs of conduit. Conduit clamps shall be used at the end of each run, at each elbow, and on each intermediate hanger to securely fasten each conduit in the group. The required strength of supports, and the size and type of anchors, shall be based on the combined weights of conduits, wires and supports, and stresses incurred during wire pulling.

Conduit runs shall be cleaned and swabbed to remove foreign matter prior to pulling in wire and cable. Cable pulling cord shall be installed in all conduits including spares. Ends of pulling cord shall be tagged with permanent type markers.

Insulated Wire, Cable and Accessories - Wire and cable shall be installed by means of equipment, devices, and the methods recommended by the manufacturer. High-voltage cable splices and terminations shall be performed by qualified personnel.

Wiring and cabling shall be terminated and connected by means of connectors, lugs, and other methods specified.

Traction power cables from the circuit breaker connections shall be run in appropriate raceways. Raceways shall provide adequate cross-sectional area to permit a neat alignment of the cables and to avoid crossing or twisting.

Wire Termination - Power wiring shall be terminated with approved connectors. Provide adequate slack wire, one loop minimum, to prevent strain on termination.

Field Touch-up

Galvanized Metal Surfaces - Coat damaged surfaces, to the strength and finish of the original coating, with polystyrene organic rich compound containing not less than 91 percent by weight metallic zinc powder in dried film.

Painted Metal Surfaces - Clean, treat, and coat damaged surfaces with required rust inhibiting undercoating and finish coat paint system in accordance with manufacturer's instructions.

See specification Section entitled "Factory Testing" for requirement for Design and Production Tests.

Method of Measurement

No separate measurement will be made for items in this Section.

Basis for Payment

No separate payment will be made for work in this Section.

NOTICE TO CONTRACTOR - UNINSULATED WIRES

Description

This Specification covers the supply and installation of uninsulated wires as shown on the plans. This work shall include, but may not be limited to, the following:

Catenary Jumper Wire

Traction Feeder Wires

Signal Power Wires

Ground Wire

The Contractor shall supply and install all applicable bare wires in accordance with the requirements specified on the plans.

Applicable Standards

Pertinent provisions of the following listed standards shall apply to the work of this Section, except as they may be modified herein, and are hereby made a part of this Specification to the extent required:

<u>Organi- zation</u>	<u>Number</u>	<u>Title</u>
ASTM	B1	Hard-Drawn Copper Wire
ASTM	B3	Soft or Annealed Copper Wire
ASTM	B8	Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM	B173	Rope-Lay-Stranded Copper Conductors Having Concentric-Stranded Members, for Electrical Conductors
ASTM	B193	Test Method for Resistivity of Electrical Conductor Materials
ASTM	B228	Concentric-Lay-Stranded Copper-Clad Steel Conductors
ASTM	B229	Concentric-Lay-Stranded Copper and Copper-Clad Steel Composite Conductors
ASTM	B258	Standard Nominal Diameters of Cross-Sectional Areas of AWG Sizes of Solid Round Wires Used as Electrical Conductors

Submittals

The Contractor shall submit product data and relevant drawings for approval prior to wire manufacture. Included as a minimum shall be:

Physical Characteristics and Parameters

- Size
- Type and stranding class
- Material
- Number of and diameter of individual wires
- Overall diameter
- Cross section area
- Weight per foot
- Rated breaking load.

Electrical Characteristics

- Rated current carrying size (AWG/kcmil)
- Resistance per unit length.

The Contractor shall provide samples of conductors.

The Contractor shall furnish certification from the manufacturer verifying that the wires have been designed, manufactured, inspected and tested in accordance with applicable portions of the referenced standards, these Specifications, and the plans.

The Contractor shall provide certified copies of manufacturer's test reports for the specific wires furnished, which shall include but not limited to the following:

- Initial and Final Modulus of Elasticity (E)
- Coefficient of Thermal Expansion (CTE)
- Yield stress
- Hardness values
- Contact wire joint strength test

Materials

Conductor materials shall be of a composition, quality and purity such that the finished product shall have the physical, mechanical, electrical properties, characteristics and parameters conforming to this Specification and the plans.

The wires shall have a minimum in-service life expectancy of 30 years under operating conditions.

The wires shall be unconditionally guaranteed by the manufacturer and/or supplier to be free from defects for a period not less than five years.

The Engineer reserves the right to witness the manufacture, testing and packing of all wires. The manufacturer shall notify the Engineer not less than ten days in advance of manufacturing and testing operations.

All wires shall be subject to factory quality control tests as required in the applicable standards. Tests shall be performed on each reel prior to shipment. A certified copy of the test report for each reel shall be submitted to the Engineer prior to shipment. A copy of the test report shall be packed with each reel.

All wires shall be shipped on wooden reels, suitable for the weight of the wires and shall be protected from damage. The diameter of the drum shall be sufficiently large so as to avoid difficulty with waves or kinks when the wire is strung. The grooved contact wire shall be wound on the reel in such manner that the vertical axis of cross section shall be parallel to the axis of the reel. Any permanent twisting or rotation of the grooved contact wire shall be cause for rejection of the reel at the manufacturer's or Contractor's expense.

Each reel shall consist of one continuous, unspliced wire; and shall have the required length of wire so that no splices are required in the tension sections as installed unless approved by the Engineer.

Each reel shall have a strong, weatherproof tag or marker securely fastened to it, showing the size and type of wire as well as the ASTM designation, name and mark of the manufacturer, total reel length, reel weight and manufacturer's special instructions.

A stripe in any contrasting color approximately 1" wide shall be painted across the outermost layer on each reel. Any visible wire shift at this line, upon receipt at the job site, will be treated as indicating a relative wire movement during shipment, and is cause for reel rejection.

Any damage to the wires shall be the Contractor's responsibility, and all repairs and replacements of the damaged wires shall be at the Contractor's expense.

Factory fused trolley splices in a wire run shall have their locations from the nearest structure recorded by the Contractor and provided to the Engineer and MNR with the as-built plans.

Method of Measurement

No separate measurement will be made for the work in this Section.

Basis for Payment

No separate payment will be made for the work in this Section.

NOTICE TO CONTRACTOR - GALVANIZED STEEL WIRE, ALUMOWELD STRANDS AND WIRE ROPE

Description

This Specification Section covers furnishing and installing all grades of galvanized steel wire, preforms, alumoweld strands, and wire rope for use as support wires, bridle wires and down guys for the catenary system, as shown on the plans.

Applicable Standards

Pertinent provisions of the following listed standards shall apply to the work of this Section, except as they may be modified herein, and are hereby made a part of this Specification to the extent required:

<u>Organi- zation</u>	<u>Number</u>	<u>Title</u>
ASTM	A474	Aluminum-Coated Steel Wire Strand
ASTM	A475	Zinc-Coated Steel Wire Strand

Submittals

Reports for each type of wire to be used containing the physical and mechanical properties of all components described in this Section shall be submitted. The conformance of components with these Specifications and the plans in the form of a manufacturer's certification shall be shown. Include the following as a minimum:

Size
Type
Material
Number of and diameter of individual wires
Overall diameter
Cross section area
Weight per foot
Rated breaking load

Materials

Zinc-coated stranded wire shall be manufactured and tested in accordance with ASTM A475. The aluminum-coated stranded wire shall be manufactured and tested in accordance with ASTM A474.

Physical properties of the stranded wire shall conform to ASTM A474 or A475 as applicable.

The material used for stranded steel wire and preforms shall conform to ASTM A474 or A475 as applicable.

The weight of coating shall not be less than that specified in ASTM A474 or A475 as applicable for the intended duty.

The Contractor shall provide certification that the galvanized steel wire, wire rope and alumoweld strands have been designed, fabricated, and tested in compliance with the applicable provisions of the relevant standards.

Materials shall be protected against damage in ordinary handling and shipping. Each reel shall have a strong, weatherproof tag securely fastened to it showing the physical and mechanical properties as well as the steel type designation, ASTM designation and the name and mark of the manufacturer.

Construction Methods

The wire and wire rope shall be cut and installed using tools and methods specified by the manufacturer.

Splicing of the galvanized steel wire, alumoweld strands and wire rope will not be permitted.

Method of Measurement

No separate measurement will be made for the items in this Section.

Basis for Payment

No separate payment will be made for the work in this Section.

NOTICE TO CONTRACTOR - INSULATORS

Description

The work of this Section covers the manufacture, and supply of various types of insulators for the traction power and signal power systems, as shown on the plans and specified herein.

Applicable Standards

Pertinent provisions of the following listed standards shall apply to the work of this Section, except as they may be modified herein, and are hereby made a part of this Specification to the extent required:

<u>Organi- zation</u>	<u>Number</u>	<u>Title</u>
ANSI	C29.1	Test Methods for Electrical Power Insulators Including Addenda C29.1a and C29.2a
ANSI	C29.2	Wet Process Porcelain Insulators (Suspension Type)
ANSI	C29.7	Wet Process Porcelain Insulators (High-Voltage Line-Post Type), Including Supplement C29.7a
ANSI	C29.8	Wet Process Porcelain Insulators (Apparatus, Cap and Pin Type)
ANSI	C76.1	Outdoor Apparatus Bushings, Requirements and Test Code for
ANSI	Z55.1	Gray Finishes for Industrial Apparatus and Equipment
ASTM	A47	Malleable Iron Castings
ASTM	A153	Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM	D116	Vitrified Ceramic Materials for Electrical Applications, Testing
ASTM	C150	Portland Cement
ASTM	C151	Test Method for Autoclave Expansion of Portland Cement
NEMA	HV-1	Insulators, High-Voltage

Submittals

Manufacturer's certification shall be provided showing compliance with the applicable requirements of the referenced standards, these Specifications and the plans.

Shop Drawings: Shop Drawings shall be submitted prior to fabrication. Component, small part steel or assembly drawings shall be prepared using AutoCAD 14. Included, as a minimum, shall be:

Electrical:

Creepage length (inches)

Insulation level (impulse withstand test voltage, kV)

DC withstand voltage (kV)

Maximum working voltage (kV)

Mechanical:

Attachment centers or overall length (inches)

Shed diameters (inches)

Core diameters (inches)

Breakdown of weights, insulator and fittings (pounds)

Tensile withstand load (pounds)

Cantilever withstand load (inch-pounds)

Recommended maximum working tensile load (inch-pounds)

Material/procurement specifications (including end caps and touch-up insulator sealants)

Manufacturer's design mechanical and electrical safety factors

Working drawings of hardware and components

Listing and description of components and hardware

List of values of BIL, ultimate tensile strength, ultimate torsional strength, weight (including weight of components) and electrical characteristics.

Certification of compliance for the following:

- Steel analysis
- Hot-dip galvanizing
- Adhesive materials
- Insulator materials
- In service record of proposed insulators
- Certified quality control procedures used in the manufacturing process

Storage and handling instructions.

Maintenance manuals.

Materials

All parts shall conform with, or be interchangeable with the Railroad's standard components.

The Contractor shall ensure that all materials furnished are suitably packaged, stored and protected from damage and exposure.

The Contractor shall handle and otherwise use the insulators in accordance with the manufacturer's instructions, so as to ensure that the products are not damaged or misused prior to or during installation.

Any damage to the insulators shall be the Contractor's responsibility, and replacements shall be accomplished by the Contractor in accordance with the manufacturer's instructions.

The insulators shall have a minimum in-service life expectancy of 30 years under normal operating conditions.

The insulators shall be unconditionally guaranteed by the manufacturer and/or supplier to be free from defects for a period not less than five years.

The suspension and termination shall be of non-ceramic type. The pin and post insulators shall be made of the best commercial-grade wet-process porcelain.

The entire surface of the porcelain insulators that will be exposed after assembly shall be glazed in No. 70 light gray color as specified in ANSI Z55.1.

The surface shall be free of imperfections. Pieces with imperfections in the glaze repaired by re-coating and refiring, as well as those pieces repaired by re-touching with paint, will be rejected.

Cement used for assembling porcelain to metal shall meet or exceed the requirements of ASTM C150 and C151.

The non-ceramic insulator shall be a unit consisting of a rod, weathersheds as required, and end fittings. The rod shall be made of glass fiber or reinforced polymer (silicon, rubber, teflon, or cycloaliphatic resin), with its fibers running longitudinally through the rod length.

The rod may be attached to the end fittings or hardware by a compression sleeve, wedge or adhesive. If adhesive is used, the adhesive shall encapsulate the rod in the end-fitting cavity and shall form a compressive wedge upon loading. Weathersheds shall, for the expected life of the insulator, protect the rod from the elements and insure the necessary leakage distance.

The non-ceramic insulator shall be constructed so as to be a light-weight, compact unit with high-impact strength. Weathersheds shall be "self-cleaning" and weather resistant to reduce the possibility of ice-bridging between sheds. They shall be of a material that is vandal resistant insofar as being shatterproof, thereby reducing vandalism damage.

All non-ceramic material shall have a smooth, void-free finish. All adhesive coatings shall be sealed to the fittings to protect them against the ingress of moisture.

The design shall be such that stress due to temperature variation, and mechanical extension/contraction in any part of the insulator under load and normal handling, shall not lead to deterioration. The materials used shall not cause degradation by chemical interactions.

The end fittings attached to the insulator's fiberglass rod shall ensure exact alignment with the rod and correct assembly with respect to each other to avoid torsional stress when the insulator is installed.

The insulators shall be so designed that no sparking or arcing shall occur on the surface of the insulator when energized at the maximum design voltage under clean and dry conditions.

The insulators shall be designed to suit the various assembly arrangements, as shown on the plans.

The metal parts of the insulators shall be made of malleable iron, Grade 35018, to conform with ASTM A47, or open-hearth or electric furnace steel. All ferrous metal parts shall be galvanized in accordance with ASTM A153. Insulator fittings shall provide for connections as shown on the plans.

To protect the galvanizing from harmful chemical action of the cement, the hardware which is in contact with cement shall be coated with a bituminous paint, or the hardware shall be protected as recommended by the insulator manufacturer for use with his materials.

Insulators shall be tested in accordance with ANSI C29.1.

The mechanical strength of insulators shall meet or exceed the strength indicated on the plans. Where the strength is not indicated, insulators shall exceed the ultimate strength of the conductor or guy to which it is attached.

Insulators for various uses shall have ratings not lower than the classes indicated on the plans.

Types and suggested electrical classes and minimum mechanical characteristics for insulators shall conform to the plans. The overall length of the insulators shall conform to the plans for standardization.

The Engineer reserves the right to witness the manufacture, testing and packing of all insulators. The manufacturer will notify the Engineer not less than ten days in advance of manufacturing and testing operations.

Each insulator shall bear the manufacturer's name, mark number, and year of manufacture, clearly and permanently imprinted, without affecting the appearance or the function of the item. The insulators shall be supplied complete with hardware, etc. as indicated on the plans.

The insulators shall be designed for the class of insulation specified on the plans for specific operating and environmental conditions. The insulators shall have the following classifications with their corresponding characteristics:

<u>Classification</u>	<u>Insulation Class (kV)</u>	<u>Creepage Distance (inches)</u>	<u>Wet Flashover (kV)</u>	<u>Impulse Withstand (kV)</u>
Feeder	25	24	60	150
Pin	34.5	21	80	200

Method of Measurement

No separate measurement will be made for the work in this Section.

Basis for Payment

No separate payment will be made for the work in this Section.

NOTICE TO CONTRACTOR – RAILROAD FEEDER RELOCATION

Scope of Work

On both North and South sides, but not simultaneously:

- Construct duct bank
- Modifications to catenary towers:
 - dead-end wires at both towers
 - install risers
 - install terminators
 - jumper both ends

At south side only:

- Remove and relocate snow melter transformer and slab

Outages:

- Track: none
- Feeders: weekdays approximately 0930 to 1530

Scheduling of the work

The Contractor is hereby alerted to the fact that the railroad feeder relocation work shall need to be completed in such a time as to prevent delays to the project completion.

The contractor shall review all of his required construction activities, including but not limited to the erection of the Segment 2 Truss, to determine conflicts with the overhead feeder wires. Based on the required completion date of these activities, the Contractor shall conduct his operations so that the overhead feeders are successfully relocated underground in time to allow the completion of all of the contractors required construction activities.

The contractor shall investigate the supplier of all materials he intends to use and verify the actual lead-time for obtaining the required materials from the time an order is placed. The Contractor shall investigate the work to be accomplished and determine the actual time duration required for the completion of the work. Based on these times, the contractor shall start the ordering of materials and the construction of the feeder relocation at such a time as to avoid any delays to the completion of the contract

To avoid conflicts with State Project No. 301-0039, the contractor shall not begin the feeder relocation work until August 2001. No delay to the contract completion or extension will be allowed base upon this restriction on the start of the feeder relocation construction.

NOTICE TO CONTRACTOR – MRI VAN ACCESS

DESCRIPTION:

The Contractor is hereby notified that access and egress must be maintained for the medical center building at 150 Sargent Drive for a portable MRI mobile unit. This mobile unit must be able to access the southwest corner of the property on Tuesday and Friday of each week from early morning to late evening.

This unit is approximately 48 feet long, 14 feet high and 9 feet wide, without the tractor.

COLD WEATHER PAVING POLICY

General Conditions:

The Contractor's operations shall employ paving practices, consistent with the terms and conditions of the "Standard Specification for Roads, Bridges and Incidental Construction" and all pertinent supplemental specifications and special provisions set forth in the contract.

The paving schedule will be reviewed by project personnel and the contractor. If it is anticipated that the placement of the HOT MIXED ASPHALT (HMA) for a project will begin or continue into the months in which the temperatures may not meet specification, the District will be notified immediately. Upon receipt, the District will review the proposed paving schedule to contract requirements. Authorization to place the HMA pavement outside of the contract specifications and provisions, and the specific requirements of this policy will only be given by the Office of Construction (OOC). The District will be required to forward a written request to the OOC for review and approval.

All requests shall be submitted in writing to the OOC from the District Engineer (DE) to the Manager of Construction Operations or the Construction Administrator. The request shall include all of the information listed in the attached Exhibit 1 of the cold weather paving policy.

HMA Placement:

No deviations from the requirements set forth in the Bituminous Concrete specification. Section 4.06.03-8 "Placing of mixture" and 4.06.03-9 "Compaction" will be allowed without prior approval of the Office of Construction.

The paving operation will not commence if the forecasted low temperatures (for both day and nighttime operations) are expected to fall below the minimum placing temperatures allowed in the specification. More specifically, if the forecasted air temperature is expected to fall below the minimum allowed air or base temperature in the bituminous concrete specifications, the paving operation shall not commence.

The forecast shall be obtained from the latest weather service information received at the DOT Highway Operations Center in Newington. The information is transmitted to the District by 2 p.m. each working day. In the event the information is unavailable at the District, the Highway Operations Center may be called directly at Telephone No. (860) 594-3447, 24 hours a day, to obtain the weather forecast. The forecasted temperatures shall be documented on the inspector's daily report.

Night Paving Operation:

Any scheduled night paving operations which are expected to begin or continue after October 15th will not be allowed without prior approval from the Office of Construction. Any requests for such authorization will be submitted in writing by the District at least one week in advance of the expected paving.

Day Paving Operation:

HMA paving operations will not be permitted after November 15th in any year without prior approval from the Office of Construction. Any requests for such authorization will be submitted in writing by the District at least one week in advance of the expected paving.

COLD WEATHER PAVING POLICY

EXHIBIT 1

The following information is required for "Cold Weather Paving Approval"

1. Project No. 92-526
2. Route and town: Church Street South Extension, New Haven
3. Anticipated paving schedule: include no. days and hours of work
4. Plant location(s)
5. Rate of production
6. Average haul distance
7. No. of trucks
8. Paver speed (distance/min)
9. Delivered mix temperature (+/- 5 degrees)
10. Number of paving lanes
11. Maximum length and width of paver pass
12. Average compacted lift thickness
13. Number of rollers (include capacity, type and drum width)
14. Name of contractor representative responsible for the placement and compaction process
15. Name of D.O.T. representatives (Inspector, Project Engineer) in charge of paving operation
16. Name of D.O.T. representative responsible for determining "go" or "no go" decision based on forecasted weather conditions
17. Reason(s) for request to allow paving under cold weather conditions
18. Impacts of not proceeding with paving under cold weather conditions
19. District Engineer's recommendation regarding cold weather paving

YEAR 2000 DATE DATA PROCESSING REPRESENTATION AND WARRANTY

The term "date data" as used herein shall mean any program function that utilizes data or input which includes an indication of or reference to the date. The Contractor represents and warrants that any hardware, software, data in a computer format and/or firmware (hereinafter referred to as "product(s)") delivered to or developed for the State shall be capable of accurately processing (including, but not limited to, calculating, comparing, and sequencing) date data from, into and/or between the twentieth and twenty-first centuries, including leap year calculations, when used in accordance with the purpose for which the State intends to use the product(s). Such processing shall employ an expanded character format using at least eight digits in the date field, but shall not be based upon a sliding scale format or increase the processing time of the product(s). The accurate processing of date data by such product(s) from, into and/or between the twentieth and twenty-first centuries, including leap year calculations, shall hereinafter be referred to collectively as "Year 2000 compliant." In addition, said product(s) delivered to or developed for the State shall be capable of accurately processing date data throughout the twenty-first century, as well as from, into and/or between centuries. If the products are obtained to perform together as a system, then this representation and warranty shall apply as well to those products as a system. This representation and warranty, along with the Contractor's commercial warranty or warranties and the remedies available to the State for breach thereof shall survive the term of this Agreement. The remedies available to the State shall include, but not be limited to, the right to repair or replace any product(s) which is(are) not "Year 2000 compliant", or to perform that repair or replacement, or have a third party of the State's choosing do so, at the Contractor's expense.

SECTION 1.03 - AWARD AND EXECUTION OF CONTRACT

Article 1.03.01 – Consideration of Bids. This Article is amended as follows:

The Contractor is not required to provide documentation and samples of materials furnished by the Utility Companies. The Utility Companies will furnish material documentation directly to the Connecticut Department of Transportation.

Article 1.03.08 – Notice to Proceed and Commencement of Work.

Change the first paragraph to read as follows:

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

Delete the last sentence of the fourth paragraph, “If, however, the Engineer ... than said April 1.”

SECTION 1.05 - CONTROL OF THE WORK

Article 1.05.02 - Plans, Working Drawings, and Shop Drawings: shall be amended as follows:

Subarticle 1.05.02-2: Delete the first sentence and substitute with the following:

When required by the contract documents or when ordered by the Engineer, the Contractor shall prepare and submit ten (10) sets of prints to the following Contracting Engineers for approval before fabrication:

Send shop drawings to:

Parsons Brinckerhoff Quade & Douglas, Inc.
Suite 200
148 Eastern Boulevard
Glastonbury, CT 06033

Attn: Mr. Anthony Moretti
Tel: (860) 659-0444
Fax: (860) 633-8117

An exception is the catalog cuts and or shop drawings for the traffic signal and illumination Items which shall be sent to:

Mr. Richard Miller, P.E., L.S.
City Engineer
City of New Haven-Dept. of Engineering
200 Orange Street
New Haven, CT. 06510
Tel: (203)946-6417

With copy of transmittal only to:

Connecticut Department of Transportation
P.O. Drawer "L"
New Haven, CT 06525-0111

Attn: Mr. Paul H. Breen

Subarticle 1.05.02-2 Add the following paragraph:

Each shop drawing prepared by a fabricator shall include the name and telephone of a contract person who is familiar with the drawings and will be available to answer the Engineer's questions should any arise during the review process.

SECTION 1.05 - CONTROL OF THE WORK

Add the following Article:

Article 1.05.02-4 - Schedule of Submissions:

Prior to the submission of any working, shop or erection drawings, the Contractor shall prepare and submit to the Engineer, for approval, a schedule for all proposed working and shop drawings. For projects that contain Item #969000A- Project Coordinator as a contract item, this information must be submitted in conformance with the requirements of that specification. For all other projects this initial schedule should be submitted within 30 days of contract award and must be submitted before the notice to proceed. The Contractor shall coordinate, schedule and control all submittals of working and shop drawings including those of his various subcontractors, suppliers and engineers to provide for an orderly and balanced distribution of the work.

The Contractor shall schedule the submission of shop drawings so that 30 calendar days (beginning on the date of receipt) is allowed for review by the Department for routine work. For work of more complexity, the time for review by the Department will be increased in proportion to the complexity of the work. The Contractor shall adjust his schedules so that an additional 15 calendar day period is provided for each resubmittal.

It is incumbent upon the Contractor to submit his shop drawings in accordance with the approved working and shop drawing schedule to facilitate expeditious review. Voluminous submittals of shop drawings at one time are discouraged and may result in increased review time. In no case will the Department accept liability for resulting delays, added costs and related damages when the time required for approval extends beyond the approximate times shown herein when the shop drawings are not submitted in conformance with the approved schedule.

**SECTION 1.05
CONTROL OF THE WORK**

1.05.06--Coordination With Utilities (including Railroads): is supplemented as follows:

Description:

This section covers authority, definitions, regulatory requirements, traffic regulation and coordination of the Contractor's work schedule with the operation of train service, construction equipment and safety requirements for working within railroad right-of-way, and provisions for storage of materials and equipment and worker safety rules. Subsequent to the Engineer's Pre-construction meeting and prior to commencement to contract activities, a working on the railroad meeting will be held by the Engineer to emphasize these Specifications.

Metro-North Commuter Railroad Company - Permission to Enter Upon Railroad Property

Permission is hereby granted to the Contractor to enter property of the State of Connecticut, under the custody and control of the Connecticut Department of Transportation (hereinafter called "CDOT") and managed by Metro-North Commuter Railroad Company (hereinafter called "Railroad"), a public benefit corporation and subsidiary of Metropolitan Transportation Authority (hereinafter called "MTA"). The purpose of this permission shall be solely for the purposes outlined in this contract and under the following terms and conditions:

1. **Location and Access.** Permission is hereby granted to the Contractor and its subcontractor(s), if any, to enter the property within the limits of construction, shown on the plans, in the State of Connecticut (hereinafter called the "Property").
2. **Liability.** The Contractor covenants and agrees to at all times indemnify, protect and save harmless MTA, Railroad, Consolidated Rail Corporation ("Conrail"), National Railroad Passenger Corporation ("Amtrak"), Housatonic Railroad Company ("Housatonic"), Providence & Worcester Railroad Company ("P&W"), and CDOT from and against any and all losses, damages, detriments, suits, claims, demands, costs, and charges which MTA, Railroad, Conrail, Amtrak, Housatonic, P&W, or CDOT may directly or indirectly suffer, sustain, or be subjected to by or on account of Contractors entry upon, occupancy or use of the Property, or the conduct thereon of the Contractor, its subcontractors, officers, employees, agents or invitees, whether such loss or damage be suffered or sustained by MTA, Railroad, Conrail, Amtrak, Housatonic, P&W or CDOT directly or persons (including employees of MTA, Railroad or CDOT or Corporations who may seek to hold MTA, Railroad, Conrail, Amtrak, Housatonic, P&W or CDOT liable therefor), and whether attributable to the fault, failure or negligence of MTA, Railroad, Conrail, Amtrak, Housatonic, P&W or CDOT or otherwise.
3. **Consideration.** The Contractor will pay to the Railroad, the sum of Zero Dollars (\$0.00) for the right to enter upon the Property.

4. Terms of Permit. The Railroad reserves the right to revoke this permission at any time. Unless subsequently modified, this shall begin with notice to proceed and shall end at contract completion at which time it shall expire automatically. Under no circumstances shall this temporary permission be construed as granting the Contractor any rights, title or interest of any kind or character in, on, or about the land or premises of MTA or Railroad thereafter. The Permittee agrees to notify the Railroad when use of the Property or work is completed.

DEFINITIONS:

Railroad - Whenever the term "Railroad" is used without further qualification, it shall be taken to mean Metro-North Railroad.

On or Adjacent to - shall be interpreted to include space on, above and below railroad right-of-way operated by Metro-North, as well as space on, above, and below adjacent property which Metro-North determines to affect the safe operations of railroad service.

The Safety Rules - All work shall be performed in accordance with rules, regulations, procedures, and safe practices on the Railroad, FRA, OSHA, NESC and all other government agencies having jurisdiction over this project.

Authority of the Engineer - This supplements Form 815, Section 1.05.01 in that all contract work upon or affecting railroad property, right-of-way or facilities, shall also be subject to the approval of the Chief Engineer of the Railroad or his duly authorized representative, through coordination with the Engineer.

Coordination of Work - This supplements Form 815, Section 1.05.06 in that the Contractor shall be responsible for the coordination of the work of his sub-contractors with respect to the railroad property, right-of-way or facilities.

Track - The space between the rails plus not less than 1220 mm (4 feet) outside each rail.

Horizontal Clearance Point - A point 3050 mm (10 feet) from the centerline of a track.

Vertical Clearance Point - A point 6858 mm (22'-6") above the top of a running rail unless otherwise authorized by Metro-North.

Traffic Envelope - The area encompassed by the vertical and the horizontal clearance points.

Obstruction - An entering of the traffic envelope, also referred to as fouling.

Occupancy - Any use of track other than direct crossing.

Right-of-Way - The limits of railroad property on either side of tracks.

Use of Track - Obtaining permission from the proper authority at Metro-North for track occupancy.

Conductor/Flagman - A Metro-North employee qualified on the Rules of the Operating Department and qualified on the physical characteristics of the portion of the railroad involved. He/she is the contact employee qualified to obtain the use of track. Each conductor/flagman will have the proper flagging equipment, up-to-date Metro-North Operating Rules, Metro-North Timetables and Metro-North Safety Rules.

Groundman - Class "A" employee of Metro-North's Power Department authorized to de-energize/re-energize and ground high tension power lines.

Qualified Metro-North Employee - For the purpose of these instructions, a qualified employee is a Metro-North employee qualified to remove track or tracks from service.

1.0 REQUIREMENTS FOR PERFORMING WORK ON OR ADJACENT TO THE RIGHT OF WAY OF THE RAILROAD

1.1 General

1.1.1 The Contractor should note that the proposed work involves construction operations on or adjacent to property owned by CDOT and operated by Metro-North Railroad. In working near an operating Railroad, great care must be exercised and the Railroad's safety rules must be strictly observed.

1.1.2 If while completing the work covered by this contract, the tracks or other facilities of the Railroad are endangered, the Contractor shall immediately do such work as directed by the Railroad through the Engineer to restore safety. Upon failure of the Contractor to carry out such orders immediately, the Railroad may take whatever steps as are necessary to restore safe conditions. The cost and expense to the Railroad of restoring safe conditions, or of any damage to the Railroad's trains, tracks or other facilities caused by the Contractor's or subcontractor's operations, shall be considered a charge against the Contractor and shall be paid for by him, or may be deducted from any monies due or that may become due him under this contract.

1.2 Rules and Regulations

1.2.1 Railroad traffic shall be maintained at all times, and the Contractor shall conduct all of his operations on or adjacent to the Railroad right-of-way fully within the rules, regulations, and requirements of the Railroad. The Contractor shall be responsible for acquainting himself with such requirements as the Railroad may demand. The Contractor shall include in his bid any expenses occasioned by delay or interruption of his work by reason of the operation or maintenance of the Railroad facilities.

1.2.2 The Contractor shall obtain verification of the time and schedule of track occupancy from the Railroad before proceeding with any construction or demolition work on or adjacent to the Railroad right-of-way.

- 1.2.3 All work to be done on or adjacent to the Railroad right-of-way shall be performed by the Contractor in a manner satisfactory to the Railroad and shall be performed at such times and in such manner as not to interfere with the movement of trains or traffic upon the tracks of the Railroad. The Contractor shall use all necessary care to avoid accidents, damage, delay or interference with the Railroad's trains or property.
- 1.2.4 If deemed necessary by the Railroad, it may furnish or assign an inspector who will be placed on the work during the time the Contractor or any subcontractor is performing work under the contract on Railroad property.
- 1.2.5 Before proceeding with any construction or demolition work on or adjacent to the Railroad's property, a pre-construction meeting shall be held at which time the Contractor shall submit for approval of the Railroad, Plans, computations, and a detailed description of his method of procedure for accomplishing the specific construction work required under this contract, including methods of protecting Railroad traffic. Such approval shall not serve in any way to relieve the Contractor of his complete responsibility for the adequacy and safety of his methods of procedures.
- 1.2.6 The Contractor shall conduct his work and handle his equipment and materials so that no part of any equipment shall foul an operated track or wire line without the written permission of the Railroad.
- 1.2.7 Equipment shall be considered to be potentially fouling the track when located in such a position that failure of same with or without load brings the equipment within the traffic envelope. No equipment shall be placed in this position without prior approval of the Railroad.
- 1.2.8 Equipment of the Contractor to be used:
- 1.2.8.1 Equipment of the Contractor to be used adjacent to the tracks shall be in first-class condition so as to fully prevent failures of defective equipment that might cause delay in the operations of trains or damage to Railroad facilities. His equipment shall not be placed or put into operation adjacent to tracks without first obtaining permission from the Railroad. Under no circumstances shall any equipment or materials be placed or stored within 7620 mm (25 feet) from the near rail of a track in operation, unless approved in advance by the Metro-North representative.
- 1.2.8.2 High rail equipment of the Contractor to be used on the tracks shall be subject to prior approval of the Railroad. The equipment must be inspected and approved in advance at Metro-North's facility by Metro-North inspectors.
- 1.2.9 Materials and equipment belonging to the Contractor shall not be stored on Railroad property without first having obtained permission from the Engineer and Railroad, and such permission will be on the condition that the Engineer and Railroad will not be liable for damage to such materials and equipment from any cause. The Contractor shall keep the tracks adjacent to the site clear of all refuse and debris that may accumulate from his operations and shall leave the Railroad property in the condition existing before the start of his operations.

- 1.2.10 The Contractor shall coordinate with the Engineer and the Railroad in order to determine the type of protection required to insure safety and continuity of Railroad traffic incident to the particular methods of operation and equipment to be used on the work.
- 1.2.11 The Railroad will require protection during all periods when the Contractor is working on, or over, the right-of-way of the Railroad, or as may be found necessary in the opinion of the Railroad. When protection is required, refer to Paragraph 1.7.
- 1.2.12 It shall be expressly understood that this contract includes no work for which the Railroad is to be billed by the Contractor, and it shall be further understood that the Contractor is not to bill the Railroad for any work which he may perform, unless the Railroad gives a written request that such work be performed at its expense.
- 1.2.13 Upon completion of the work, and before final payment is made, the Contractor shall remove from within the limits of the Railroad's right-of-way, all machinery, equipment, surplus materials, falsework, rubbish and temporary buildings, and other property of the Contractor/sub-contractor, and shall leave the right-of-way in a condition satisfactory to the Railroad.

1.3 Railroad Protective Services

Railroad protective services will be provided in accordance with the Roadway Worker's Protective Act, Title 49, Part 214, Sub-part C.

Railroad protective services will also be performed to insure safe operations of trains when construction work would, in the Railroad's opinion, be a hazard to Railroad operations.

1.4 Definition of Hazard

Metro-North has furnished the statements quoted below, explaining when they consider a hazard to operations exists.

"Protective services will be required whenever the Contractor is performing work on or adjacent to the Railroad tracks or right-of-way, such as excavating, sheeting, shoring, erection and removal of forms, handling materials, using equipment which by swinging or by failure could foul the track, and when any other type of work being performed, in the opinion of the Railroad, requires such service."

1.5 Contractor Requirements for Work Affecting the Railroad

1.5.1 All matters requiring Railroad Company approval or coordination shall be directed to the Engineer or a duly authorized representative thereof, for forwarding to Metro-North Railroad.

1.5.2 Detailed plans and appurtenant data and calculations for any operation which, in the opinion of Metro-North, affect the Railroad, must be submitted to the Engineer or a duly authorized representative thereof, for forwarding to Metro-North Railroad for approval prior to commencement of the work.

All plans and calculations submitted must be stamped by a Connecticut registered Professional Engineer.

1.5.3

PARAGRAPH
1.5.3
RESERVED

1.5.4 The Contractor shall maintain a minimum of 305 mm (1 foot) level shoulder from ends of ties to maintain lateral track support for all excavations and shall not excavate any slope steeper than 1 (vertical) or 2 (horizontal) from the edge of the shoulder. Sheeting shall be required on all excavations where the side of the excavation is intercepted by the Railroad live load influence line. The live load influence line is defined as a line originating at the bottom edge of tie and extending downward at a slope of 1 (vertical) on 1-1/2 (horizontal). Such excavations must be designed to withstand, in addition to all common loads such as soil pressure and hydrostatic pressure, a railroad live load of Cooper E-80.

1.5.5 The Contractor shall be required to design and install protective scaffolding over the right-of-way where, at the sole discretion of the Railroad, such scaffolding is necessary to protect the Railroad from possible falling debris; paint or other materials; to protect personnel working about the right-of-way or to provide a platform for personnel, materials and/or equipment. Said scaffolding shall be designed for live load of 980 kilograms per square meter (200 lbs. per square foot) applied uniformly over the entire structure and a 910 kg (2 kips) concentrated load placed anywhere on the structure. The two loads are not to be applied simultaneously for design purposes.

1.5.6 All excavation areas within or near interlocking limits shall be located by the Contractor and inspected by Metro-North Railroad for the purpose of determining conflicts with underground facilities.

Exploratory trenches, 915 mm (3 feet) deep and 380 mm (15 inches) wide in the form of an "H" with outside dimensions matching and outside of sheeting dimensions are to be hand dug, in areas where railroad underground installations are known to exist. These trenches are for exploratory purposes only and are to be backfilled and compacted immediately. All work outlined above must be done in the presence of a Railroad inspector.

1.5.7 Cavities adjacent to sheet piling, created by driving of sheet piling, shall be filled with sand and any distributed ballast must be restored and tamped immediately.

- 1.5.8 Sheet piling shall be cut off at top of tie during construction and at 915 mm (3 feet) below bottom of tie after construction just prior to completion of back filling.
- 1.5.9 Plans and calculations for sheeting and scaffolding must be submitted to the Engineer for forwarding to the Railroad for approval prior to construction. Further, plans and calculations must be stamped by a Connecticut registered Professional Engineer.

1.6 Requirements for Erection, Demolition and Other Rigging Operations On or Adjacent to Railroad Right-of-Way

The Contractor will be required to furnish the following information to the Engineer or a duly authorized representative thereof, for forwarding to Metro-North Railroad for their approval prior to the start of any rigging operation over or adjacent to the Railroad right-of-way:

- 1.6.1 Plan view showing locations of cranes, boom length and rigging operating radii, with delivery or disposal locations shown.
- 1.6.2 Crane rating sheets showing crane(s) to be adequate or 150% of the lift. Crane and boom nomenclature is to be indicated.
- 1.6.3 Plans and computations showing weight of pick.
- 1.6.4 Location plan showing obstructions, indicating that the proposed swing is possible.
- 1.6.5 Plans showing locations and details of mats, planking or special decking as may be required by the Railroad.
- 1.6.6 Written statement from crane owner giving date of last crane condition and safety inspection and the results of said inspection.
- 1.6.7 Data sheet listing number, type, size and arrangement of slings, spreader bars or other connecting equipment. Include copies of catalog or information sheets of specialized equipment. All such equipment shall be shown adequate to safely carry 150% of the calculated loading.
- 1.6.8 A complete procedure is to be included, indicating the order of lifts and repositioning or rehitching of the crane or cranes.
- 1.6.9 Temporary support of any components or intermediate stages is to be shown.
- 1.6.10 A time schedule of the various stages must be shown, as well as a schedule for the entire lifting procedure.
- 1.6.11 All erection, demolition and rigging plans and calculations submitted to the Railroad must be stamped by a Connecticut licensed Professional Engineer.
- 1.6.12 Operations directly on or adjacent to the operating right-of-way will be performed only at times and under conditions specified by the Railroad's representative.

1.7 Ordering Protective Personnel

Metro-North will furnish protective personnel (flagmen, inspectors, maintenance personnel and similar labor) to protect the operation of train traffic during the Contractor's construction activities. Railroad protective services will also be provided in conformance with the Roadway Worker's Protective Act. There will be no charge to the Contractor for Metro-North protective personnel. It is agreed that the providing (or failure to provide) of any conductors, flagmen, groundmen or other employees shall not relieve the Contractor from liability or payment for any damage caused by his operations.

1.7.1 The Contractor must obey all instructions from Metro-North representatives on the job site promptly. Failure to follow instructions shall be deemed sufficient cause for closing the job site to the Contractor and its employees.

1.7.2 The Railroad will at its sole discretion, determine the need for and the availability of protective, support personnel. The Railroad will provide protective forces to the extent possible considering operational and maintenance priorities. The Railroad makes no guarantee that protection personnel will be available to meet the Contractor's preferred schedule. Further, no such work may actually commence until the assigned Railroad representative affirmatively advises the Contractor that the necessary protective forces are stationed and that he may proceed.

1.7.3 The assessment of the need for protective services will be based upon a Weekly Railroad Coordination Meeting held on a Tuesday. At these meetings the Contractor shall provide a Bi-weekly Schedule that will begin on the following Saturday. Based on that schedule the Railroad will determine the Protective Service required for the two week period. Protective services will be reserved for the following week beginning on the Saturday and ordered for the second week of the schedule. It will be the Contractor's responsibility to perform work in accordance with its approved schedule. Variations from the approved schedule may result in additional and unnecessary costs to the Engineer, Railroad and Contractor.

When performing work which has a duration of more than one week, the Contractor shall base his operations on a five (5) consecutive day work week. The hours of operation during this time shall remain constant. Multiple shifts may be worked.

The Contractor must demonstrate maximum use of protective service personnel ordered. Failure to do so may cause the inability to consistently obtain services.

1.7.4 Requests to cancel construction activities and subsequently, the scheduled protective personnel will be also determined at the Weekly Railroad Coordination Meeting held on Tuesdays. At these meetings, the previously scheduled protective service for the week beginning on the following Saturday may be canceled. This will be the only time for cancellation. No ordering of Protective services for the following week will be allowed.

1.7.5 The Contractor shall be held responsible for his subcontractors and suppliers. Weather conditions are considered the only acceptable excuse for nonperformance and only on work items which have been identified and agreed to have been weather dependent when scheduled. Activities not presented on the Bi-weekly schedule at the Railroad Coordination Meeting will not be able to commence until it has been inserted into the schedule and presented at the next Protective Service Meeting.

1.7.6 Work that requires the support of Railroad personnel shall not be scheduled on the following days, unless the work is of an emergency nature:

Holiday's Observed:

- *New Year's Day
- *President's Day
- *Good Friday
- *Memorial Day
- *Independence Day
- *Labor Day
- *Thanksgiving Day
- *Day Following Thanksgiving Day
- *Christmas Eve
- *Christmas Day
- *New Year's Eve

- * The Saturday and Sunday preceding a Monday holiday.
- * The Saturday and Sunday following a Friday holiday.
- * The Friday and Monday preceding and following a weekend holiday.

1.8 Requirements for Requesting Track Outages

Track outages as described in the plans and specifications must be requested at a weekly Railroad Coordination Meeting held on the Tuesday for the following week (Saturday through Friday) in which the outage is requested.

- 1.8.1 All procedures, material and equipment must be approved and on site prior to accepting the track outages request.
- 1.8.2 Track outages will be granted based on need for constructability not for convenience.
- 1.8.3 The Contractor must demonstrate the maximum use of track outages by coordinating his activities and work so that various elements and multiple activities are performed during approved outages. Failure to consistently utilize track outages may cause the inability to gain approval of future requests for outages.

- 1.8.4 No new track outages may be initiated the weekend preceding or following the following holidays:

Thanksgiving
Christmas
New Year's

However, long-term continuous outages may extend through these periods.

1.9 Catenary and Transmission Systems/Power Outages

- 1.9.1 Catenary and Transmission Systems - The Contractor shall assume that all the wires on the Railroad Company are energized at all times and must be governed by the restrictions imposed by the Railroad with respect to such electrical circuits. Should it become necessary, in the opinion of the Railroad Engineer to de-energize any wire or wires to insure safety of operation, such wires will be de-energized by the Railroad only during such period that will not interfere with the Railroad's operation. When the de-energizing and re-energizing of wires is deemed necessary, a representative of the Power Department of the Railroad must be on duty and present to arrange for the same. He will notify the Contractor in writing when the wires have been de-energized and also when said wires are to be re-energized.

1.9.1.1 The Contractor is advised that the overhead electrification will remain in place for the duration of the entire project, except where called for on the drawings and in the specifications.

1.9.1.2 Track rails of the Railroad are energized. Particular care must be taken to see that no contact is made between adjoining rails with any material which is a good conductor of electricity when dry, or material of any nature when wet. Particular care is necessary when any work involving the use of chains, steel rods, cables, pipes, etc., is done. Since the Contractor shall assume the wires and rails of the Railroad will be energized at all times, the Contractor shall require all of his employees, sub-contractors, and others to sign a form similar to the form shown as Appendix A.

1.9.2 Power Outages

- 1.9.2.1 Catenary Power Outages - A catenary power outage must be scheduled concurrently with a track outage for the track and is restricted to the same periods as specified in the plans and specifications.

1.9.2.2 Metro-North Railroad Power and Signal Distribution Feeder Outages - Outages for feeders can be allowed only during off-peak hours. These outages should be requested at a weekly Railroad Coordination meeting held on Tuesdays for the second (2nd) week (Saturday through Friday). One set (north or south) side of Railroad of power and signal feeders must be maintained energized at all times.

NOTE: During peak (5:00 a.m. to 10:00 a.m. and 3:30 p.m. to 10:00 p.m., Monday thru Friday) hours of Railroad traffic, both sets (north and south) of power and signal feeders must be energized.

1.10 Safety for Contractor's Employees Working on or Adjacent to the Right-of-Way of the Railroad

1.10.1 Personal Protection Equipment

1.10.1.1 Approved hard hats must be worn by all Contractor employees while on the right-of-way in yard, shop facilities, and construction and/or work sites. Approved safety eyewear must be worn by all Contractor employees while on right-of-way, in yard, shop facilities and construction and/or work sites and in the operating control cab of a moving locomotive or train. Any exclusion must be jointly approved by department head and Director of Safety.

1.10.1.2 Metro-North Safety Engineer approved reflectorized vest or clothing must be worn by all Contractor employees while on or about tracks and right-of-way and in yards.

1.10.1.3 Other protective equipment such as goggles, face shields, safety belts, floatation vests, gloves and respirators shall be issued by the Contractor when required. Protection devices for hearing conservation may be used when determined necessary and safe to do so.

1.10.2 Possession or use of Drinking Intoxicants and Narcotics

1.10.2.1 The use of intoxicants, narcotics, marijuana, amphetamines or hallucinogens or while on duty, is prohibited and is sufficient cause for dismissal. Contract employees under medication before or while on duty, must be certain that such use will not affect the safe performance of their duties.

1.10.3 Surveying Equipment

1.10.3.1 Measuring tape must be non-metallic to avoid shunting the signal system electric circuits. This will occur when a metallic object is laid across the top of two rails of any track.

1.10.3.2 Electrically rated fiberglass elevation rods are to be used to avoid injury in the event contact is made with energized catenary or signal/communication lines. Elevations of catenary wires must be obtained by or under direct supervision of a qualified Metro-North Class "A" groundman.

1.10.4 On or About Track

1.10.4.1 Contractor employees must walk on tracks or cross tracks only when necessary, and when accompanied by or with permission from a qualified Metro-North employee.

1.10.4.2 Contractor employees must not enter track unless it is necessary in performance of their duty.

1.10.4.3 The possession of an umbrella on or about tracks is prohibited.

1.10.4.4 Do not rest any object on shoulder while close to moving train.

1.10.4.5 Expect equipment to move on any track, in either direction, at any time. Contractor employees must look in both directions and have permission from a qualified Metro-North employee before:

- a. Fouling track
- b. Crossing track
- c. Going between or around end of equipment or structure
- d. Moving out from between or under equipment of structure
- e. Getting on or off equipment
- f. Performing any other applicable operation

1.10.4.6 **When crossing tracks have permission from a qualified Metro-North employee.** Always use approved walkways when available; otherwise take the shortest safe route after looking in both directions. If more than one track is to be crossed, stop and look before crossing each track.

1.10.4.7 When required by a conductor/flagman or other qualified Metro-North employee to vacate tracks, the Contractor employees must comply immediately.

1.10.5 Catenary Electric Systems

All work by the Contractor shall meet the Railroad's safety rules (MN-290 Electrical Operating Instructions), and the National Electric Safety Code. Including the rule that none of the Contractor's personnel shall be within 3050 mm (10 feet) of a live wire until qualified by the Metro-North Power Department. In order to maximize the work that can be performed during the limited daytime track outages, the Contractor may utilize means shown in the Plans and Specifications, subject to the Railroad's approval, to safeguard his work activities while adjacent catenaries remain energized.

1.10.5.1 All overhead wires must be considered energized (LIVE) at all times except when it is known they have been de-energized and properly grounded.

- 1.10.5.2 Until after wires are de-energized and properly grounded, all Contractor employees must not approach within 3050 mm (10 feet) of transmission systems wires, catenary system or signal power wires.
- 1.10.5.3 At the beginning of each tour of duty, the Class "A" groundman will instruct the Contractor foreman and each Contractor employee in the crew of the dangers surrounding them, calling their particular attention to any hazards to be encountered by the nature of the work to be done.
- 1.10.5.4 If in the opinion of the Class "A" groundman, any Contractor employee in the crew does not understand the instructions due to not having a proper knowledge of the English language, or for any other reason, such person shall not be permitted to work, or observe.
- 1.10.5.5 When clearances have been obtained and the wires, equipment or apparatus properly grounded, the Class "A" groundman will indicate to the Contractor foreman and the crew the location of wires, equipment or apparatus from which power has been removed and the location of the grounding devices applied. The Class "A" groundman must obtain on standard form, the signature of the Contractor foreman indicating that he and the crew have been so instructed, and will confine their work within the limits as outlined to them by the Class "A" groundman.
- 1.10.5.6 When the Class "A" groundman leaves his crew for any reason, he must notify the Contractor foreman and each person in the crew to stop all work in the vicinity of the wires, personally assuring himself that all persons have moved to a safe distance away from his departure. The Class "A" groundman will obtain the signature of the Contractor foreman on standard form, that he and the crew have been informed that the Class "A" groundman is leaving the gang and they will not resume work until advised to do so on return of the Class "A" groundman.
- 1.10.5.7 When the clearances are to be released, the Class "A" groundman will inform the Contractor foreman and each other Contractor employee and will personally observe that all persons have moved to a safe distance from the wires, equipment or apparatus to be energized, before removing the grounding devices. He will obtain the signature of the Contractor foreman, on a standard form, stating that he and the gang have been advised that the wires, equipment or apparatus will be energized, and that they will remain at a safe distance from them until informed otherwise by the Class "A" groundman.

1.10.5.8 The Class "A" groundman will inform the Contractor foreman if any Contractor employee on the job is unsafe and will not comply with instructions. If trouble is experienced with the Contractor foreman in maintaining safe working conditions, the Class "A" groundman will immediately notify his supervisor.

1.10.6 Safety Program and Plan

1.10.6.1 Prior to the commencement of work the Contractor shall submit a Working on the Railroad Safety Plan that will include a Program to implement the plan to the Engineer or a duly authorized representative for forwarding to the Railroad for review of compliance with this specification. This plan is separate to the Health and Safety Plan required for other aspects of the project (i.e., lead, excavations, etc.).

1.10.6.2 Each employee of the Contractor, subcontractor or others on site shall be given an initial training session prior to being allowed to work on the project, but not on the Railroad Right of Way, at this session the following will be furnished to the employee:

- a. Safety Orientation for Contract Employees Working on Metro-North Property produced by the Safety Engineer of Metro-North.
- b. Safety Inspection Checklist
- c. List of the applicable publications referenced in these specifications with respect to safety and where they are located for review if necessary. The list shall include, but not be limited to, such regulatory standards and mandates, i.e., OSHA, NIOSH, DOL, NFPA, EPA, FRA, MSDS, etc.
- d. Copy of the applicable corporate safety plan.
- e. Copy of the project Railroad Safety Plan or other project related plans.

The employee shall sign the standard form for acknowledgement of the above-noted documents.

1.10.6.3 As soon as possible after the initial training, the employee shall also be given a one-hour training session administered by Metro-North Safety Engineer or his representative. All employees receiving this training will receive a Registered Hard Hat sticker that will identify them from the employees with initial training on the project. No Contractor employees are permitted on the Railroad right-of-way without this training.

1.10.6.4 The Contractor shall hold "TOOL BOX" safety meetings for their employees at least once a week which will be documented and attendees listed.

1.10.6.5 The Contractor personnel shall attend a monthly Metro-North Safety Meeting.

2.0 INSURANCE REQUIREMENTS – METRO-NORTH RAILROAD

2.1 Submission of Insurance

The Contractor engaged in work on the project shall be required, before the Contractor begins work on the project, to provide and to maintain in force during the course of the project, at no cost to Metro-North, insurance described in paragraph 2.2. These insurance policies are in addition to any other forms or insurance or bonds required under the Terms of the contract.

2.2 Insurance

The Contractor shall furnish evidence that, with respect to the operations it performs, carries Workmen's Compensation Insurance and Public Liability and Property Damage Insurance covering all the Contractor's operations in any way connected with the project, and to furnish evidence of such policy to Metro-North.

2.2.1 Contractor's Public Liability and Property Damage Insurance – The Contractor shall furnish evidence that, with respect to the operations it performs, it carries regular Contractor's Public Liability Insurance providing for a limit of not less than \$2,000,000 single limit, bodily injury and/or property damage combined, for damages arising out of bodily injuries to or death of all persons in any one occurrence and for damage to or destruction of property, including the loss of use thereof, in any one occurrence.

2.2.2 Contractor's Protective Public and Property Damage Liability Insurance – The Contractor shall furnish evidence that, with respect to the operations performed by Subcontractors, it carries in its own behalf regular Contractor's Protective Public Liability Insurance providing for a limit of not less than \$2,000,000, single limit, bodily injury and/or property damage combined, for damages arising out of bodily injuries to or death of all persons in any one occurrence and for damage to or destruction of property, including the loss of use thereof, in any one occurrence.

2.2.3 Railroad's Protective Public Liability Insurance – In addition to the above, the Contractor shall furnish evidence that, with respect to the operations it or any of its subcontractors perform, it has provided Railroad Protective Public Liability Insurance (AAR-AASHTO Form) in the name of the Metro-North Railroad providing for a limit of not less than \$2,000,000 single limit, bodily injury and/or property damage combined, for damages arising out of bodily injuries to or death of all persons in any one occurrence for damage to or destruction of property, including the loss of use thereof, in any one occurrence. Such insurance shall be furnished with an aggregate of less than \$6,000,000 for all damages as a result of more than one occurrence.

The named insured shall include:

Metro-North Commuter Railroad
Metropolitan Transportation Authority of New York
Connecticut Department of Transportation
Consolidated Rail Corporation
National Railroad Passenger Corporation
Providence and Worcester Railroad Company

The insurance hereinbefore specified shall be carried until all work on the project is satisfactorily completed and formally accepted. Failure to carry or keep such insurance in force until all work is satisfactorily completed shall constitute a violation of the project contract.

The Contractor shall furnish to Metro-North a signed copy of the policy for Contractor's Public Liability Insurance and Protective Public Liability Insurance. If any work is subcontracted, the Contractor shall furnish a signed copy of the policy for Contractor's Public Liability Insurance.

This policy shall be endorsed to the effect that for the purposes of this insurance, the employees of the Railroad Company, as listed below, shall be considered the same as regular employees of the Contractor:

2.2.3.1 Any watchman, flagman and similar employee who is employed by the Railroad Company and is specifically assigned or furnished by the Railroad Company for work in connection with the Project.

2.2.3.2 Any employee of the Railroad Company while operating the work trains or other equipment while engaged in the performance of work directly involved in this contract.

2.2.4 The insurance described in paragraphs 2.2.1, 2.2.2 and 2.2.3 above, shall be endorsed to provide for not less than 30 days advance written notice to Metro-North of any change or cancellation of policies. Said notice shall be sent to Assistant Director - Insurance, Metro-North Commuter Railroad, 11th Floor, 347 Madison Avenue, New York, NY 10017. Work may not proceed on Metro-North property until all insurance requirements have been met to the satisfaction of Metro-North's Engineer.

2.2.5 Proof of Insurance must be supplied to the Railroad on the Metro-North Commuter Railroad Certificate of Insurance form.

GENERAL INSURANCE INFORMATION

Equipment of the Contractor to be used adjacent to tracks shall be in first class condition, so as to fully prevent any facilities that would cause delay in the operations of trains or damage to Railroad facilities. His equipment shall not be placed or put in operation adjacent to tracks without first obtaining permission from the Railroad. Operations of such equipment shall be satisfactory to the Railroad Company.

Normal speed of passenger trains is 45 mph in the area of the work. Normal speed of freight trains is 10 mph in the area of the work.

The number of trains in the work area in a 24 hour weekend day is as follows:

- More than 100 scheduled Metro-North Amtrak and Shore Line East passenger trains
- 4 Freight trains
- Many unscheduled passenger deadhead trains and shop moves

3.0 COSTS ASSOCIATED WITH THIS SPECIFICATION

- 3.1 There shall be no direct payment for this work, regulatory requirements, traffic regulation, administering of the specification, coordination and incidentals to fulfill the requirements of this specification. The cost thereof will be considered as included in the general cost of the work and distributed in all items.
- 3.2 Any work, material's supplied, inspections and protective services by Metro-North as described in the plans and specification expressly needed for the construction of the project will be compensated by the Engineer on a separate agreement.

AMTRAK REQUIREMENTS

NATIONAL RAILROAD PASSENGER CORPORATION

Date: _____

TEMPORARY PERMIT TO ENTER UPON PROPERTY File: E-47-_____
C.E.-17 (REVISED 03/99) W.O.: _____

ATTN: _____

1. **TEMPORARY PERMISSION.** Temporary permission is hereby granted to _____
_____ (hereinafter called "Permittee"), to
enter property owned and/or controlled by the National Railroad Passenger Corporation
(hereinafter called "Railroad"), for the purpose of _____

_____, in the County of _____, State of _____
_____, under the terms and conditions set forth below:

2. **LOCATION AND ACCESS.** (Give map reference, description or both)

(hereinafter called "Property").

3. **INDEMNIFICATION.** Permittee agrees to provide the indemnification set forth below unless it is statutorily prohibited from doing so, in which event Permittee will assure that each of its contractor(s) provides such indemnification:

Permittee agrees to defend, indemnify and hold harmless Railroad, its officers, directors employees, agents, servants, successors, assigns and subsidiaries, irrespective of their negligence or fault, from and against any and all losses and liabilities, penalties, fines, forfeitures, demands, claims, causes of action, suits, costs and expenses incidental thereto (including cost of defense and attorney's fees), which any or all of them may hereafter incur, be responsible for, or pay as a result of injury, death, disease, or occupational disease to any person, and for damage (including environmental contamination and loss of use) to or loss of any property, including property of Railroad, arising out of or in any degree directly or indirectly caused by or resulting from activities of or work performed by Permittee, its officers, employees, agents, servants, contractors, subcontractors, or any other person acting for or by permission of Permittee. The foregoing obligation shall not be limited by the existence of any insurance policy or by any limitation on the amount or type of damages, compensation, or benefits payable by or for Permittee or any contractor or subcontractor, and shall survive the termination of this permit for

any reason. As used in this paragraph, the term "Railroad" includes the National Railroad Passenger Corporation, all commuter agencies and other railroads, and their respective officers, directors, employees, agents, servants, successors, assigns and subsidiaries.

4. CONSIDERATION FOR PREPARATION OF TEMPORARY PERMIT. Permittee will pay to Railroad the sum of _____ Dollars (\$_____.00) as compensation for the preparation of this Temporary Permit.

5. STARTING OF USE OF PROPERTY. Permittee shall notify Railroad's Assistant Chief Engineer-Structures, or his designee, at least fifteen (15) business days in advance before entering upon, or starting any work on, the Property. No entry upon or use of the Property will be permitted until a fully executed copy of this Temporary Permit is returned to Railroad, and specific permission to enter upon the Property is received from Larry K. Lewis, Director I&C Projects, 30th Street Station, Box 64 - Third Floor South, Philadelphia, PA 19104, telephone number 215-349-1505.

6. RAILROAD OPERATIONS. All activities by or on behalf of Permittee (and all contractors, subcontractors and/or any other entity or person acting for or by permission of Permittee (hereinafter collectively called "Contractors")) shall be performed so as not to interfere with Railroad's operations or with any of Railroad's facilities. In no event shall personnel, equipment or material cross a track or tracks without special advance permission from Railroad's Assistant Chief Engineer-Structures or his designee. If, in the opinion of Railroad's Assistant Chief Engineer-Structures or his designee, conditions warrant at any time, Railroad will provide flag service and/or other protection at the sole cost and expense of Permittee, and Permittee agrees to pay to Railroad the full cost and expense therefor.

7. CLEARANCES. All equipment and material of Permittee and Contractors shall be kept at all times not less than fifteen (15) feet from the centerline of the outside track, unless specifically otherwise authorized in writing by Railroad's Assistant Chief Engineer-Structures or his designee. Permittee and Contractors shall conduct all operations so that no part of any equipment shall foul an operated track; transmission, communication or signal line; or any other structure or facility of Railroad.

8. RESTORATION OF PREMISES. Upon completion of its work, Permittee and Contractors shall, at the option of Railroad, (a) leave the Property in a condition satisfactory to Railroad or, (b) restore the Property to its original condition. This may include, without limitation, the restoration of any fences removed or damaged by Permittee or Contractors.

9. TERM OF PERMIT. This Temporary Permit shall commence on the date Railroad receives a fully executed copy of this Temporary Permit pursuant to paragraph 15 hereof and shall extend until the end of the period Railroad determines is necessary for Permittee to accomplish the purpose set forth in Paragraph 1; provided, however, Railroad reserves the right

to revoke this Temporary Permit at any time, and in no event shall this Temporary Permit extend beyond _____, _____. Under no circumstances shall this Temporary Permit be construed as granting to Permittee or Contractors any right, title or interest of any kind or character in, on, or about any property of Railroad.

10. **PROTECTION.** All work in, on, or about the Property shall be in accordance with the document entitled "SPECIFICATIONS REGARDING SAFETY AND PROTECTION OF RAILROAD TRAFFIC AND PROPERTY," a copy of which is attached hereto as Exhibit A and incorporated herein by reference.

11. **INSURANCE.** Before Permittee or Contractors commence any work in, on, or about the Property, Permittee, and Contractors (unless Permittee opts to provide coverage for them), shall furnish to Director I&C Projects, with evidence of Workers' Compensation, Commercial General Liability Insurance, and other coverages, as specified in the document entitled "INSURANCE REQUIREMENTS - NATIONAL RAILROAD PASSENGER CORPORATION," a copy of which is attached hereto as Exhibit B and incorporated here by reference.

12. **SAFETY ORIENTATION CLASS.** No person may enter within twenty-five (25) feet of the Property until he/she has attended Railroad's Safety Orientation Class, as noted in paragraph 11 of Exhibit A.

13. **COMPLIANCE BY CONTRACTORS.** Permittee shall take all steps necessary to assure that Contractors comply with the terms and conditions of this Temporary Permit.

14. **LABOR CHARGES; PAYMENTS.** Railroad's labor charges will be billed to Permittee at Railroad's standard force account rates. Except as specified in Paragraph 4 hereof, all costs, payments and other amounts due from Permittee to Railroad under this Temporary Permit shall be due and payable within thirty (30) days from the date of invoice therefor. Permittee shall have no right to set off against any payment due under this Temporary Permit any sums which Permittee may believe are due to it from Railroad for any reason whatsoever. In the event that Permittee shall fail to pay, when due, any amount payable by it under this Temporary Permit, Permittee shall also pay to Railroad, together with such overdue payment, interest on the overdue amount at an annual rate of six (6) percentage points over and above the rate published from time to time by *The Wall Street Journal* as the prime commercial lending rate (or the highest rate allowed by law, if less than the foregoing), calculated from the date the payment was due until paid. All payments due from Permittee to Railroad hereunder shall be: (a) made by check drawn from currently available funds; (b) deemed made only upon receipt by Railroad of collected funds; (c) made payable to National Railroad Passenger Corporation; and (d) delivered to the National Railroad Passenger Corporation, P.O. Box 18266F, St. Louis, Missouri, 63150. All payment obligations of Permittee under this Temporary Permit shall survive the termination or expiration of this Temporary Permit.

15. **ACCEPTANCE.** To confirm acceptance of this Temporary Permit, one fully executed

copy must be returned to: Larry K. Lewis, Director I&C Projects, National Railroad Passenger Corporation, 30th Street Station, Box 64 - Third Floor South, Philadelphia, PA 19104. The second copy may be retained for your file.

NATIONAL RAILROAD PASSENGER CORPORATION

By: _____
IRFAN ONCU, P. E.
ASSISTANT VICE PRESIDENT ENGINEERING

Date: _____
AGREED TO AND ACCEPTED:

By: _____
(signature)

Title: _____
Must be an Owner/Partner or
duly authorized representative

Date: _____

bc: File

IO/LKL/____/____

EXHIBIT A - TEMPORARY PERMIT TO ENTER

**SPECIFICATIONS REGARDING SAFETY
AND PROTECTION OF RAILROAD TRAFFIC AND PROPERTY**

National Railroad Passenger Corporation (Amtrak)

In the following Specifications "Chief Engineer" shall mean Railroad's Vice President, Chief Engineer, Senior Project Manager, or a duly authorized representative.

(1) Pre-Entry Meeting: Before entry of Permittee and/or Contractors onto Railroad's property, a pre-entry meeting shall be held at which time Permittee and/or Contractors shall submit for written approval of the Chief Engineer, plans, computations and a detailed description of proposed methods for accomplishing the work, including methods for protecting the Railroad's traffic. Any such written approval shall not relieve Permittee and/or Contractor of it's complete responsibility for the adequacy and safety of it's operations.

(2) Rules, Regulations and Requirements: Railroad traffic shall be maintained at all times with safety and continuity, and Permittee and/or Contractors shall conduct their operations in compliance with all rules, regulations, and requirements of the Railroad (including these Specifications) with respect to any work performed on, over, under, within or adjacent to the Railroad's property. Permittee and/or Contractors shall be responsible for acquainting itself with such rules, regulations and requirements. Any violation of the railroad's safety regulations shall be grounds for the immediate suspension of the Permittee and/or Contractor work, and the re-training of all personnel, at the Permittee's expense.

(3) Maintenance of Safe Conditions: If tracks or other property of the Railroad are endangered during the work, Permittee and/or Contractor shall immediately take such steps as may be directed by the Railroad to restore safe conditions, and upon failure of Permittee and/or Contractor to immediately carry out such direction the Railroad may take whatever steps are reasonably necessary to restore safe conditions. All costs and expenses of restoring safe conditions, and of repairing any damage to the Railroad's trains, tracks, right-of-way or other property caused by the operations of Permittee and/or Contractors, shall be paid by Permittee.

(4) Protection in General: Permittee and/or Contractors shall consult with the Chief Engineer to determine the type and extent of protection required to insure safety and continuity of railroad traffic. Any Inspectors, Track Foremen, Track Watchmen, Flagman, Signalmen, Electric Traction Linemen, or other employees deemed necessary

by Railroad, at its sole discretion, for protective services shall be obtained from the Railroad by Permittee and/or Contractors. The cost of same shall be paid directly to the Railroad by Permittee. The provision of such employees by the Railroad, and any other precautionary measures taken by the Railroad, shall not relieve Permittee and/or Contractors from their complete responsibility for the adequacy and safety of their operations.

(5) **Protection for Work Near Electrified Track or Wire:** Whenever work is performed in the vicinity of electrified tracks and/or high voltage wires, particular care must be exercised, and the Railroad's requirements regarding clearance to be maintained between equipment and tracks and/or energized wires, and otherwise regarding work in the vicinity of electrified tracks, must be strictly observed. No employees or equipment will be permitted to work near overhead wires, except when protected by a Class A employee of the Railroad. **Permittee and/or Contractors must supply an adequate length of grounding cable (4/0 copper with approved clamps) for each piece of equipment working near or adjacent to any overhead wire.**

(6) **Fouling of Track or Wire:** **No work will be permitted within twenty-five (25) feet of the centerline of track or the energized wire or have potential of getting within 25 feet of track wire without the approval of the Chief Engineer's Representative.** Permittee and/or Contractors shall conduct their work so that no part of any equipment or material shall foul an active track or overhead wire without the written permission of the Chief Engineer's Representative. **When Permittee and/or Contractors desire to foul an active track, they must provide the Chief Engineer's Representative with their site-specific work plan a minimum of twenty-one (21) working days in advance, so that, if approved, arrangements may be made for proper protection of the Railroad.** Any equipment or material shall be considered to be fouling a track or overhead wire when located (a) within fifteen (15) feet from the centerline of the track or within fifteen (15) feet from the wire, or (b) in such a position that failure of same, with or without a load, would bring it within fifteen (15) feet from the centerline of the track or within fifteen (15) feet from the wire shall be considered fouling and requires the presence of the proper Amtrak protection personnel.

If acceptable to the Chief Engineer's Representative, a Safety Barrier (approved temporary fence or barricade) may be installed at fifteen (15) feet from centerline of track or overhead wire to afford the Permittee and/or Contractor with a work area that is not considered fouling. Nevertheless protection personnel may be required at the discretion of the Chief Engineer's Representative.

(7) **Track Outages:** Permittee and/or Contractors shall verify the time and schedule of track outages from the Railroad before scheduling any of their work on, over, under, within, or adjacent to the Railroad's right-of-way. Railroad does not guarantee the

availability of any track outage at any particular time. Permittee and/or Contractors shall schedule all work to be performed in such a manner as not to interfere with Railroad operations. Permittee and/or Contractors shall use all necessary care and precaution to avoid accidents, delay or interference with the Railroad's trains or other property.

(8) **Equipment Condition:** All equipment to be used in the vicinity of operating tracks shall be in "certified" first-class condition so as to prevent failures that might cause delay to trains or damage to the Railroad's property. No equipment shall be placed or put into operation near or adjacent to operating tracks without first obtaining permission from the Chief Engineer's Representative. Under no circumstances shall any equipment or materials be placed or stored within twenty-five (25) feet from the centerline of an outside track, except as approved by the Site Specific Safety Work Plan. To insure compliance with this requirement, Permittee and/or Contractors must establish a twenty-five (25) foot foul line prior to the start of work by either driving stakes, taping off or erecting a temporary fence, or providing an alternate method as approved by the Chief Engineer's Representative. Permittee and/or Contractors will be issued warning stickers which must be placed in the operating cabs of all equipment as a constant reminder of the twenty-five (25) foot clearance envelope.

(9) **Storage of Materials and Equipment:** No material or equipment shall be stored on the Railroad's property without first having obtained permission from the Chief Engineer. Any such storage will be on the condition that the Railroad will not be liable for loss of or damage to such materials or equipment from any cause.

(10) **Condition of the Railroad's Property:** Permittee and/or Contractors shall keep the Railroad's property clear of all refuse and debris from its operations. Upon completion of the work, Permittee and/or Contractors shall remove from the Railroad's property all machinery, equipment, surplus materials, falsework, rubbish, temporary structures, and other property of the Permittee and/or Contractors and shall leave the Railroad's property in a condition satisfactory to the Chief Engineer.

(11) **Safety Training:** All individuals, including representatives and employees of the Permittee and/or Contractors, before entering onto the Railroad's property or coming within twenty-five (25) feet of the centerline of the track or energized wire shall first attend the Railroad's Safety Contractor/Lessee Employee Training Class. The Safety Orientation Class will be provided by the Railroad's Safety Representative. Permittee shall pay for the Railroad's Safety Orientation Class. A photo I.D. will be issued and must be worn/displayed while on Amtrak property. All costs of complying with the Railroad's safety training shall be at the sole expense of Permittee. Permittee and/or Contractors shall appoint a qualified person as its Safety Representative. He/she shall continuously assure that all individuals comply with Railroad's safety requirements. All safety training records shall be maintained with site specific work plan.

(12) No Charges to the Railroad: It is expressly understood that neither these Specifications, nor any document to which they are attached, include any work for which the Railroad is to be billed by Permittee and/or Contractors, unless the Railroad gives a written request that such work be performed at the Railroad's expense.

Revised August 1999

EXHIBIT B - TEMPORARY PERMIT TO ENTER**INSURANCE REQUIREMENTS FOR TEMPORARY PERMIT TO ENTER
NATIONAL RAILROAD PASSENGER CORPORATION
(AMTRAK)****Revised as of April 1999****DEFINITIONS**

Whenever in these Insurance Requirements or in the plans or contract documents the words "Company," "Railroad," or "Amtrak" are used, the same shall mean National Railroad Passenger Corporation. "Contractor" shall be defined as the party identified as "Permittee" in the Permit to Enter Agreement, as well as its officers, employees, agents, servants, contractors, subcontractors, or any other person acting for or by permission of Permittee or the party identified as Contractor in the Preliminary Engineering Agreement or Force Account Agreement, as well as its officers, employees, agents, servants, contractors, subcontractors, or any other person acting for or by permission of Contractor. "Operations" shall be defined as activities of or work performed by Contractor, its officers, employees, agents, servants, contractors, subcontractors, or any other person acting for or by permission of Contractor. Agreement shall be defined as the Permit to Enter Agreement, Preliminary Engineering Agreement, and/or Force Account Agreement.

INSURANCE

The Contractor shall procure and maintain, at its sole cost and expense, the types of insurance specified below. Contractor shall evidence such coverage by submitting Certificate(s) of Insurance for Workers' Compensation, Commercial General Liability and Automobile Liability, and the original Railroad Protective Liability Policy, prior to commencement of Operations. All insurance shall be procured from insurers authorized to do business in the jurisdiction(s) where the Operations are to be performed. The Contractor shall require all subcontractors to carry the insurance required herein, or Contractor may, at its option, provide the coverage for any or all subcontractors, provided the evidence of insurance submitted by Contractor to Amtrak so stipulates. The insurance specified below shall provide for thirty (30) days prior written notice to Amtrak in the event coverage is substantially changed, canceled or non-renewed. All insurance specified below shall remain in force until all Operations are satisfactorily completed, all contractor personnel and equipment have been removed from railroad property, and any work has been formally accepted. Contractor's failure to comply with the insurance requirements set forth herein shall constitute a violation of this Agreement.

Workers' Compensation Insurance complying with the requirements of the statutes of the jurisdiction(s) in which the Operations will be performed, covering all employees of Contractor. Employer's Liability coverage with limits of not less than \$1 million each accident or illness shall be included.

In the event the Operations are to be performed on or over navigable waterways, a Longshoremens and Harbor Workers' Compensation Act Endorsement and a Maritime Coverage Endorsement are to be added, including coverage for wages, transportation, maintenance and cure.

Commercial General Liability Insurance covering liability of the Contractor with respect to all Operations to be performed and all obligations assumed by the Contractor under the terms of this Agreement. Products-completed operations, independent contractors and contractual liability coverages are to be included, with the contractual exclusion related to construction/demolition activity within fifty (50) feet of the railroad and any X-C-U exclusions deleted. The policy shall name Amtrak as an additional insured with respect to the Operations to be performed. Coverage under this policy, or policies, shall have limits of liability of not less than \$2 million per occurrence, combined single limit, for bodily injury (including disease or death), personal injury and property damage (including loss of use) liability.

Automobile Liability Insurance covering the liability of Contractor arising out of the use of **ANY VEHICLES** which bear, or are required to bear, license plates according to the laws of the jurisdiction in which they are to be operated, and which are not covered under the Contractor's Commercial General Liability Insurance. The policy shall name Amtrak as an additional insured with respect to the Operations to be performed. Coverage under this policy shall have limits of liability of not less than \$1 million per occurrence, combined single limit, for bodily injury and property damage (including loss of use) liability.

Railroad Protective Liability Insurance covering the Operations performed by Contractor or any subcontractor within fifty (50) feet vertically or horizontally of railroad tracks. The AAR-AASHTO (ISO/RIMA) Occurrence Form (claims-made forms are unacceptable) in the name of the National Railroad Passenger Corporation (and any other railroad operating over the tracks) shall have limits of liability of not less than \$2 million per occurrence, combined single limit, for Coverages A and B, for losses arising out of injury to or death of all persons, and for physical loss or damage to or destruction of property, including the loss of use thereof. A \$6 million annual aggregate shall apply. Additionally, Policy Endorsement CG 28 31 - Pollution Exclusion Amendment, is required to be endorsed onto the policy. Further, "Physical Damage to Property" as defined in the policy is to be deleted and replaced by the following endorsement:

It is agreed that Physical Damage to Property is amended to read as follows:

Physical Damage to Property means direct and accidental loss of or damage to all property owned by any named insured and all property in any named insured's care, custody and control arising out of the acts or omissions of the Contractor named on the Declarations.

The original Railroad Protective Liability Insurance Policy must be submitted to Amtrak prior to commencement of Operations.

In the alternative, and upon Amtrak's approval, Contractor may elect to have Amtrak insure the Operations under its Blanket Railroad Protective Liability Insurance Program (RRP). The premium, which shall be determined by the rate schedule promulgated by the insurer in effect as of the effective date of the Agreement, shall be prepaid by the Contractor. In the event Contractor and Amtrak agree to insure the Operations under Amtrak's RRP, Contractor shall include RRP premium of \$_____ in addition to the Permit Fee, and send its check made payable to National Railroad Passenger Corporation to the individual set forth below prior to commencement of Operations.

All Risk Property Insurance covering physical loss or damage to all property used in the performance of the Operations. The policy shall have limits of liability adequate to cover all property of the Contractor (including personal property of others in Contractor's care, custody or control) and include a waiver of subrogation against Amtrak.

Claims-Made Insurance

If any liability insurance specified above shall be provided on a claims-made basis, then in addition to coverage requirements above, such policy shall provide that:

1. the retroactive date shall coincide with or precede Contractor's start of Operations (including subsequent policies purchased as renewals or replacements);
2. the policy shall allow for the reporting of circumstances or incidents that might give rise to future claims;
3. Contractor will use its best efforts to maintain similar insurance for at least three (3) years following completion of the Operations, including the requirement of adding National Railroad Passenger Corporation as an additional insured; and
4. if insurance is terminated for any reason, Contractor agrees to purchase an extended reporting provision of at least two (2) years to report claims arising from Operations performed in connection with the Agreement.

The Contractor shall furnish evidence of insurance as specified above fifteen (15) days

prior to commencing Operations. **THESE DOCUMENTS SHALL INCLUDE A DESCRIPTION OF THE PROJECT AND THE LOCATION ALONG THE RAILROAD RIGHT-OF-WAY** (typically given by milepost designation) **IN ORDER TO FACILITATE PROCESSING**. The fifteen (15) day advance notice of coverage may be waived by Amtrak in situations where such waiver will benefit Amtrak, but under no circumstances will the Contractor begin Operations without providing satisfactory evidence of insurance as approved by Amtrak. Such evidence of insurance coverage shall be sent to:

Mr. Larry K. Lewis
Director of I&C Projects
National Railroad Passenger Corporation
30th Street Station, Box 64
Philadelphia, PA 19104-2817

SECTION 1.06 – CONTROL OF MATERIALS

Article 1.06.01 - Source of Supply and Quality:

Delete the last paragraph and replace with the following:

For the following items the contractor shall submit a complete description of the item, with nine (9) copies of shop drawings, cuts and other descriptive literature which completely illustrates such items presented for formal approval. Such approval shall not change the requirements for a certified test report and materials certificate as may be called for. All shop drawings shall be submitted at one time.

- Controller
- Solid State Time Switch
- Solid State Load Switch
- Conflict Monitor
- Solid State Flasher
- Pre-Emption Equipment
- Detectors
- Steel Mast Arm Assembly
- Aluminum Pedestals
- Pedestrian Signals
- Pedestrian Pushbuttons and Signs
- Traffic Signals
- LED Traffic Signal Lamp Unit

For the following items the Contractor shall submit a complete description of the item, together with eight (8) copies of shop drawings, cuts and other descriptive literature which completely illustrates such items presented for formal approval. Such approval shall not change the requirements for a certified test report, and materials certificate as may be called for.

- Conduit
- Conductor
- 14/2 Cable
- Cabinet
- Epoxy
- Cable in Duct
- Cast Iron Junction Boxes
- Service Items

Required catalog cuts for all items listed above shall be submitted in one package at the same time. All approvals or disapprovals and comments will be returned in one package.

SECTION 1.06 - CONTROL OF MATERIALS

Article 1.06.05 - Shipping Materials: Add the following:

All vehicles transporting materials on highways and bridges in the State shall comply with all the vehicle regulations of the General Statutes of Connecticut as they apply to vehicle length, width, height and weight.

Any vehicle, either loaded or unloaded, will not be allowed to travel across any bridge or on any highway when such vehicle exceeds the legal limits or posted limits of such bridge or highway without a permit. The owner of the vehicle must apply to the Department for a permit for such travel, as provided in the statutes.

The General Statutes include the following limitations:

- Vehicle Width (Section 14-262(a)(1)) - The width of a vehicle and combination vehicle and trailer, including its load, is limited to 8'-6", without a permit.
- Vehicle Length (Section 14-262(c)) - The length of the semitrailer portion of a tractor-trailer unit, including its load, is limited to 48', without a permit.
- Vehicle Height (Section 14-264) - The height of a vehicle, with its load, is limited to 13'-6", without a permit.
- Vehicle Weight (Section 14-267a(b)(7)) - The gross vehicle weight (weight of vehicle including its load) is limited to 80,000 pounds, on vehicles with a 51' wheelbase, without a permit.
- Axle Weights of Vehicles (Section 14-267a) - The axle weights of vehicles varies and is determined by vehicle type and axle spacing.

On Department projects, any member or component, either temporary or permanent, that measures 120' or less and weighs no greater than 120,000 pounds, is transportable via an authorized permit route established by the Department provided the individual axle weights on the vehicle and trailer transporting the member or component do not exceed 20,000 pounds.

Applications for permits, required to transport materials, shall be submitted a minimum of two weeks prior to their required use, to the Department's Motor Transport Services Unit.

SECTION 1.06 - CONTROL OF MATERIALS

Article 1.06.07 - Certified Test Reports and Materials Certificate.

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

- Steel Span Pole I Mast Arm Anchor Bolts
- Steel Mast Arm Assembly
- Sign Face Extruded Aluminum (Type III Reflective Sheeting)
- Sign Face Sheet Aluminum (Type I Reflective Sheeting)
- Sign Face Sheet Aluminum (Type III Reflective Sheeting)

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

- Controller
- Solid State Time Switch
- Solid State Load Switch
- Conflict Monitor
- Solid State Flasher
- Pre-Emption Equipment
- Detectors
- Aluminum Pedestals
- Traffic Signals
- Pedestrian Signals
- Pedestrian Pushbuttons and Signs
- Electrical Conduit
- Handholes
- Rigid Metal Conduit

SECTION 1.06 – CONTROL OF MATERIALS

1.06.07 – Certified Test Reports and Materials Certificate

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

Item #511--- Materials:	Bridge Scupper Hopper Resin
Item #512--- Materials:	Pipe for Bridge Drainage Glass Fiber Reinforced Epoxy Pipe Adhesive
Item #520--- Materials:	Elastomeric Concrete Expansion Joint System Extruded Steel Sealing Element Extrusion Anchorage Elastomeric Binder Material Adhesive Lubricant Closed Cell Foam Bonding Material for Cell
Item #521--- Materials	Elastomeric Bearing Pads Steel Laminate Elastomer Adhesive Bonding Material Short-Duration Compression Tests
Item #522--- Materials	Isolation Bearing Assembly Poly-tetrafluoroethylene Sliding Surface Elastomer Disk Non-shrink Grout Friction of Fabricated Bearings Bolts
Item #601--- Materials	Concrete for Structures Joint Sealer Closed Cell Elastomer
Item #601--- Materials	Asphaltic Plug Expansion Joint System Closed cell Foam Backer Rod Binder Material
Item #602--- Materials	Deformed Steel Bars – Epoxy Coated Epoxy Coating
Item #602---	Deformed Steel Bars – Cladded Stainless Steel

Materials	Stainless Steel Cladding
Item #603--- Materials	Structural Steel (Low Alloy) Charpy V-Notch Tests Welding Electrodes High Strength Bolts Coating Material
Item #755--- Materials	Geotextile Geotextile
Item #1002--- Materials	Light Standard Foundation Cement Admixtures
Item #1003--- Materials	Light Standards Base Shaft Bracket Arm Galvanizing Deflection Test
Item #1104--- Materials	Mast Arm Assemblies

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

Item #512--- Materials	Pipe for Bridge Drainage Glass Fiber Reinforced Epoxy Pipe Adhesive
Item #522--- Materials	Isolation Bearing Assembly Adhesive Material Stainless Steel Structural Steel Bronze Castings
Item #601--- Materials	Class "A" Concrete, Class "F" Concrete and High Performance Concrete Concrete Mix Non-shrink Grout Anchorage Materials Joint Sealer (Sealants conforming to listed manufacturers) Closed Cell Elastomer
Item #601--- Materials	Asphaltic Plug Expansion Joint System Backing Plates Locating Pins Aggregate

Item #602--- Materials	Drilling Holes and Grouting Dowels Adhesive Bonding Material
Item #602--- Materials	Deformed Steel Bars – Epoxy Coated Epoxy Coating
Item #602--- Materials	Deformed Steel Bars – Cladded Stainless Steel Stainless Steel Cladding
Item #603--- Materials	Structural Steel (Low Alloy) High Strength Bolts Coating Material
Item #707--- Materials	Membrane Waterproofing Membrane Glass Fabric Primer Mastic
Item #904--- Materials	Metal Bridge Rail (Combination) (Extruded Aluminum) Rail Posts Rails Rail Splices Preset Anchorages Bolts Washers Molded Pads
Item #904--- Materials	Metal Bridge Solid Panel Rail Posts Rails Preset Anchorages Bolts Washers Molded Pads
Item #913--- Materials	Metal Bridge Rail – Protective Fence (5' High) (Chain Link) Fabric Rails Posts All Fittings
Item #930--- Materials	Object Marker Object Marker
Item #950--- Materials	Turf Establishment Seed

Item #1002--- Materials	Light Standard and Traffic Control Foundation Seed Fertilizer Ground Rod Electrical Conduit
Item #1004--- Materials	Roadway Luminaire Luminaire Ballasts
Item #1006--- Materials	Underbridge Luminaire Luminaire Ballasts
Item #1008--- Materials	Electrical Conduit Rigid Metal Conduit & All Fittings
Item #1009--- Materials	Cast Iron Junction Box Cast Iron Junction Box
Item #1010--- Materials	Concrete Handhole Seed Fertilizer
Item #1012--- Materials	Single Conductor in Conduit Single Conductor
Item #1013--- Materials	Control Cable Cable
Item #1014--- Materials	Nonmettalic Sheathed Cable Cable
Item #1015--- Materials	Polyvinyl Chloride Conduit PVC Conduit
Item #1015--- Materials	Grounding Conductor Grounding Rod
Item #1017--- Materials	Service Entrance & Cabinet Service Cabinet Service Entrance
Item #1102--- Materials	Pedestals Pedestal

SECTION 1.07 – LEGAL RELATIONS AND RESPONSIBILITIES

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

The following agencies, companies and representatives shall be contacted by the Contractor four (4) weeks prior to the start of any work on this project to coordinate the protection of their utilities within and adjacent to the limits of State Project No. 92-526.

Mr. David Jacobs
Senior Construction Engineer
Metro North Commuter Railroad
New Haven Station, 4th Floor
New Haven, CT 06519
(203) 786-8204

Larry K. Lewis
Director I&C Projects
National Railroad Passenger Corporation
30th Street Station
Box 64 – Third Floor South
Philadelphia, PA 19104

Ms. Suzanne P. Paddock
Supervisor 1
The Southern New England Telephone
Company
1441 North Colony Road, 1st Floor
Meriden CT 06450
(203) 238-5620

Mr. Richard Miller, P.E., L.S.
City Engineer
City of New Haven – Dept. of Engineering
200 Orange Street
New Haven, CT 06510
(203) 946-6417

Mr. Peter D. Loomis
Vice President, Distribution & Customer
Service
The Southern Connecticut Gas Company
855 Main Street
Bridgeport, CT 06604
(203) 382-8111

Mr. Duncan Loomis
Distribution Lead Engineer
United Illuminating Company
801 Bridgeport Avenue
Shelton, CT 06484
(203) 926-5251

Mr. Thomas Coughlin
General Manager
Comcast Cablevision of New Haven, Inc.
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SECTION 1.08 - PROSECUTION AND PROGRESS

Article 1.08.01 – Subletting or Assigning of Contracts:

Add the following after the last paragraph:

The Contractor shall pay the subcontractor for work performed within thirty (30) days after the Contractor receives payment for the work performed by the subcontractor. Also, any retained monies on a subcontractor's work shall be paid to the subcontractor within thirty (30) days after satisfactory completion of all the subcontractor's work.

For the purpose of this Item, satisfactory completion shall have been accomplished when:

- (1) The subcontractor has fulfilled the contract requirements of both the Department and the subcontract for the subcontracted work, including the completion of any specified material and equipment testing requirement or plant establishment period and the submission of all submittals (i.e.: certified payrolls, material samples and certifications, required state and federal submissions, etc.) required by the specifications and the Department, and
- (2) The work done by the subcontractor has been inspected and approved by the Department and the final quantities of the subcontractor's work have been determined and agreed upon.

If the Contractor determines that a subcontractor's work is not complete, the Contractor shall notify the subcontractor and the Engineer, in writing, of the reasons why the subcontractor's work is not complete. This written notification shall be provided to the subcontractor and the Engineer within twenty-one (21) days of the subcontractor's request for release of retainage.

The Engineer will institute administrative procedures to expedite the determination of final quantities for the subcontractor's satisfactorily completed work.

The inspection and approval of a subcontractor's work does not eliminate the Contractor's responsibilities for all the work as defined in Article 1.07.12, "Contractor's Responsibility for Work."

The inspection and approval of the subcontractor's work does not release the subcontractor from its responsibility for maintenance and other periods of subcontractor responsibility specified for the subcontractor's items of work. Failure of a subcontractor to meet its maintenance, warranty and/or defective work responsibilities may result in a finding that the subcontractor is non-responsible on future subcontract assignments.

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

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

Rev. Date 04/12/00

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

SECTION 1.08 – PROSECUTION AND PROGRESS

LIMITATIONS OF OPERATIONS

Article 1.08.04 – Limitation of Operations – Add the following:

In order to provide for traffic operations as outlined in the Special Provision “Maintenance and Protection of Traffic”, the Contractor shall not be permitted to perform any work which will interfere with one lane of traffic in each direction on Church Street South (U.S. 1), Union Avenue (U.S. 1), Church Street South Extension and Sargent Drive on all days between 7:00 AM and 8:00 PM.

The Contractor will not be allowed to interfere with existing traffic operations on Sargent Drive on Monday and through Friday between 6:00 a.m. and 9:00 a.m. and between 3:00 p.m. and 6:00 p.m.

In order to provide for traffic operations as outline in the Special Provisions “Maintenance and Protection of Traffic” the Contractor shall progress his construction activities in accordance with the “Sequence of Operations” as outlined herein. Any revisions shall require the written approval of the Department.

Temporary concrete barriers, other protective systems and traffic control devices as called for by the contract or ordered by the Engineer must be on hand and available in sufficient quantity for immediate installation prior to any stage change.

Existing traffic signalization shall be maintained at all times through the use of existing, new or temporary signalization.

SUGGESTED SEQUENCE OF OPERATIONS

The reconstruction of critical roadway elements of Church Street South, Union Avenue, Church Street South Extension and Sargent Drive must be completed during the phase in which they appear in this Suggested Sequence of Operations unless otherwise directed by the Engineer. The Contractor, however, may commence other work included in this Contract provided that construction procedures will not violate, conflict with or impair the traffic movements for each stage as described in the Special Provisions, “Maintenance and Protection of Traffic”, its accompanying traffic control plans, and the construction plans forming part of this Contract Document.

In the event of an approved deviation from these Special Provisions for “Maintenance and Protection of Traffic,” the Contractor shall immediately notify all utility companies on this Contract of any such charge.

Union Avenue Construction

Roadway Phase 1

- Shift Union Avenue eastbound traffic to the existing westbound Union Avenue roadway. Northbound and southbound Church Street south will remain on existing roadway with the exception of left shoulders in both directions to be closed for removal of the existing median.
- Construct sidewalk, curbing and grass berm along eastbound side of Union Avenue from Station 15+50 to Station 23+50.

- Construct temporary pavement transition ramp on Church Street south from Station 8+66 to Station 9+16.

Roadway Phase 2

- Shift traffic from the existing westbound lanes of Union Avenue to the newly constructed eastbound side of Union Avenue. Shift Church Street traffic to the southbound side.
- Construct the westbound portion of Union Avenue full width from Station 15+50 to Station 18+50 and Station 20+00 to Station 23+50.

Roadway Phase 3

- Shift traffic from the southbound lanes of Church Street south to the previously constructed northbound lanes of Church Street south. Traffic on Union Avenue shall remain on the previously constructed eastbound lanes of Union Avenue.
- Remove temporary pavement transition ramp and construct remaining southbound portions of Church Street south from Station 6+71 to Station 9+09.42.
- Construct remaining westbound portions to Union Avenue from Station 18+50 to Station 19+99.25.

Roadway Phase 4

- Complete construction of raised median from Church Street south Station 4+00 to Station 6+71.
- Place final 2" lift of Bituminous Concrete, Class 1 along Church Street south and Union Avenue.
- Shift traffic to proposed traffic patterns along Church Street south and Union Avenue.

Church Street South Extension and Box Culvert Construction

- Church Street South Extension shall be closed to traffic for construction of Church Street South Extension Bridge, installation of a 4 x 12 Precast Concrete Box Culvert and roadway reconstruction from Station 22+20 southerly to Station 32+50.
- Existing access to Sargent Manufacturing Company and Community Health Care Center shall be provided and maintained as long as possible as indicated in the Suggested Sequence of Operation Plans.
- Access and egress from Sargent Manufacturing Company VIP parking lot shall be relocated to a proposed temporary driveway at Sargent Drive.
- Access and egress from Community Health Care Center shall use an existing driveway to the east of Community Health Care Center. Egress traffic shall use the northerly parking lot and detour via Brewery St.

SECTION 1.08 - PROSECUTION AND PROGRESS

Article 1.08.07 - Determination of Contract Time:

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

The number of calendar days allowed for the completion of the Project will be fixed by the Department, will be stated in the proposal form and Contract, and will be known as the "Contract time." If a Contractor, prior to award of the Contract, anticipates completing the project before schedule indicating the anticipated early completion date and the schedule by which the Contractor would achieve that early completion. If the Contractor does not submit such a schedule prior to award of the Contract, the Contractor shall be barred from making any formal or informal claim for damages or additional compensation that is based (in whole or in part) on an assertion that the Contractor could have completed the Project prior to award of the Contract, the failure of the Department to challenge the feasibility or reasonableness of the schedule at the time may not be construed as an admission or acknowledgement that the schedule is feasible or reasonable.

If the Contractor has submitted, prior to commencement of the Project, a schedule that indicates completion of the Project more than 30 calendar days in advance of the Contract completion date, the Department, after award, may issue a no-cost construction order revising the allowable Contract time to that shown on the Contractor's schedule.

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.

Article 1.08.08 - Extension of Time:

In the second paragraph, insert the following as a new paragraph after the sentence ending "...concurrent delays for which the State was not responsible.":

If, in the opinion of the Contractor, an unanticipated event or sequence of events subsequent to award of the Contract makes it feasible for the Contractor to complete the Project at least thirty (30) calendar days earlier than the then-current Contract completion date, Contractor must either (a) submit to the Engineer, within thirty (30) calendar days of said event(s), a revised Project schedule showing the anticipated early completion, with a written explanation of how said event(s) made that early completion feasible when it otherwise would not have been feasible; or (b) forego any formal or informal claims based on the assertion that the Contractor, because of that event or sequence of events, could have completed the Project early if not for the action or indication of the State.

Following this paragraph, insert a paragraph break, and continue with the revised text of the current article:

Damages for periods of Project delay for which the State has sole responsibility...

Delete the last paragraph, "If an approved extension of time...of the following year".

Article 1.08.09 - Failure to Complete Work on Time:

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

SECTION 1.10 - ENVIRONMENTAL COMPLIANCE

ADD THE FOLLOWING:

1.10.08 - General Environmental Procedures

The requirements set forth herein pertain to the environmental aspects of the proposed construction and are supplementary to the requirements as set forth in the Contract Documents. The environmental construction activities may include, but may not be limited to, the excavation, handling, staging, transportation, and disposal of Controlled Materials.

Excavation activities performed by the Contractor or subcontractors within the project limits shall be performed in a manner which considers the health and safety of operating personnel, the surrounding environment and the community in conformance with the various environmental specifications in the Contract Documents.

Soils and/or debris excavated within the project limits of construction will be regarded as contaminated, as identified in the Contract Documents and as shown on the Contract Plans. Construction debris shall not be intermixed or co-mingled with other materials within the project limits of construction as identified in the Contract Documents. If this occurs, the Contractor shall separate and segregate the debris from the soils and it shall be disposed of as a construction debris.

The limits of contaminated materials are the horizontal pay limits and vertical depth below existing grade specified on the Contract Drawings for excavations, including but not limited to, Structure Excavation, Trench Excavation, Earth Excavation, and Rock (Concrete) Excavation within the limits of the Area of Environmental Concern as shown on the Contract Drawings and identified within the Contract Specifications.

Environmental Construction Documentation

All environmental construction related work shall be documented by the Contractor.

The Contractor shall be the custodian of the environmental construction documentation until such time as the documentation is turned over to the Engineer. Documentation may include but not be limited to; permits, laboratory data, disposal facility approval(s) and manifests or Bill of Lading paperwork. All documentation associated with environmental construction work shall be clearly marked "Environmental Construction Documentation" and shall be used solely for that purpose.

The documentation package shall be maintained on-site by the Contractor, shall be kept current with construction, shall be available to the Engineer upon request and shall at a minimum consist of the following:

1. Contract drawings;
2. Environmental Specifications;

3. Submittals;
4. Addenda, if appropriate;
5. Change Orders/Modifications, if any;
6. Product information;
 - a) List of products used
 - b) Manufacturers information, warranties
7. Laboratory data;
8. Copies of pertinent and required permits, notifications;
9. Copies of disposal facility paperwork for liquids, solids, demolition debris, etc. removed and disposed of;
10. Site Specific Health and Safety Plan; and
11. Any other information deemed appropriate.

No separate measurement or payment will be made for the Contractor's general work required under this Section. Unless otherwise specified, this work is considered incidental to the Items of work to which they pertain.

SECTION 6.01 – CONCRETE FOR STRUCTURES

Article 6.01.02 – Materials: Subarticle M.03.01-8(b) – Joint Sealer for Structures: Add the following:

- 1) Where “Joint Seal” is specified on the plans, it shall conform to the Federal Specifications SS-S-200-E (Self-leveling type), TT-S0227E (COM-NBS) Type II-Class A to the Federal Specification TT-S-00230C Type II-Class A.
- 2) Where “Silicone Joint Sealant” is specified on the plans, it shall be the following or an approved equal:

Dow Corning 902 RCS or 888
manufactured by: The Dow Corning Corporation
3901 S. Saginaw Road
Midland, Michigan 48686-0994

Other silicone joint sealants expressly manufactured for use with concrete will be considered for use provided they are submitted in advance for approval to the Engineer. Other joint sealants will be considered for use only if a complete product description is submitted, as well as documentation describing at least five installations of the product. These documented installations must demonstrate that the product has performed successfully for at least five years under traffic conditions.

- 3) Certification: For listed manufacturers, a Certificate of Compliance and a Materials Certificate will be required in accordance with Article 1.06.07.

For other than listed manufacturers, a Certified Test Report and a Certificate of Compliance will be required in accordance with Article 1.06.07, certifying the conformance of the sealant to the requirements set forth in the Federal Specifications. Should the consignee noted on a Certified Test Report be other than the Prime Contractor, the Materials Certificates shall be required to identify the shipment.

Add the following:

Subarticle M.03.03 – Closed Cell Elastomer

The closed cell elastomer shall conform to the requirements of ASTM D1056, Grade RE-41 B2. The elastomer shall have a pressure-sensitive adhesive backing on one side.

The Contractor shall deliver the closed cell elastomer to the job site a minimum of thirty (30) days prior to installation. Each separate length, roll or container shall be clearly tagged or marked with the manufacturer's name, trademark and lot number. A lot is defined as that amount of closed cell elastomer manufactured at one time from one batch of elastomer. A batch is defined as that amount of elastomer prepared and compounded at one time. The Contractor shall furnish a Certified Test Report and a Certificate of Compliance in accordance with Article 1.06.07, confirming the conformance of the closed cell elastomer to the requirements set forth in these specifications. Should the consignee noted on a Certified Test Report be other than the Prime Contractor, the Materials Certificate shall be required to identify shipment.

Prior to the delivery of the closed cell elastomer, the Contractor shall notify the Engineer of the date of shipment and the expected date of delivery. Upon delivery of the closed cell elastomer to the job site, the Contractor shall immediately notify the Engineer.

The Contractor shall furnish a 12" extra length of closed cell elastomer in each lot for purposes of inspection and testing by the Engineer. The Engineer will cut a 12" sample from each lot and inspect the sample for conformance to size, and perform physical tests on the sample as deemed necessary.

The Engineer shall reject any lot or portion of a lot that does not conform to the requirements stated herein. A rejected lot or portion of a lot may be resubmitted provided the Contractor has removed or corrected, in a manner acceptable to the Engineer, all nonconforming material.

Article 6.01.03 – Construction Methods: Subarticle 6.01.03 – 24 – Joint Seal: Add the following:

Sealants shall be applied as outlined in the manufacturer's printed instructions and as directed by the manufacturer's representative.

Primer shall be supplied by the sealant manufacturer and shall be applied on contact surfaces of joints in accordance with the requirements of the particular sealant manufacturer.

The Contractor shall arrange for, and have present at the commencement of the joint-sealing operations, a technically competent manufacturer's representative knowledgeable in the methods of installation of the sealant. The Contractor shall also arrange to have the representative present at such other times as the Engineer may request.

Add the following:

Subarticle 6.01.03 – 25 - Closed Cell Elastomer

The closed cell elastomer shall be installed as shown on the plans.

Article 6.01.04 – Method of Measurement: Subarticle 6.01.04-2 – Joint Filler: Delete in its entirety.

Article 6.01.05 – Basis of Payment: Subarticle 6.01.05-4 – Joint Filler: Delete in its entirety and replace with the following:

There shall be no direct payment for furnishing or installing expansion joint filler of the type and thickness specified on the plans or as directed by the Engineer.

Add the following:

Subarticle 6.01.05-5 – Closed Cell Elastomer

The cost of furnishing and installing closed cell elastomer shall be included in the cost of "Class A" Concrete.

SECTION 6.01 – CONCRETE FOR STRUCTURES

Article 6.01.03 – Construction Methods:

Article 6.01.03, Sub-article-3, Forms are supplemented by the following:

Remain-In-Place Steel Forms:

Attention is directed to the fact that where indicated on the plans remain-in-place, galvanized steel forms shall be used for the forming of the deck slabs.

The remain-in-place, galvanized steel forms shall conform to the following requirements:

No remain-in-place forms shall be placed over or supported on the top flanges of the beams or girders. The form supporting steel for the remain-in-place forms may be supported by or attached to the top flanges. Welding of supporting members or remain-in-place forms to the top flanges of steel beams and girders will not be permitted in the flange areas indicated on plans. The Contractor shall submit to the Engineer for his information and approval plans showing his proposed method of form construction prior to start of such construction. Before proceeding with pouring of the concrete the Contractor shall receive the Engineer's approval. The furnishing of such plans and approval by the Engineer shall not serve to relieve the Contractor of any of his responsibility for the safety of the work or the responsibility for the successful completion of the project.

Shop Drawings: Before fabricating any material, the Contractor shall submit shop drawings to the Engineer for approval in accordance with Article 1.05.02(b). These drawings shall include the proposed method of form construction, erection plans, material lists, material designation, gage of all materials and the details of corrugation. Also four (4) copies of form design computations shall be submitted with the shop drawings.

Where forms or their installation are unsatisfactory in the opinion of the Engineer, either before or during the placing of the concrete, the Contractor shall correct the defects before proceeding with the construction work. The cost of such corrective work shall be at the sole expense of the Contractor.

All steel and hardware for the form supports shall be galvanized in an approved manner.

All material and elements of the remain-in-place bridge deck form units shall be manufactured of corrugated galvanized steel conforming to ASTM A-446 (Grades A through E), and shall have a coating class of G165 in accordance with ASTM A525. The Grade shall be indicated on the shop plans.

Such forms shall be adequate in strength, safe, rigid, braced, supported and tied and constructed of material of sufficient thickness and strength to retain their true shape without distortion and withstand all pressures and loads to which the forms may be subjected. All edges of openings cut for drains, pipes and similar appurtenances shall be independently supported around the entire periphery of the opening.

The remain-in-place metal form shall be designed on the basis of dead load of the form, reinforcement and the plastic concrete plus 50 pounds per square foot for construction loads.

Unit working stresses shall be accordance with the standard specifications for construction loads and the unit working stress in the steel sheet shall be not more than 0.725 of the specified minimum yield strength of the material furnished, but not to exceed 36,000 pounds per square inch. Maximum deflection under weight of plastic concrete, reinforcement and form shall not exceed 1/180 of the form span or 0.5 inches, whichever is less, but in no case shall this loading be less than 120 PSF total. The permissible form camber shall be based on the actual dead load condition. Camber shall not be used to compensate for deflection in excess of the foregoing limits. The span for design and deflection shall be the span of the form plus two inches, measured parallel to the form flutes.

Physical design properties shall be computed in accordance with requirements of American Iron and Steel Institute Specification for the Design of Cold-Formed Steel Structural Members, latest published edition.

Provision shall be made for positive lateral support of steel beams or girder top flanges in compression by the concrete slab except where shear connectors are provided.

The remain-in-place metal forms shall not be used in panels where longitudinal slab construction joints are located between stringers.

These forms shall be installed from the topside in accordance with the manufacturer's placing plans, recommended details and printed instructions.

Forms shall be constructed to conform to the lines, grades, shapes and dimensions shown on the plans unless otherwise ordered by the Engineer. Supporting members for the forms shall insure that forms retain their correct dimensions and positions during use at all times.

The form supports shall provide vertical adjustment to maintain design slab thickness at the crest of corrugation, to compensate for variations in camber of beams and girders and to allow for deflections.

Welding of corrugated steel which has been galvanized will not be allowed.

The depth of the concrete slab shall be as shown on the plans and the corrugated form shall be placed so that the top of the corrugations will coincide with the bottom of the deck slab as indicated on the plans. No part of the forms or their supports shall protrude into the slab. All reinforcement shall have a minimum concrete cover of 1-inch.

Form sheets shall not be permitted to rest directly on the top of the stringer or floor beam flanges. Sheets shall be securely fastened to form supports and shall have a minimum bearing length of 1-inch at each end. The steel form supports shall be placed in direct contact with the flange of stringer on floor beams. All attachments shall be made by bolts, clips, welding where permitted, or other approved means.

Where practicable, self-drilling fasteners to fasten remain-in-place forms to form supports shall be used to reduce or eliminate welding.

Transverse construction joints shall be located at the bottom of a flute and ¼ - inch weep holes shall be provided in the field at not less than 12 inches on center along the line of the joint.

Where galvanizing is damaged on the underside of the form sheets or supports, the damaged areas shall be thoroughly cleaned, wire brushed, and given two coats of Zinc Dust-Zinc Oxide Primer. The Primer shall conform to the requirements for Type II as specified in Federal Specification TT-P-641d, no color added.

Field cutting of form sheet shall be done with a steel cutting saw. Supports, closures and cut outs shall be cut with shears or saw. Flame cutting by the use of a gas torch will not be permitted.

Calcium Chloride or any admixture containing chloride salts shall not be used in concrete placed on remain-in-place forms.

Should the Engineer determine that the procedures used during the placement of the concrete warrant inspection of the underside of the deck, the Contractor shall remove at least one section of the forms at a location and time selected by the Engineer for each concrete pour sequence on each span in the contract. This should be done as soon after placing the concrete as practicable in order to provide visual evidence that the concrete mix and the Contractor's procedures are obtaining the desired results. An additional section shall be removed if the engineer determines that there has been any change in the concrete mix or in the contractor's procedures warranting additional inspection.

After the deck concrete has been in place for a minimum period of two days, the concrete shall be tested for soundness and bonding of the forms by sounding with a hammer as directed by the engineer. If areas of doubtful soundness are disclosed by this procedure, the contractor will be required to remove the forms from such areas for visual inspection after the pour has attained adequate strength. This removal of the permanent steel bridge deck forms shall be at no cost to the State.

At locations where sections of the forms are removed, the Contractor will not be required to replace the forms but the adjacent metal forms and supports shall be repaired to present a neat appearance and assure their satisfactory retention. As soon as the form is removed, the concrete surfaces will be examined for cavities, honeycombing and other defects. If irregularities are found, and in the opinion of the Engineer these irregularities do not justify rejection of the work, the concrete surface shall be repaired as directed by the Engineer. If the concrete where the form is removed is unsatisfactory, additional forms, as necessary, shall be removed to inspect and repair the slab, and the Contractor's methods of construction shall be modified as required to obtain satisfactory concrete in the slabs. All unsatisfactory concrete shall be removed or repaired by the Contractor as directed by the Engineer.

The amount of sounding and form removal may be moderated, at the Engineer's discretion, after a substantial amount of slab has been constructed and inspected, if the Contractor's methods of construction and the results of the inspections as outlined herein indicate that sound concrete is being obtained throughout the slabs.

There will be no direct payment for the cost of the remain-in-place steel forms and form supports or any material, tools, equipment, or labor incidental thereto or the cost of any additional concrete due to the use of the remain-in-place steel forms but the cost thereof shall be considered included in the contract unit price per cubic yard for "High Performance Concrete".

SECTION 6.03 - STRUCTURAL STEEL

Subarticle 6.03.03-8 - Plans: Add the following:

The Contractor shall not, under normal circumstances, request changes to the field splice locations shown on the plans which will result in shipping lengths and/or shipping weights that exceed the limits in Article 1.06.05.

If, during the course of the Contractor's review of the site in conjunction with the preparation of his steel erection plans, it is discovered that extenuating circumstances exist which could be mitigated by altering the location of field splices, the Contractor must bring this situation to the attention of the Engineer. Any request to alter field splice locations that would result in the fabrication of oversize members as defined in Article 1.06.05 must be submitted to the Engineer in writing. The Engineer shall submit the request to the designer and the Department's Motor Transport Services Unit for review and comments. The request must be made prior to the preparation and submittal of any shop drawings for review by the designer.

SECTION 6.03 - STRUCTURAL STEEL

Delete **Subarticle 6.03.03-19 - Bolted Connections** and replace with the following:

19 - Connections Using High-Strength Bolts:

19 (a) General:

This Subarticle covers the assembly of structural joints using ASTM A325 or ASTM A490 high-strength bolts installed so as to develop the minimum required bolt tension specified in Table A.

19 (b) Bolted Parts:

All material within the grip of the bolt shall be steel, there shall be no compressible material, such as gaskets or insulation, within the grip. Bolted steel shall fit solidly together after the bolts are tensioned. The slope of the surfaces of parts in contact with the bolt head or nut shall not exceed 1:20 with respect to a plane normal to the bolt axis. The length of the bolts shall be such that the end of the bolt will be flush with or outside of the face of the nut when properly installed.

19 (c) Surface Conditions:

At the time of assembly, all joint surfaces, including surfaces adjacent to the bolt head and nut, shall be free of scale, except tight mill scale, and shall be free of dirt or other foreign material. Burrs that would prevent solid seating of the connected parts in the snug tight condition shall be removed.

Paint is permitted on the faying surface, including slip critical joints, when shown on the plans. The faying surfaces of slip-critical connections shall meet the requirements of the following paragraphs, as applicable:

- (1) In joints specified to have un-coated faying surfaces, any paint, including any inadvertent over spray, shall be excluded from areas closer than one bolt diameter, but not less than one inch, from the edge of any hole and all areas within the bolt pattern.
- (2) Joints specified to have painted faying surfaces shall be blast cleaned and coated in accordance with Article 6.03.03 - Construction Methods.
- (3) Joints with coated faying surfaces shall not be assembled before the coating has cured for the minimum time used in the qualifying test.
- (4) Faying surfaces specified to be galvanized shall be hot-dip galvanized in accordance with ASTM A123, and shall subsequently be roughened by means of hand wire brushing. Power wire brushing is not permitted.

19 (d) Installation:

- (1) General: A "fastener assembly" is defined as a bolt, a nut, and a washer. Only complete fastener assemblies of appropriately assigned lot numbers shall be installed. Fastener assemblies shall be stored in an area protected from dirt and moisture. Only as many fastener assemblies as are anticipated to be installed and tensioned during a work shift shall be taken from protected storage. Fastener assemblies not used shall be returned to protected storage at the end of the shift. Fastener assemblies shall not be cleaned of lubricant that is required to be present in as-delivered condition. Fastener assemblies which accumulate rust or dirt resulting from site conditions shall be cleaned, relubricated and tested for rotational-capacity prior to installation. All galvanized nuts shall be lubricated with a lubricant containing a visible dye. Plain bolts must be oily to touch when delivered and installed. Lubricant shall be removed prior to painting.

A bolt tension measuring device (a Skidmore-Wilhelm calibrator or other acceptable bolt tension indicating device) shall be provided by the Contractor at all locations where high-strength fasteners are being installed and tensioned. The tension measuring device shall be used to perform the rotational-capacity test and to confirm (1) the suitability of the fastener assembly to satisfy the requirements of Table A, including lubrication if required, (2) calibration of the wrenches, if applicable, and (3) the understanding and proper use by the bolting crew of the method of tensioning to be used.

To perform the calibrated wrench verification test for short grip bolts, direct tension indicators (DTI) with solid plates may be used in lieu of a tension measuring device. The DTI lot shall be first verified with a longer grip bolt in the tension measuring device. The frequency of confirmation testing, the number of tests to be performed and the test procedure shall be as specified in Subarticles 19(d)(4) through 19(d)(6), as applicable. The accuracy of the tension measuring device shall be confirmed by an approved testing agency at least annually.

Complete fastener assemblies with washers of size and quality specified, located as required below, shall be installed in properly aligned holes then tensioned and inspected by any of the methods described in Subarticles 19(e) through 19(g) to at least the minimum tension specified in Table A. Tensioning may be done by turning the bolt while

the nut is prevented from rotating when it is impractical to turn the nut. Impact wrenches, if used, shall be of adequate capacity and sufficiently supplied with air to perform the required tensioning of each bolt in approximately 10 seconds.

Bolts shall be installed in all holes of the connection and brought to a snug condition. Snug is defined as having all the plies of the joint in firm contact. Bolt torquing to develop a snug condition shall progress systematically from the most rigid part of the connection to the free edges. The bolts of the connection shall then be retorqued in a similar manner as necessary until the connection is snug.

Nuts shall be located, whenever practical, on the side of the connection which will not be visible from the traveled way.

ASTM A490 fasteners and galvanized ASTM A325 fasteners shall not be reused. Other ASTM A325 bolts may be reused if approved by the Engineer. Touching up or retorquing previously tensioned bolts which may have been loosened by the tensioning of adjacent bolts shall not be considered as reuse provided the retorquing (snugging up) continues from the initial position and does not require greater rotation, including the tolerance, than that required by Table B.

- (2) Rotational-Capacity Tests: Rotational-capacity tests are required and shall be performed at the location where the fasteners are installed and tensioned for all fastener assemblies. The following shall apply:
- (a) Except as modified herein, the rotational capacity test shall be performed in accordance with the requirements of ASTM A325.
 - (b) Each combination of bolt production lot, nut lot and washer lot shall be tested as an assembly.
 - (c) A rotational-capacity lot number shall have been assigned to each combination of lots tested.
 - (d) The minimum frequency of testing shall be two assemblies per rotational-capacity lot.
 - (e) For bolts that are long enough to fit in a Skidmore-Wilhelm Calibrator, the bolt, nut and washer assembly shall be assembled in a Skidmore-Wilhelm Calibrator or an acceptable equivalent device.
 - (f) Bolts that are too short to test in a Skidmore-Wilhelm Calibrator may be tested in a steel joint. The tension requirement of Section (g) need not apply. The maximum torque requirement, $\text{torque} \leq 0.25 \text{ PD}$, shall be computed using a value of P equal to the turn test tension (1.15 times the fastener tension in Table A).
 - (g) The tension reached at the rotation below (turn test tension) shall be equal to or greater than 1.15 times the required fastener tension (installation tension) shown in Table A.

- (h) The minimum rotation, from an initial tension of 10% of the "Minimum Required Tension" listed in Table A, shall be two times the required number of turns indicated in Table B in a Skidmore-Wilhelm Calibrator or an equivalent device without stripping or failure.
- (i) After the required installation tension listed above has been exceeded, one reading of tension and torque shall be taken and recorded. The torque value shall conform to the following:

$$\text{Torque} \leq 0.25 PD$$

Where: Torque = measured torque (foot-pounds)
P = measured bolt tension (pounds)
D = bolt diameter (feet).

- (3) Washer Requirements: All bolts shall have a hardened washer under the turned element (nut or bolt head), irrespective of the tension inspection method.

Where the outer face of the bolted parts has a slope greater than 1:20 with respect to a plane normal to the bolt axis, a hardened beveled washer shall be used to compensate for the lack of parallelism. Hardened beveled washers for American Standard Beams and Channels shall be square or rectangular, taper in thickness and conform to the requirements of ASTM F436.

Where necessary, washers may be clipped on one side to a point not closer than 7/8 of the bolt diameter from the center of the washer. Circular and beveled washers, when used adjacent to direct tension indicator washers shall not be clipped. Direct tension indicator washers shall not be clipped.

Additionally, hardened washers shall be placed in connections as follows:

- Hardened washers shall be used under both the head and the nut when ASTM A490 bolts are to be installed in material having a specified yield point less than 40 ksi.
- Where ASTM A325 bolts of any diameter or ASTM A490 bolts equal to or less than one inch in diameter are to be installed in oversize or short-slotted holes in an outer ply, a hardened washer conforming to ASTM F436 shall be used.
- When ASTM A490 bolts over one inch in diameter are to be installed in an oversize or short-slotted hole in an outer ply, hardened washers conforming to ASTM F436 except with 5/16-inch minimum thickness shall be used under both the head and the nut in lieu of standard thickness hardened washers. Multiple hardened washers with combined thickness equal to or greater than 5/16-inch do not satisfy this requirement.
- Where ASTM A325 bolts of any diameter or ASTM A490 bolts equal to or less than one inch in diameter are to be installed in a long slotted hole in an outer ply, a plate washer or continuous bar of at least 5/16-inch thickness with standard holes shall be provided. These washers or bars shall have a size sufficient to completely cover the

slot after installation and shall be of structural grade material, but need not be hardened, except as follows. When ASTM A490 bolts over one inch in diameter are to be used in long slotted holes in external plies, a single hardened washer conforming to ASTM F436 but with 5/16-inch minimum thickness shall be used in lieu of washers or bars of structural grade material. Multiple hardened washers with combined thickness equal to or greater than 5/16-inch do not satisfy this requirement.

19 (e) Turn-of-Nut Inspection Method:

Verification testing using a representative sample of not less than three complete fastener assemblies of each diameter, length and grade to be used in the work shall be performed at the start of work in a device capable of indicating bolt tension. This verification test shall demonstrate that the method used to develop bolt tensions necessary to snug the condition and controlling the turns subsequently applied by the bolting crew develops a tension not less than five percent greater than the tension required by Table A. Periodic retesting shall be performed when ordered by the Engineer.

After snugging the connection, the applicable amount of rotation specified in Table B shall be achieved. During the torquing operation there shall be no rotation of the part not turned by the wrench. Torquing shall progress systematically from the most rigid part of the joint to its free edges.

19 (f) Calibrated Wrench Inspection Method:

Calibrated wrench inspection may be used only when wrenches are calibrated on a daily basis. Standard torques determined from tables or from formulas which are assumed to relate torque to tension shall not be acceptable.

When calibrated wrenches are used for installation, they shall be set to deliver a torque which has been calibrated to produce a tension not less than 5 percent in excess of the minimum tension specified in Table A. The installation procedures shall be calibrated by verification testing at least once each working day for each bolt diameter, length and grade using fastener assemblies that are being installed in the work. This verification testing shall be accomplished in a device capable of indicating actual bolt tension by tensioning three complete fastener assemblies of each diameter, length and grade from those being installed with a hardened washer under the element turned.

Wrenches shall be recalibrated when significant difference is noted in the surface condition of the bolts, threads, nuts or washers. It shall be verified during actual installation in the assembled steel work that the wrench adjustment selected by the calibration does not produce a nut or bolt head rotation from snug greater than that permitted in Table B. If manual torque wrenches are used, nuts shall be turned in the tensioning direction when torque is measured.

When calibrated wrenches are used to install and tension bolts in a connection, bolts shall be installed with hardened washers under the element turned to tension the bolts. Once the connection has been snugged, the bolts shall be torqued using the calibrated wrench. Torquing shall progress systematically from the most rigid part of the joint to its free edges. The wrench shall be returned to "touch up" previously torqued bolts which may have been

relaxed as a result of the subsequent torquing of adjacent bolts until all bolts are torqued to the prescribed amount.

19 (g) Direct Tension Indicator Inspection Method:

When Direct Tension Indicators (DTI) meeting the requirements of Subarticle M.06.02-5.1 are to be used with high-strength bolts to indicate bolt tension, they shall be subjected to the verification testing described in Subarticle 19(g)(1) and installed in accordance with the method specified in Subarticle 19(g)(2). Unless otherwise approved by the Engineer, the DTI shall be installed under the head of the bolt and the fastener assembly torqued by turning the nut. The manufacturer's recommendations shall be followed for the proper orientation of the DTI and additional washers, if any, required for the correct use of the DTI.

- (1) Verification - Verification testing shall be performed in a calibrated bolt tension measuring device. A special flat insert shall be used in place of the normal bolt head holding insert. Three verification tests are required for each combination of fastener rotational-capacity lot, DTI lot, and DTI position relative to the turned element (bolt head or nut) to be used on the project. The fastener shall be torqued by turning the element not against the DTI. The element (bolt head or nut) against the DTI shall be prevented from rotating. The purpose of the verification testing is to ensure that the fastener will be at or above the desired installation tension when half or more of the spaces in the DTI have a gap less than 0.005 inches and that the fastener will not undergo excessive plastic deformation at the minimum gap allowed on the project.

The verification tests shall be conducted in two stages. The bolt, nut and DTI assembly shall be installed in a manner so that at least three and preferably not more than five threads are located between the bearing face of the nut and the bolt head. The bolt shall be tensioned first to the load equal to that listed in Table C under "Verification Tension" for the grade and diameter of bolt. If an impact wrench is used, the tension developed shall be no more than two thirds the required tension. Subsequently a manual wrench shall be used to attain the required tension. Determine and record the number of refusals of a 0.005 inch tapered feeler gage in the spaces between the protrusions. The number of refusals shall not exceed the number listed under "Maximum Verification Refusals" in Table C for the grade and diameter of bolt used. The maximum number of refusals for coated DTIs (galvanized, painted or epoxy coated), when used under the turned element shall be no more than the number of spaces on the DTI less one. The DTI lot is rejected if the number of refusals exceeds the values in the table or, for coated DTIs if the gage is refused in all spaces.

After the number of refusals is recorded at the verification load, the turned element shall be further torqued until the 0.005 inch feeler gage is refused at all the spaces and a visible gap exists in at least one space. The load at this condition shall be recorded and the bolt removed from the tension measuring device. The nut must be able to be turned down the bolt by hand for the complete thread length of the bolt excluding thread runout. If the nut cannot be rundown for this thread length, the DTI lot shall be rejected unless the load recorded is less than 95% of the average load measured in the rotational capacity test for the fastener lot as specified in Subarticle 19(d)(2)(g).

If the bolt is too short to be tested in the calibration device, the DTI lot shall be verified on a long bolt in a calibrator to determine the number of refusals at the "Verification Tension" listed in Table C. The number of refusals shall not exceed the values listed under "Maximum Verification Refusals" in Table C. Another DTI from the same lot shall then be assembled with the short bolt in a convenient hole in the work. The bolt shall be tensioned until the 0.005 inch feeler gage is refused in all spaces and a visible gap exists in at least one space. The fastener shall then be disassembled. Subsequently, the nut shall be able to be rundown by hand for the complete thread length of the bolt excluding thread runout. The DTI lot shall be rejected if the nut cannot be rundown for this thread length.

- (2) Installation - Installation of fasteners using DTIs shall be performed in two stages. The element against the DTI shall be held against rotation during each stage of the installation. The connection shall be first snugged with bolts installed in all the holes of the connection and tensioned sufficiently to bring all the plies of the connection into firm contact. The number of spaces in which a 0.005 inch feeler gage is refused in the DTI after snugging shall not exceed those listed under "Maximum Verification Refusals" in Table C. If the number exceeds the values in the table, the fastener assembly shall be removed and another DTI installed followed by retensioning to snug the connection.

The bolts shall be further tensioned until the number of refusals of the 0.005 inch feeler gage is equal to or greater than the number listed under "Minimum Installation Refusals" in Table C. If the fastener is tensioned so that no visible gap in any space remains, the bolt and DTI shall be removed, and replaced by a new properly tensioned bolt and DTI.

19 (h) Inspection:

- (1) The Contractor shall provide all the material, equipment, tools and labor necessary for the inspection, including access, of the bolted parts and fasteners both before and after the fasteners are installed and tensioned.

The Engineer shall determine that the requirements of Subarticles 19(h)(2) and 19(h)(3), following, are met in the work.

- (2) Before the installation of fasteners in the work, the Engineer shall check the marking, surface condition and storage of fastener assemblies and the faying surfaces of joints for compliance with the requirements of Subarticles M.06.02-5, 19(a) and 19(d)(1). He shall observe calibration and/or testing procedures required in Subarticles 19(e) through 19(g) as applicable, to confirm that the selected procedure is properly used and that, when so used with the fastener assemblies supplied, the tensions specified in Table A are provided. He shall monitor the installation of fasteners in the work to assure that the selected procedure, as demonstrated in the initial testing to provide the specified tension, is routinely properly applied.
- (3) Either the Engineer or the Contractor, in the presence of the Engineer at the Engineer's option, shall inspect the tensioned bolts using an inspection torque wrench, unless alternate fasteners or direct tension indicator devices are used, allowing verification by other methods. Inspection tests should be within 24 hours of bolt tensioning to prevent possible loss of lubrication or corrosion influence on tensioning torque.

Three bolts of the same grade, size, and condition as those under inspection shall be placed individually in a device calibrated to measure bolt tension. This calibration operation shall be done at least once each inspection day. There shall be a washer under the part turned in torquing each bolt. In the calibrated device, each bolt shall be tightened by any convenient means to the specified tension. The inspecting wrench shall then be applied to the tensioned bolt to determine the torque required to turn the nut or head five degrees in the tightening direction. The average of the torque required for all three bolts shall be taken as the job-inspection torque.

Ten percent (at least two) of the tensioned bolts on the structure represented by the test bolts shall be selected at random in each connection. The job-inspection torque shall then be applied to each with the inspecting wrench turned in the tightening direction. If this torque turns no bolt head or nut, the bolts in the connection shall be considered to be properly tensioned. But if the torque turns one or more bolt heads or nuts, the job-inspection torque shall then be applied to all bolts in the connection. Any bolt whose head or nut turns at this stage shall be retorqued and reinspected. The Contractor may, however, retension all the bolts in the connection and resubmit it for inspection, so long as bolts are not over tensioned or damaged by this action.

TABLE A
Minimum Bolt Tension in kips*

Bolt Size (Inches)	ASTM A325	ASTM A490
5/8	19	24
¾	28	35
7/8	39	49
1	51	64
1 1/8	56	80
1¼	71	102
1 3/8	85	121
1½	103	148

* Equal to 70% of specified minimum tensile strength of bolts (as specified in ASTM Specifications for tests of full-size A325 and A490 bolts with UNC threads, loaded in axial tension) rounded to the nearest kip.

TABLE C

Bolt Dia. (in.)	Verification Tension		Maximum Verification Refusals		DTI Spaces		Minimum Installation Refusals	
	A325	A490	325	490	325	490	325	490
5/8	20	25	1	2	4	5	2	3
¾	29	37	2	2	5	6	3	3
7/8	41	51	2	2	5	6	3	3
1	54	67	2	3	6	7	3	4
1 1/8	59	84	2	3	6	7	3	4
1¼	75	107	3	3	7	8	4	4
1 3/8	89	127	3	3	7	8	4	4
1½	108	155	3	4	8	9	4	5

TABLE B
Nut Rotation from the Snug Condition
Geometry^{a,b} of Outer Faces of Bolted Parts

Bolt Length (measured from underside of head to end of bolt)	Both Faces Normal to Bolt Axis	One Face Normal to Bolt Axis and Other Face Sloped Not More Than 1:20, Bevel Washer Not Used	Both Faces Sloped Not More Than 1:20 From Normal to Bolt Axis, Bevel Washer Not Used
Up to and including 4 diameters	1/3 turn	1/2 turn	2/3 turn
Over 4 diameters but not exceeding 8 diameters	1/2 turn	2/3 turn	5/6 turn
Over 8 diameters but not exceeding 12 diameters	2/3 turn	5/6 turn	1 turn

- (a) Nut rotation, as used in Table B, shall be taken as relative to the bolt, regardless of the element (nut or bolt) being turned. For bolts installed by 1/2 turn and less, the tolerance should be plus or minus 30 degrees; for bolts installed by 2/3 turn and more, the tolerance should be plus or minus 45 degrees.

To determine the nut rotation for installation and inspection of the fasteners, the nut and the end of the bolt or the head of the bolt and the adjacent steel shall be match marked.

- (b) The values, given in Table B, shall be applicable only to connections in which all material within grip of the bolt is steel.
- (c) No research work has been performed by the Research Council Riveted and Bolted Structural Joints to establish the turn-of-nut procedure when bolt lengths exceed 12 diameters. For situations in which the bolt length, measured from the underside of the head to the end of the bolt, exceeds 12 diameters, the required rotation shall be determined by actual tests in a suitable tension device simulating the actual conditions.

SECTION 7.02 - PILES

Article 7.02.03 – Construction Methods

Add the following:

Subarticle 15 – Vibration Monitoring - Sargent Manufacturing: The Contractor shall monitor vibrations due to pile driving at the Sargent Manufacturing Facility. A seismograph shall be located on the ground surface adjacent to the Sargent Manufacturing building, at the closest point between the building and the pile driving location, whenever a pile is driven within 200 feet of the building. The seismograph used shall be a Model D477 Blastmate II as manufactured by InstanTel, Inc. of Kanata (Ottawa), Ontario, Canada or equivalent, acceptable to the Engineer. The seismograph shall be set with a trigger velocity of 0.05 inches per second. The maximum peak particle velocity shall not exceed 0.50 inches per second. The Contractor shall immediately notify the Engineer and stop pile driving when this velocity criterion has been exceeded. The Contractor shall modify its operations by preaugering or other methods it deems appropriate to assure that the vibration limit is not exceeded. The Contractor shall supply a summary report of the maximum peak particle velocity recorded each day, and copies of the seismograph strip charts to the Engineer on a weekly basis.

Vibration Monitoring – Railroad Tracks: The Contractor shall monitor track horizontal and vertical movement by providing the following:

1. Survey work shall be performed by a Registered Land Surveyor in the State of Connecticut.
2. Pre pile driving survey: Prior to driving piles within 50 feet of any railroad tracks, perform survey of tie locations and grade.
 - a. Coordinates and elevations of top of tie at centerline of track for points located at the centerline of the proposed roadway and offset 25, 50 and 100 feet of both sides of the roadway centerline (7 points per track).
 - b. Mark location where each shot is taken.
 - c. Submit plan showing surveyed coordinates and elevations to the Engineer.
3. Monitoring during driving: Daily monitor top of tie coordinates and elevations to detect horizontal or vertical movement.
 - a. Monitor all tracks once a day except Tracks 1, 2, 3 and 4.
 - b. Monitor Tracks 1, 2, 3 and 4 twice daily, once at mid-day and at the completion of daily driving.
 - c. Monitoring shall continue until all pile driving within 50 feet of the tracks is completed.
 - d. Immediately report any indication of horizontal or vertical movement to the Engineer.

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

Article 10.00.10 – Tests: Preliminary and Final:

Delete entire article and replace with the following:

(1) Highway Illumination Projects:

The Contractor shall make all operational tests, supervised by the Engineer. Operational tests and testing equipment shall be supplied by the Contractor.

Upon completion of all work, the lights will be energized and inspected. If acceptable, the system will be left on, and a 30 day test period will begin on the date designated by the Engineer. During the 30 day test period, the lights will be monitored, and any malfunctions, knockdowns, or outages, shall be attended to and corrected by the Contractor within 48 hours or so to the satisfaction of the Engineer. Failure to promptly or properly attend to reported problems will result in the test period being restarted. Upon satisfactory completion of any corrective or clean-up work, maintenance of the system will be turned over to the State (town).

Partial acceptance may be made in accordance with Article 1.08.12.

Upon request, the Contractor shall demonstrate that all ground rods shall have a resistance to earth of not more than 25 ohms. Also, upon request, the Contractor shall perform insulation testing which shall be a minimum of 1000 ohms per volt.

SECTION M.06 - METALS

Work under this item shall conform to the requirements of Section M.06 amended as follows:

Subarticle M.06.02-5 - High Strength Bolts: Delete the entire subarticle and replace it with the following:

5 - High Strength Bolts:

High strength bolts, including suitable nuts and hardened washers, shall conform to the requirements of the appropriate ASTM specifications as amended and revised herein.

5 (a) Bolts, Nuts, Washers and Load Indicator Devices:

High strength bolts shall conform to ASTM A325 or ASTM A490 as shown on the plans. When high-strength bolts are used with coated steel, the bolts shall be mechanically galvanized. When high-strength bolts are used with uncoated weathering grades of steel, the bolts shall be Type 3.

Nuts for ASTM A325 bolts shall conform to ASTM A563, grades DH, DH3, C, C3 and D or ASTM A194, grades 2 or 2H. Where galvanized high-strength bolts are used, the nuts shall be galvanized, heat treated grade 2H, DH or DH3. Where Type 3 high-strength bolts are used, the nuts shall be grade C3 or DH3.

Nuts for ASTM A490 bolts shall conform to the requirements of ASTM A563, grades DH and DH3 or ASTM A194, grade 2H. Where Type 3 high-strength bolts are used, the nuts shall be grade DH3.

All galvanized nuts shall be lubricated with a lubricant containing a visible dye of any color that contrasts with the color of the galvanizing. Black bolts must be oily to the touch when delivered and installed.

Circular flat and square or rectangular beveled, hardened steel washers shall conform to ASTM F436. Unless otherwise specified, galvanized washers shall be furnished when galvanized high-strength bolts are specified, and washers with atmospheric corrosion resistance and weathering characteristics shall be furnished when Type 3 high-strength bolts are specified.

Compressible-washer-type direct tension indicator washers, used in conjunction with high strength bolts, shall conform to ASTM F959. Where galvanized high-strength bolts are used, the washers shall be galvanized in accordance with ASTM B695, Class 50. Where Type 3 high-strength bolts are used, the washers shall be galvanized in accordance with ASTM B695, Class 50 and coated with epoxy.

5 (b) Identifying Marks:

ASTM A325 for bolts and the specifications reference therein for nuts require that bolts and nuts manufactured to the specification be identified by specific markings on the top of the bolt head and on one face of the nut. Head markings must identify the grade by the symbol "A325", the manufacturer and the type, if type 3. Nut markings must identify the grade, the manufacturer and if type 3, the type. Markings on direct tension indicators must identify the manufacturer and type "325". Other washer markings must identify the manufacturer and if type 3, the type.

ASTM A490 for bolts and the specifications reference therein for nuts require that bolts and nuts manufactured to the specification be identified by specific markings on the top of the bolt head and on one face of the nut. Head markings must identify the grade by the symbol "A490", the manufacturer and the type, if type 2 or 3. Nut markings must identify the grade, the manufacturer and if type 3, the type. Markings on direct tension indicators must identify the manufacturer and type "490". Other washer markings must identify the manufacturer and if type 3, the type.

5 (c) Dimensions:

Bolt dimensions shall conform to the requirements for Heavy Hexagon Structural Bolts and for Heavy Semi-Finished Hexagon Nuts given in ANSI Standard B18.2.1 and B18.2.2, respectively.

5 (d) Galvanized High Strength Bolts:

Galvanized bolts shall conform to ASTM A325, Type 1 and shall be mechanically galvanized in accordance with ASTM B695, Class 50. Bolts, nuts, and washers of any assembly shall be galvanized by the same process. The nuts shall be overtapped to the minimum amount required for the fastener assembly, and shall be lubricated with a lubricant containing a visible dye so a visual check can be made for the lubricant at the time of field installation. Galvanized bolts shall be tension tested after galvanizing. ASTM A490 bolts shall not be galvanized.

5 (e) Test Requirements:

The hardness of A325 bolts of 1/2" through 1" in diameter shall be as follows:

Brinell - Min. 248; Max. 311
Rockwell C - Min. 24; Max. 33

Plain, ungalvanized nuts shall have a minimum hardness of 89 HRB.

Proof load tests, in accordance with the requirements of ASTM F606 Method 1, shall be required for the bolts. Wedge tests of full-size bolts are required in accordance with Section 8.3 of ASTM A325. Galvanized bolts shall be wedge tested after galvanizing. Proof load tests of ASTM A563 are required for nuts. Proof load tests for nuts used with galvanized bolts shall be performed after galvanizing, overtapping and lubricating.

Rotational-capacity tests are required and shall be performed on all plain or galvanized (after galvanizing) bolt, nut and washer assemblies by the manufacturer or distributor prior to

shipping and by the Contractor at the job site. The testing procedure is described in the special provision "Section 6.03 - Structural Steel".

Bolts, nuts and washers from each rotational-capacity lot shall be shipped in the same container. If there is only one production lot number for each size of nut and washer, the nuts and washers may be shipped in separate containers. Each container shall be permanently marked with the rotational-capacity lot number such that identification will be possible at any stage prior to installation. Assemblies of bolts, nuts and washers shall be installed from the same rotational-capacity lot.

The thickness of galvanizing on bolts, nuts and washers shall be measured. On bolts, it shall be measured on the wrench flats or on top of the bolt head, and on nuts it shall be measured on the wrench flats.

5 (g) Certified Test Reports and Materials Certificates:

The Contractor shall submit notarized copies of Certified Test Reports and Materials Certificates in conformance with Article 1.06.07 for bolts, nuts and washers. The Certified Test Reports and Materials Certificates shall include the following:

- a. Mill test reports shall indicate the place where the material was melted and manufactured.
- b. Test reports for proof load tests, wedge tests, and rotational-capacity tests shall indicate where the tests were performed, date of tests, location of where the components were manufactured and lot numbers.
- c. The test report for galvanized components shall indicate the thickness of the galvanizing.

PRICE ADJUSTMENT OF ASPHALT

The price paid per ton for the liquid asphalt contained in the hot mix asphalt (HMA) contract items (pay unit = tons) will be adjusted, up or down, in accordance with the following criteria and formula.

For the purpose of the price adjustment (**Pa**), the base price of liquid asphalt (**A**), will be \$135.00 /ton. The actual price of the liquid asphalt (**B**), as documented by the company producing the HMA (HMA vendor), will be furnished by the contractor for every month that HMA, subject to adjustment, is incorporated in a project. The delivery costs, for transporting the material from the liquid asphalt supplier to the HMA vendor, shall be shown separately on the invoices for the liquid asphalt and will not be included in any calculations of the base price or actual price.

The quantity of the liquid asphalt in the mix shall be computed at 5.2% (0.052) by weight of the applicable HMA items.

The Contractor will be responsible for ensuring that the proper documentation is furnished to the Engineer (sample attached), at least once a month, and is signed and sealed by an officer of the company producing the HMA. The document shall certify the price(s) paid per ton for each liquid asphalt supplier, and include the actual date(s) and cost(s) of the liquid asphalt delivered. The document shall also state that copies of the original invoices substantiating the liquid asphalt price(s) will be maintained for a period of three years from the date of project completion. This is the only acceptable documentation for the asphalt price adjustment.

Failure to furnish the required documentation within 30 calendar days, following the month in which the HMA contract items were used, will result in \$5.00 per ton being deducted from the contract bid price(s) for the applicable HMA item(s). The deduction will be applied on a one-time basis for the tons of bituminous concrete representing each period in which the required documentation has not been provided. Once the documentation is received, these monies will be released to the contractor.

ASPHALT PRICE ADJUSTMENT FORMULA

$$Pa = .052 X (B-A)$$

- Pa** = Price adjustment to be added to or subtracted from the contract bid price of each ton of HMA measured for payment
- A** = Base price of liquid asphalt per ton
- B** = Price per ton of liquid asphalt on file with the Engineer (excluding delivery). (To be in increments of \$5.00 either more or less than A, above)

PRICE ADJUSTMENT OF ASPHALT

There will be no adjustment permitted in the remaining contract items containing asphalt. Because of this provision and because the Contractors are being notified before submission of bids, the adjustment being applied shall not be considered as a changed condition in the contract.

Payment: The asphalt adjustment will be a separate pay item. The price adjustment will be calculated using the formula indicated above. A payment will be made for an increase in costs. A deduction from monies due the contractor will be made for a decrease in costs.

Date

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
Mailing Address

Attn:

Subject: Liquid Asphalt Price Certification
for Bituminous Concrete Price Adjustment
[Insert vendor name]

In compliance with the special provision entitled Price Adjustment of Asphalt, we hereby certify the following information for the bituminous liquid is based on documentation furnished by our supplier as shown below.

Plant Location	Plant Delivery Date	Vendors Supplier	Vendor Cost/Type			
			AC20	MC250	MC3000	OTHER

The undersigned agrees to retain copies of the liquid asphalt supplier invoices, substantiating the above information, for a period of three years from the date of completion of the project.

I have personally examined and am familiar with the information provided in this document and certify that, based on reasonable investigation, including my inquiry of individuals responsible for obtaining the information, the submitted information is true.

Respectfully Submitted:

By _____
Signature Title

Company Name and Seal

CODE OF ETHICS

The Contractor shall comply with the provisions contained in Section 1-86e of the Connecticut General Statutes, which provides as follows:

- (a) No person hired by the state as a Contractor or independent contractor shall:
 - (1) Use the authority provided to the person under the contract, or any confidential information acquired in the performance of the contract, to obtain financial gain for the person, an employee of the person or a member of the immediate family of any such person or employee;
 - (2) Accept another state contract which would impair the independent judgment of the person in the performance of the existing contract; or
 - (3) Accept anything of value based on an understanding that the actions of the person on behalf of the state would be influenced.
- (b) No person shall give anything of value to a person hired by the state as a Contractor or independent contractor based on an understanding that the actions of the Contractor or independent contractor on behalf of the state would be influenced.

In addition, the Contractor is hereby advised that the following policies apply to all employees of the Department of Transportation, and it shall be the responsibility of each employee to be familiar with them and to comply with them:

No employee of the Connecticut Department of Transportation shall, either individually (or as a member of a group), directly or indirectly, solicit or accept any gift or gratuity from any person or organization with whom the Department has, has had, or may expect to have, a business relationship which could cause, or create the appearance of, a conflict with or influence the performance of the employee's duties with the Department.

Any gift or gratuity must be refused or returned with a copy of the letter concerning our Code of Ethics Policy which has been sent to the concerns doing business with the Department of Transportation. The only exception recognized is for advertising matter which has negligible monetary value and which is widely distributed or generally available without charge.

No employee of the Connecticut Department of Transportation shall, either individually (or as a member of a group), directly or indirectly, solicit the sale of tickets for a charitable event or accept any gift for the benefit of a charitable organization from any person or organization with whom the Department has, has had, or may expect to have, a business relationship which would cause, or create the appearance of, a conflict with or influence the performance of the Department.

No employee of the Connecticut Department of Transportation shall use or distribute State information or use State equipment or materials for other than State business purposes.

No employee of the Connecticut Department of Transportation shall allow any private obligation of employment or enterprise to take precedence over his/her responsibility to the Department.

No employee of the Connecticut Department of Transportation shall accept employment with any consultant, contractor, appraiser or any other organization or individual which is under contract or agreement with the State of Connecticut, nor shall any employee of the Connecticut Department of Transportation have, directly or indirectly, a financial interest in any business, firm or enterprise doing business with the State of Connecticut, which could cause, or create the appearance of, a conflict with or influence the performance of the employee's duties with the Department.

The Contractor hereby acknowledges and agrees to comply with the policies enumerated in "Connecticut Department of Transportation Policy Statement Policy No. ADMIN.-10 Subject: Code of Ethics Policy", **March 25, 1999**, a copy of which is attached hereto and made a part hereof.



CONNECTICUT DEPARTMENT OF TRANSPORTATION
POLICY STATEMENT

Policy No. ADMIN.-10
March 25, 1999.

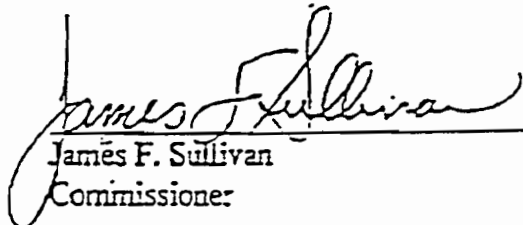
SUBJECT: Code of Ethics Policy

It is the policy of the Department that all employees are to comply with Sections 1-79 through 1-89 of the Connecticut General Statutes, as amended, entitled Code of Ethics for Public Officials.

Any questions concerning the application of the Code of Ethics for specific situations should be directed to the State Ethics Commission.

The Personnel Administrator shall be responsible for issuing periodic updates and/or clarifications of previously released Personnel Memorandums concerning this Code of Ethics Policy as is deemed appropriate.

(This statement supersedes the Commissioner's Policy Statement No. ADMIN.-10, dated November 28, 1994.)


James F. Sullivan
Commissioner

BIDRIGGING AND/OR FRAUDS

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 bidrigging and/or frauds.

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 bidrigging and/or frauds either past or current. The "HOT LINE" telephone number will be manned during normal working hours (8 A.M. - 5 P.M. EST.), and information will be treated confidentially and anonymity respected.

REQUIREMENTS OF TITLE 49, CODE OF FEDERAL REGULATIONS PART 26

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.

DISADVANTAGED BUSINESS ENTERPRISES AS SUBCONTRACTORS AND MATERIAL SUPPLIERS OR MANUFACTURERS

Revised – May 2000

NOTE: Certain of the requirements and procedures stated in this special provision are applicable prior to the award and execution of the contract document.

I. ABBREVIATIONS AND DEFINITIONS AS USED IN THIS SPECIAL PROVISION

- A. "CDOT" means the Connecticut Department of Transportation.
- B. "DOT" means the U.S. Department of Transportation, including the Office of the Secretary, the Federal Highway Administration ("FHWA"), the Federal Transit Administration ("FTA"), and the Federal Aviation Administration ("FAA").
- C. "Broker" is acting as an agent for others in negotiating contracts, agreements, purchases, sales, etc., in return for a fee or commission.
- D. "Contract," "agreement" or "subcontract" means a legally binding relationship obligating a seller to furnish supplies or services (including, but not limited to, construction and professional services) and the buyer to pay for them. For the purposes of this provision a lease for equipment or products is also considered to be a contract.
- E. "Contractor," means consultant, second party or any other entity doing business with CDOT or, as the context may require, with another contractor.
- F. "Disadvantaged Business Enterprise" ("DBE") means a small business concern:
 - 1. That is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51 percent of the stock of which is owned by one or more such individuals; and
 - 2. Whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it.
- G. "DOT-assisted contract" means any contract between a recipient and a contractor (at any tier) funded in whole or in part with DOT financial assistance, including letters of credit or loan guarantees.
- H. "Good Faith Efforts" means efforts to achieve a DBE goal or other requirement of this part which, by their scope, intensity, and appropriateness to the objective, can

reasonably be expected to fulfill the program requirement. Refer to Appendix A of 49 CFR Part 26 – "Guidance Concerning Good Faith Efforts," a copy of which is attached to this provision, for guidance as to what constitutes good faith efforts.

- I. "Small Business Concern" means, with respect to firms seeking to participate as DBEs in DOT-assisted contracts, a small business concern as defined pursuant to Section 3 of the Small Business Act and Small Business Administration ("SBA") regulations implementing it (13 CFR Part 121) that also does not exceed the cap on average annual gross receipts specified in 49 CFR Part 26 Section 26.65(b).
- J. "Socially and Economically Disadvantaged Individuals" means any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who is—
 1. Any individual who CDOT finds on a case-by-case basis to be a socially and economically disadvantaged individual.
 2. Any individuals in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged:
 - i. "Black Americans," which includes persons having origins in any of the Black racial groups of Africa;
 - ii. "Hispanic Americans," which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;
 - iii. "Native Americans," which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians;
 - iv. "Asian-Pacific Americans," which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kiribati, Juvalu, Nauru, Federated States of Micronesia, or Hong Kong;
 - v. "Subcontinent Asian Americans," which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;
 - vi. Women;
 - vii. Any additional groups whose members are designated as socially and economically disadvantaged by the SBA, at such time as the SBA designation becomes effective.

II. GENERAL REQUIREMENTS

- A. The Contractor, sub recipient 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 DOT deems appropriate.
- B. The Contractor shall cooperate with CDOT and DOT in implementing the requirements concerning DBE utilization on this contract in accordance with Title 49 of the Code of Federal Regulations, Part 26 entitled Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs ("49 CFR Part 26") as revised. The Contractor shall also cooperate with CDOT and DOT in reviewing the Contractor's activities relating to this provision. This Special Provision is in addition to all other equal opportunity employment requirements of this Contract.
- C. The Contractor shall designate a liaison officer who will administer the Contractor's DBE program. Upon execution of this contract, the name of the liaison officer shall be furnished to the Division of Contract Compliance of CDOT, in writing.
- D. For the purpose of this Special Provision, DBEs to be used to satisfy the DBE goal must be certified by CDOT's Division of Contract Compliance for the type(s) of work they will perform.
- E. If the Contractor allows work designated for DBE participation required under the terms of this Contract and required under Paragraph III-B to be performed by other than the named DBE organization without concurrence from the Office of Construction, CDOT will not pay the Contractor for the value of the work performed by organizations other than the designated DBE.
- F. At the completion of all Contract work, the Contractor shall submit a final report to CDOT's unit administering the Contract indicating the work done by, and the dollars paid to DBEs. If the Contractor does not achieve the specified Contract goals for DBE participation, the Contractor shall also submit written documentation to the CDOT unit administering the Contract detailing its good faith efforts to satisfy the goal that were made during the performance of the Contract. Documentation is to include but not be limited to the following:
 - 1. A detailed statement of the efforts made to select additional subcontracting opportunities to be performed by DBEs in order to increase the likelihood of achieving the stated goal.
 - 2. A detailed statement, including documentation of the efforts made to contact and solicit bids with CDOT certified DBEs, including the names, addresses, dates and telephone numbers of each DBE contacted, and a description of the information provided to each DBE regarding the scope of services and anticipated time schedule

of work items proposed to be subcontracted and nature of response from firms contacted.

3. Provide a detailed statement for each DBE that submitted a subcontract proposal, which the Contractor considered not to be acceptable stating the reasons for this conclusion.
 4. Provide documents to support contacts made with CDOT requesting assistance in satisfying the Contract specified goal.
 5. Provide documentation of all other efforts undertaken by the Contractor to meet the defined goal.
- G. Failure of the Contractor at the completion of all Contract work to have at least the specified percentage of this Contract performed by DBEs as required in Paragraph III-B will result in the reduction in Contract payments to the Contractor by an amount determined by multiplying the total Contract value by the specified percentage required in Paragraph III-B and subtracting from that result, the dollar payments for the work actually performed by DBEs. However, in instances where the Contractor can adequately document or substantiate its good faith efforts made to meet the specified percentage to the satisfaction of CDOT, no reduction in payments will be imposed.
- H. All records must be retained for a period of three (3) years following acceptance by CDOT of the Contract and shall be available at reasonable times and places for inspection by authorized representatives of CDOT and Federal agencies. If any litigation, claim, or audit is started before the expiration of the three (3) year period, the records shall be retained until all litigation, claims, or audits findings involving the records are resolved.
- I. Nothing contained herein, is intended to relieve any Contractor or subcontractor or material supplier or manufacturer from compliance with all applicable Federal and State legislation or provisions concerning equal employment opportunity, affirmative action, nondiscrimination and related subjects during the term of this Contract.

III. SPECIFIC REQUIREMENTS:

In order to increase the participation of DBEs, CDOT requires the following:

- A. The Contractor shall assure that certified DBEs will have an opportunity to compete for subcontract work on this Contract, particularly by arranging solicitations, time for the preparation of proposals for services to be provided so as to facilitate the participation of DBEs regardless if a Contract goal is specified or not.
- B. Contract goal for DBE participation equaling 13 percent of the total Contract value has been established for this Contract. Compliance with this provision may be fulfilled

when a DBE or any combination of DBEs perform work under contract in accordance with 49 CFR Part 26 Subpart C Section 26.55, as revised. **Only work actually performed by and/or services provided by DBEs which are certified for such work and/or services can be counted toward the DBE goal. Supplies and equipment a DBE purchases or leases from the prime contractor or its affiliate can not be counted toward the goal.**

If the Contractor does not document commitments, by subcontracting and/or procurement of material and/or services that at least equal the goal, it must document the good faith efforts that outline the steps it took to meet the goal in accordance with VII.

- C. The low bidder shall indicate, in writing on the forms provided by CDOT, to the Manager of Contracts within 14 days after the bid opening, the DBE(s) it will use to achieve the goal indicated in III-B. The submission shall include the name and address of each DBE that will participate in this Contract, a description of the work each will perform, the dollar amount of participation, and the percentage this is of the bid amount. This information shall be signed by the named DBE and the low bidder. The named DBE shall be from a list of certified DBEs available from CDOT. **In addition, the named DBE(s) shall be certified to perform the type of work they will be contracted to do.**
- D. The prime Contractor shall submit to the Manager of Construction Operations all requests for subcontractor approvals on the standard forms provided by CDOT.

If the request for approval is for a DBE subcontractor for the purpose of meeting the Contract DBE goal, a copy of the legal contract between the prime and the DBE subcontractor must be submitted along with the request for subcontractor approval. Any subsequent amendments or modifications of the contract between the prime and the DBE subcontractor must also be submitted to the Manager of Construction Operations with an explanation of the change(s). The contract must show items of work to be performed, unit prices and, if a partial item, the work involved by all parties.

In addition, the following documents are to be attached:

1. An explanation indicating who will purchase material.
 2. A statement explaining any method or arrangement for renting equipment. If rental is from a prime, a copy of the Rental Agreement must be submitted.
 3. A statement addressing any special arrangements for manpower.
- E. The Contractor is required, should there be a change in a DBE they submitted in III-C, to submit documentation to CDOT's Office of Construction which will substantiate and justify the change, (i.e., documentation to provide a basis for the change for review and approval by CDOT's Office of Construction) prior to the implementation of the change. The Contractor must demonstrate that the originally named DBE is unable to perform in conformity to the scope of service or is unwilling to perform, or is in default of its contract, or is overextended on other jobs. **The Contractor's ability to negotiate a**

more advantageous agreement with another subcontractor is not a valid basis for change. Documentation shall include a letter of release from the originally named DBE indicating the reason(s) for the release.

- F. Contractors subcontracting with DBEs to perform work or services as required by this Special Provision shall not terminate such firms without advising CDOT's Office of Construction in writing, and providing adequate documentation to substantiate the reasons for termination if the DBE has not started or completed the work or the services for which it has been contracted to perform.
- G. When a DBE is unable or unwilling to perform or is terminated for just cause the contractor shall make good faith efforts to find other DBE opportunities to increase DBE participation to the extent necessary to at least satisfy the goal required by III-B.
- H. In instances where an alternate DBE is proposed, a revised submission to CDOT's Office of Construction together with the documentation required in III-C, III-D, and III-E, must be made for its review and approval.
- I. Each quarter after execution of the Contract, the Contractor shall submit a report to CDOT's unit administering the Contract indicating the work done by, and the dollars paid to the DBE for the current quarter and to date.

IV. MATERIAL SUPPLIERS OR MANUFACTURERS

- A. If the Contractor elects to utilize a DBE supplier or manufacturer to satisfy a portion or all of the specified DBE goal, the Contractor must provide the CDOT with:
 - 1. An executed Affidavit "Connecticut Department of Transportation (Office of Construction) Bureau of Highway" (sample attached), and
 - 2. Substantiation of payments made to the supplier or manufacturer for materials used on the project.
- B. Credit for DBE suppliers is limited to 60% of the value of the material to be supplied, provided such material is obtained from a regular DBE dealer. A regular dealer is a firm that owns, operates, or maintains a store, warehouse or other establishment in which the materials or supplies required for the performance of the contract are bought, kept in stock and regularly sold or leased to the public in the usual course of business. To be a regular dealer, the firm must engage in, as its principal business, and in its own name, the purchase and sale of the products in question. A regular dealer in such bulk items as steel, cement, gravel, stone and petroleum products, need not keep such products in stock if it owns or operates distribution equipment. Brokers and packagers shall not be regarded as material suppliers or manufacturers.
- C. Credit for DBE manufacturers is 100% of the value of the manufactured product. A manufacturer is a firm that operates or maintains a factory or establishment that

produces on the premises the materials or supplies obtained by the Department of Transportation or contractor.

V. NON-MANUFACTURING OR NON-SUPPLIER DBE CREDIT:

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

1. Reasonable fees or commissions charged for providing a bona fide service such as professional, technical, consultant or managerial services and assistance in the procurement of essential personnel, facilities, equipment materials or supplies necessary for the performance of the contract provided that the fee or commission is determined by the CDOT to be reasonable and consistent with fees customarily allowed for similar services.
2. The fees charged for delivery of materials and supplies required on a job site (but not the cost of the materials and supplies themselves) when the hauler, trucker, or delivery service is a DBE but is not also the manufacturer of or a regular dealer in the materials and supplies, provided that the fee is determined by the CDOT to be reasonable and not excessive as compared with fees customarily allowed for similar services.
3. The fees or commissions charged for providing bonds or insurance specifically required for the performance of the contract, provided that the fee or commission is determined by the CDOT to be reasonable and not excessive as compared with fees customarily allowed for similar services.

VI. BROKERING

- A. Brokering of work by DBEs who have been approved to perform subcontract work with their own workforce and equipment is not allowed, and is a contract violation.
- B. DBEs involved in the brokering of subcontract work that they were approved to perform may be decertified.
- C. Firms involved in the brokering of work, whether they are DBEs and/or majority firms who engage in willful falsification, distortion or misrepresentation with respect to any facts related to the project shall be referred to the U.S. Department of Transportation's Office of the Inspector General for prosecution under Title 18, U.S. Code, Section 10.20.

VII. REVIEW OF PRE-AWARD GOOD FAITH EFFORTS

- A. If the Contractor does not document pre-award commitments, by subcontracting and/or

procurement of material and/or services that at least equal the goal stipulated in III-B, the Contractor must document the good faith efforts that outline the specific steps it took to meet the goal. The Contract will be awarded to the Contractor if its good faith efforts are deemed satisfactory and approved by CDOT. To obtain such an exception, the Contractor must submit an application to CDOT's Manager of Contracts, which documents the specific good faith efforts that were made to meet the DBE goal. Application forms for Review of Pre-Award Good Faith Efforts are available from CDOT's Division of Contract Administration.

The application must include the following documentation:

1. a statement setting forth in detail which parts, if any, of the contract were reserved by the contractor and not available for bid from subcontractors;
2. a statement setting forth all parts of the contract that are likely to be sublet.
3. a statement setting forth in detail the efforts made to select subcontracting work in order to likely achieve the stated goal.
4. copies of all letters sent to DBEs;
5. a statement listing the dates and DBEs that were contacted by telephone and the result of each contact;
6. a statement listing the dates and DBEs that were contacted by other means other than telephone and the result of each contact;
7. copies of letters received from DBEs in which they decline to bid;
8. a statement setting forth the facts with respect to each DBE bid received and the reason(s) any such bid was declined;
9. a statement setting forth the dates that calls were made to CDOT's Division of Contract Compliance seeking DBE referrals and the result of each such call; and
10. any information of a similar nature relevant to the application.

The review of the Contractor's good faith efforts may require an extension of time for award of the Contract. In such a circumstance and in the absence of other reasons not to grant the extension or make the award CDOT will agree to the needed extension(s) of time for the award of the Contract, provided the Contractor and the surety also agree to such extension(s).

- B. Upon receipt of the submission of an application for review of pre-award good faith efforts, CDOT's Manager of Contracts shall submit the documentation to the Division of Contract Compliance who will review the documents and determine if the package is complete and

accurate and adequately documents the Contractor's good faith efforts. Within 14 days of receipt of the documentation the Division of Contract Compliance shall notify the Contractor by certified mail of the approval or denial of its good faith efforts.

- C. If the Contractor's application is denied, the Contractor shall have seven (7) days upon receipt of written notification of denial to request administrative reconsideration. The Contractor's request for administrative reconsideration should be sent in writing to: Manager of Contracts, P.O. Box 317546, Newington, CT 06131-7546. The Manager of Contracts will forward the Contractor's reconsideration request to the DBE Screening Committee. The DBE Screening Committee will schedule a meeting within 14 days from receipt of the Contractor's request for administrative reconsideration and advise the Contractor of the date, time and location of the meeting. At this meeting the Contractor will be provided with the opportunity to present written documentation and/or argument concerning the issue of whether it made adequate good faith efforts to meet the goal. Within seven (7) days following the reconsideration meeting, the chairperson of the DBE Screening Committee will send the contractor via certified mail a written decision on its reconsideration request, explaining the basis of finding either for or against the request. **If the reconsideration is denied the Contractor shall indicate in writing to the Manager of Contracts within 14 days of receipt of written notification of denial, the DBEs it will use to achieve the goal indicated in III-B.**
- D. Approval of pre-award good faith efforts does not relieve the Contractor from its obligation to make additional good faith efforts to achieve the DBE goal should contracting opportunities arise during actual performance of the Contract work.

APPENDIX A TO 49 CFR PART 26 -- GUIDANCE CONCERNING GOOD FAITH EFFORTS

- I. When, as a recipient, you establish a contract goal on a DOT-assisted contract, a bidder must, in order to be responsible and/or responsive, make good faith efforts to meet the goal. The bidder can meet this requirement in either of two ways. First, the bidder can meet the goal, documenting commitments for participation by DBE firms sufficient for this purpose. Second, even if it doesn't meet the goal, the bidder can document adequate good faith efforts. This means that the bidder must show that it took all necessary and reasonable steps to achieve a DBE goal or other requirement of this part which, by their scope, intensity, and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if they were not fully successful.
- II. In any situation in which you have established a contract goal, part 26 requires you to use the good faith efforts mechanism of this part. As a recipient, it is up to you to make a fair and reasonable judgment whether a bidder that did not meet the goal made adequate good faith efforts. It is important for you to consider the quality, quantity, and intensity of the different kinds of efforts that the bidder has made. The efforts employed by the bidder should be those that one could reasonably expect a bidder to take if the bidder were actively and aggressively trying to obtain DBE participation sufficient to meet the DBE contract goal. Mere pro forma efforts are not good faith efforts to meet the DBE contract requirements. We emphasize, however, that your determination concerning the sufficiency of the firm's good faith efforts is a judgment call: meeting quantitative formulas is not required.
- III. The Department also strongly cautions you against requiring that a bidder meet a contract goal (i.e., obtain a specified amount of DBE participation) in order to be awarded a contract, even though the bidder makes an adequate good faith efforts showing. This rule specifically prohibits you from ignoring bona fide good faith efforts.
- IV. The following is a list of types of actions which you should consider as part of the bidder's good faith efforts to obtain DBE participation. It is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases.
 - A. Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBEs who have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBEs to respond to the solicitation. The bidder must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.
 - B. Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE

- participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.
- C. Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
 - D. (1) Negotiating in good faith with interested DBEs. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBEs to perform the work.

(2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Prime contractors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.
 - E. Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The contractor's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the contractor's efforts to meet the project goal.
 - F. Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or contractor.
 - G. Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.
 - H. Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and Federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs.

- V. In determining whether a bidder has made good faith efforts, you may take into account the performance of other bidders in meeting the contract. For example, when the apparent successful bidder fails to meet the contract goal, but others meet it, you may reasonably raise the question of whether, with additional reasonable efforts, the apparent successful bidder could have met the goal. If the apparent successful bidder fails to meet the goal, but meets or exceeds the average DBE participation obtained by other bidders, you may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made good faith efforts.

CONNECTICUT DEPARTMENT OF TRANSPORTATION
(OFFICE OF CONSTRUCTION)
BUREAU OF ENGINEERING AND HIGHWAY OPERATIONS

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

State Project No. _____

Federal Aid Project No. _____

Description of Project _____

I, _____, acting in behalf of _____
(Name of person signing Affidavit) (DBE person, firm, association or corporation)
of which I am the _____ certify and affirm that _____
(Title of Person) (DBE person, firm, association or corporation)

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

I further certify and affirm that _____ will assume the actual and
(DBE person, firm, association or Corporation)

for the provision of the materials and/or supplies sought by _____
(State Contractor)

If a manufacturer, I produce goods from raw materials or substantially alter them before resale, or if a supplier, I perform a commercially useful function in the supply process.

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

(Name of Corporation or Firm)

(Signature & Title of Official making the Affidavit)

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

Notary Public (Commissioner of the Superior Court)

My Commission Expires

CERTIFICATE OF CORPORATION

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

(Signature of Person Certifying)

(Date)

VOLUNTARY PARTNERING

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

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

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

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

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

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

ITEM #0000465A - 600V COPPER WIRE NO. 1 AWG
ITEM #0000543A - 600V ALUMINUM WIRE NO. 4/0 AWG

Description:

Work under these items shall include furnishing and installing 600 volt class conductors as shown on the plans and in conformity with these specifications.

The work shall include all materials, equipment and labor incidental for the completion of all work specified.

General:

The following shall be submitted:

Product Data: Provide manufacturer's literature and catalog cuts for all products/materials.

Regulatory Requirements:

Conform to the requirements of NFPA No. 70 (National Electrical Code) and ANSI C2 (National Electrical Safety Code).

Provide products listed and classified by UL as suitable for the purpose specified and indicated on the plans.

Project Conditions:

Verify that field measurements are as indicated.

Rules:

The installation shall be in accordance with the requirements of the National Electrical Code, the National Electrical Safety Code and as shown on the plans.

Coordination:

The plans indicate the extent and the general location and arrangement of the work. The Contractor shall study the plans and details so that the work will be properly located and readily accessible. If conflicts occur necessitating departures from the plans, the Contractor shall submit details of departures and reasons therefor shall be submitted as soon as practicable for written approval of the Engineer.

Capacities of materials shall not be less than capacities indicated on the plans.

Workmanship:

General: Materials and equipment shall be installed in accordance with the approved recommendations of the manufacturer, unless otherwise specified. The installation shall be accomplished by workmen skilled in this type of work.

Qualification of Cable Splicers: Before assigning cable splicer work covered by this specification, the Contractor shall provide the Engineer with the names of the cable splicers to be employed with satisfactory proof that each splicer has had at least 3 years experience in splicing high voltage cables and is experienced with the type and rating of cables to be spliced. In addition, each cable splicer may be required to make an approved dummy splice in the presence of the Engineer in accordance with cable manufacturer's instructions, before the splicer is approved to splice cable covered by this specification. All material for dummy splices shall be furnished by the Contractor.

Materials:

Secondary cable system in conduits shall include 600 volt copper conductors with NEC Type XHHW insulation. Equipment grounding wire shall have NEC, Type T, insulation. The size and number of conductors and the number of cables shall be as indicated on the plans. Conductors larger than No. 8 AWG shall be stranded.

Connectors for 600 volt conductors No. 6 AWG and larger shall have double bolted or long barrel indent type connectors. Conductors rated above 600 volts shall have long barrel indent connectors. All below grade splices shall be submersible hot-melt adhesive type.

Lugs for 600 volt conductors No. 6 AWG and larger shall have the two hole NEMA tongue, double bolted or long barrel indent lugs

Testing:

Tests shall be performed in accordance with the Special Provision CABLE TESTING.

Tests will be measured and paid for under the Special Provision CABLE TESTING.

Method of Measurement:

The work will be measured per linear foot, as applicable, complete in place and accepted.

Basis of Payment:

The work will be paid for at the respective contract unit price.

The prices shall include all costs to provide for the completion of all work specified.

<u>Pay Item</u>	<u>Pay Unit</u>
600V Copper Wire No. 1 AWG	Linear Foot
600V Copper Wire No. 4/0 AWG	Linear Foot

ITEM #0000565A - 15 KV FUSED CUTOUTS (1-PHASE)

ITEM #0000566A - 15 KV NO. 4/0 ACSR XLPE

ITEM #0000568A - 15 KV NO. 4/0, CU, EPR

ITEM #0000574A - 5 KV NO. 4/0, CU, EPR

ITEM #0100294A - 15 KV CLASS INSULATORS

ITEM #1015039A - POLE LINE GROUNDING

Description:

Work under these items shall include furnishing and installing utility poles, wire and pole as shown on the plans and in conformity with these specifications.

The pole line grounding will be considered a separate item and shall be as specified.

The work shall include all materials, equipment and labor incidental for the completion of the work specified.

Wood poles and pole hardware shall be as specified in these specifications.

General:

Rules: The installation shall conform to the requirements of the National Electrical Code, the National Electrical Safety Code and the requirements specified.

Coordination: The plans indicate the extent and the general location and arrangement of the work. The Contractor shall study the plans and details so that equipment will be properly located and readily accessible. If conflicts occur necessitating departures from the plans, details of departures and reasons therefor shall be submitted as soon as practicable for written approval of the Engineer.

Capacities of equipment and materials shall not be less than capacities indicated on the plans.

Approval of Materials and Equipment:

Approval of materials and equipment will be based on the manufacturer's published data. Where materials and equipment are specified to be constructed or tested, or both, in accordance with the standards of the National Electrical Manufacturers Association (NEMA), American National Standards Institute (ANSI) or other standards, the Contractor shall submit proof that the items furnished conform to such requirements. A certification or published catalog specification data statement, to the effect that the item is in accordance with the referenced ANSI standards, will be

92-526

ITEM#0000565A to ITEM#0000568A
ITEM#0000574A
ITEM#0100294A
ITEM#1015039A

acceptable as sufficient evidence that the item conforms. A similar certification or published catalog specification data statement to the effect that the item is in accordance with the referenced NEMA standards by a company listed as a member company of NEMA will be acceptable as sufficient evidence that the item conforms to the requirements of the National Electrical Manufacturers Association. In lieu of such certification or published data the Contractor may submit a certificate, from an approved, nationally recognized testing agency adequately equipped and competent to perform such services, stating that the items have been tested and that the units conform to the requirements listed, including methods of testing of the specified agency.

Approval of Equipment Which Differs from that Specified: The Engineer may, at his option, approve equipment submitted by the Contractor that may differ from that indicated in the contract documents. These differences shall not affect the performance of the equipment, the quality of the materials or the general intent of the design. These differences might include, but shall not be limited to, differences in layout configuration, foundation and mounting requirements. When the Contractor selects to use equipment that requires such design changes, the Contractor shall be responsible to make all changes required in all trades necessary to install the equipment at no additional cost to the Department. In addition, the Contractor shall submit, as shop drawings for approval, revised plans showing all modifications required in all trades. The originals of the plans shall be revised "as-built" before completion of the project.

Shop Drawings:

Shop drawings shall be submitted for equipment not completely identifiable by information submitted in the materials and equipment lists, in accordance with requirements contained in the SPECIAL PROVISIONS. Submit shop drawings for items including, but not limited to, cable and conductors, cutouts, fuses, surge arresters, potheads, and steel structures. Shop drawings shall include one-line diagrams, three-line diagrams, interconnection diagrams, bills of materials and manufacturer's bulletins. Shop drawings shall demonstrate that the equipment has been properly coordinated, will provide for safe operating clearances and readily accessible controls and will function properly. If equipment arrangement differs from that shown, the Contractor shall submit, in addition to the shop drawings, front views and revised plans showing modifications required. This shall include, but shall not be limited to, revised conduit plans, and supports systems. Approved departures shall be made at no additional cost to the Department.

Workmanship:

General: Materials and equipment shall be installed in accordance with the approved recommendations of the manufacturer, unless otherwise specified. The installation shall be accomplished by workmen skilled in this type of work.

92-526

ITEM#0000565A to ITEM#0000568A
ITEM#0000574A
ITEM#0100294A
ITEM#1015039A

Qualification of Cable Splicers: Before assigning cable splicer work covered by this specification, the Contractor shall provide the Engineer with the names of the cablesplacers to be employed, together with satisfactory proof that each splicer has had at least 3 years experience in splicing high voltage cables and is experienced with the type and rating of cables to be spliced. In addition, each cable splicer may be required to make an approved dummy splice in the presence of the Engineer in accordance with cable manufacturer's instructions, before the splicer is approved to splice cable covered by this specification. All material for dummy splices shall be furnished by the Contractor.

Submit inspection and test reports.

Materials:

Fuse Cutouts:

NEMA SG 2 and SG 6 with mounting brackets where required and as specified.

Insulators:

ANSI C29.1, C29.2, C29.4, C29.5 and C29.7 as applicable and as specified.

Zinc Coating for Ferrous Metals:

ASTM A 123 or A 153.

15 KV Class Conductor Spacers:

Separators shall be track resistant polyethylene, open diamond shape, and have weather washing characteristics.

The phase conductors shall be spaced at approximately 8 inches.

The anti-sway brackets at each pole shall be 14 inches long and made of aluminum alloy.

Insulators:

Insulators shall conform to ANSI C29.2, C29.4, C29.5 or C29.7, as applicable for the installation, with testing in accordance with ANSI C29.1. Suspension type insulators shall be used on the primary system at corners and angles, as shown for suspended buses, at dead ends, and wherever else post types do not provide adequate strength. Other insulators shall be of the line post type. Mechanical strength of

92-526

ITEM#0000565A to ITEM#0000568A
ITEM#0000574A
ITEM#0100294A
ITEM#1015039A

suspension and strain insulators shall exceed the ultimate strength of the conductor or guy attached thereto. Insulators of various uses shall have ratings not lower than the classes indicated in the following table:

MINIMUM RATING OF INSULATORS IN TERMS OF CLASS

<u>SERVICE</u> 15,000 volts	<u>LINE POST</u> 57-1L or 1S	<u>SUSPENSION</u> 52-4	<u>GUY STRAIN</u> 54-2
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Cable:

Overhead line conductors shall be XLPE insulated aluminum conductors steel reinforced (ACSR) of the sizes indicated. Splices under tension shall be mechanically and electrically secure with a strength not less than the conductor. Splice materials, sleeves, fittings, and connectors shall be noncorrosive and shall not adversely affect the conductor with which they are used. Conductors shall be tied to insulators in an approved manner. Tie wires shall be No. 6 AWG strong aluminum alloy or No. 4 annealed aluminum. ACSR conductors shall be armored at all supports with approved armor recommended by the manufacturer. All dead ends shall be made with approved clamps designed for the purpose, with a strength not less than the conductor. Care shall be taken in handling and stringing of conductors to guard against cuts, scratches, and kinks. Conductors shall not be drawn over rough or rocky ground, or around sharp bends. When drawn by machine power, conductors shall be drawn from the mounted reel through approved stringing sheaves in approximately straight lines and clear of all obstructions. Where lines pass through trees, all trees shall be trimmed at least 8 feet clear of primary lines and 4 feet clear of secondaries below and horizontally, and no branch shall overhang the horizontal clearance. A climbing space at least 48 inches square shall be provided. Initial stringing sags and tensions shall be as indicated, or in accordance with approved tables for the conductor furnished by the Contractor, provided indicated clearances are maintained.

Cable installed in raceways for 13.8 kV shall be ethylene-propylene rubber based power cable, moisture, heat and ozone resistant, 15 kV single conductor copper, ungrounded, 133 percent insulation level, and shielded with a neoprene type jacket. Conductors shall be stranded.

Cable installed in raceways for 2400 V shall be ethylene-propylene rubber based power cable, moisture, heat and ozone resistant, 5 kV single conductor copper, ungrounded, 133 percent insulation level, and shielded with a neoprene type jacket. Conductors shall be stranded.

Cable splices shall be made by qualified cable splicers in accordance with the recommendations of the cable manufacturer, except where otherwise specified. A copy of the manufacturer's recommendations

92-526

ITEM#0000565A to ITEM#0000568A
 ITEM#0000574A
 ITEM#0100294A
 ITEM#1015039A

shall be furnished for review by the Engineer before any splices are permitted. Splice kits meeting the manufacturer's recommendations may be used if approved by the Engineer. Splices shall provide insulation and jacket equal in every respect to that of the cable. Splices shall be capable of being completely submersed. In order to prevent the possibility of moisture entering the splice, the jacket shall be cut back sufficiently to expose the required length of insulation between the jacket and the tapered end of the insulation as recommended by the manufacturer of the splicing materials. Special care shall be taken to insure that all wax is removed from the area to be covered with splicing tape. Shielding tape shall be applied to splices in shielded cables as required to continue the shielding through the entire system.

Cable terminations shall have voltage ratings of not less than 15,000 volts for systems operating at 13,800 volts between phases. The standard withstand test voltage of the completed terminations shall conform to IEEE 48. Stress relief cones shall be provided at the terminals of cable on systems operating at 13,800 volts between phases. Cable terminations shall be of the preformed stress cone type with porcelain track resistant skirts for the 15 kV cables. The terminations shall be furnished in kit form and shall be as recommended by the manufacturer of the medium voltage cable. The termination kit descriptive information with complete installation instructions shall be submitted for review.

Cable Tests: Immediately after the medium voltage cables have been installed, AC or DC voltage tests at the option of the Contractor and insulation resistance tests shall be conducted in accordance with NEMA WC 8 and/or the cable manufacturer. Tests shall be performed by a qualified cable test engineer. Certified typewritten copies of test results along with remarks shall be submitted to the Engineer immediately following the test, and shall indicate acceptability of the tested cable.

Fuse Cutouts:

Fuse cutouts shall be of the open fuse, load break, current limiting type. Current limiting fuse cutout shall be modular design consisting of a partial range current limiting fuse in series with a NEMA standards fuse link to provide a minimum interrupting rating of 7,000 amperes symmetrical. Fuse cutout shall be rated at 14.4/8.3 kV and 100 amperes continuous current rating.

Pole Line Grounding:

Grounds shall conform to applicable requirements of the National Electrical Code, the National Electrical Safety Code and as specified.

Neutral conductors, down guys, cable shields, metallic cable sheaths and armor, metallic conduits, pothead bodies, junction boxes, lightning arresters, and all non-current carrying metallic parts of equipment at each pole shall be grounded.

92-526

ITEM#0000565A to ITEM#0000568A
ITEM#0000574A
ITEM#0100294A
ITEM#1015039A

Ground rods shall be made of copper or copper clad steel, not less than 1 inch by 10 feet long. The ground rod shall be driven at least 10 feet into the ground approximately 3 feet out from the base of the pole. After installation is completed, the top of the ground rod shall be approximately 1 foot below finished grade. The total ground resistance shall not exceed 25 ohms. Where this condition cannot be obtained with one rod driven 10 feet in the ground, a longer rod, deep driven sectional rods, or additional rods connected in parallel shall be installed until the required ground resistance is obtained, except that not more than a total of three 10-foot ground rods will be required. Ground resistance shall be measured in normally dry conditions not less than 48 hours after rainfall. The ground conductor on the pole shall be protected by half round wood, plastic, or fiber molding from a point 18 inches above the ground line to a point at least 8 feet above the ground line. Rigid steel conduit shall protect the ground conductor on the pole from a point approximately 12 inches above grade to a point approximately 6 inches below grade. The conduit shall be terminated with a grounding bushing at each end, and the ground conductor shall be bonded to each bushing. The conduit shall be fastened to the pole with two 2-hole, galvanized, rigid conduit straps spaced approximately 9 inches apart. The wood, plastic or fiber molding shall be stapled to the pole at intervals not exceeding 2 feet, with one staple not more than 3 inches from each end. Single-point serrated staples of a type suitable for use with the plastic or fiber molding shall be used for stapling molding to the pole. Where ground conductor is not covered by molding, it shall be stapled to the pole at intervals not exceeding 2 feet. All connections shall be made with solderless connectors except where solder type lugs are furnished on the equipment.

Products shall be UL 96 and LPI-176 listed.

Ground conductor shall be soft drawn copper, having a current capacity of at least 20 percent of the largest conductor to which it is connected, but not smaller than No. 6 AWG and not smaller than indicated.

All connections shall be made with solderless connectors or by the molded fusion welding process.

Where the ground wire is connected to aluminum conductors, special treated or lined connectors suitable for this purpose shall be utilized.

Resistance of each ground shall be measured separately before bonding.

Submit test report of measurements of ground resistance.

Conduit And Wire Installation:

92-526

ITEM#0000565A to ITEM#0000568A
ITEM#0000574A
ITEM#0100294A
ITEM#1015039A

Conduit and wire shall be installed as shown on the plans and as specified in these specifications.

Painting And Finishing:

Unless otherwise specified, items fabricated from ferrous metal shall be factory finished with a weather resistant finish that withstands 500 hours of exposure to the salt spray test specified in ASTM B 117, except a 20 percent sodium chloride solution shall be used (20 plus or minus 2 parts of sodium chloride in 80 plus or minus 2 parts by weight of water). Immediately after completion of the test, the specimen shall show no sign of blistering, wrinkling, cracking, or loss of adhesion and no sign of rust creepage beyond 1/8 inch on either side of the scratch mark.

Method of Measurement:

The work will be measured per each or per linear foot, as applicable, complete in place and accepted.

Raceways will be measured as specified in these specifications.

Basis of Payment:

The work will be paid for at the respective contract unit price.

The prices shall include all costs to provide for the completion of the work specified.

Raceways will be paid as specified in these specifications.

<u>Pay Item</u>	<u>Pay Unit</u>
15 KV Fused Cutouts (1-Phase)	Each
15 KV No. 4/0 ACSR XLPE	Linear Foot
5 KV No. 4/0, Cu, EPR	Linear Foot
15 KV No. 4/0, Cu, EPR	Linear Foot
15 KV Class Insulators	Each
Pole Line Grounding	Each

92-526

ITEM#0000565A to ITEM#0000568A
ITEM#0000574A
ITEM#0100294A
ITEM#1015039A

- ITEM #0090044A - SIGNAL POWER FEEDER
- ITEM #0090085A - AERIAL GROUND WIRE
- ITEM #1012212A - WIRE AND CABLE - 4/0 AWG CABLE
- ITEM #1012223A - WIRE AND CABLE, 500 KCMIL CABLE

Description

The Work under this Section consists of furnishing, installing and testing new traction power feeder wire, signal power feeder wire and aerial ground wire as shown on the plans. This work includes furnishing, installing, testing, and turn over to the Railroad, those conductors and related items which comprise these wire systems and includes all related components and accessories for a complete and functional system.

The Work under this Section also consists of the demolition and removal of selected traction power, signal power, aerial ground wires as shown on the plans.

The Contractor shall be responsible for coordinating the installation with the requirements set forth in the Special Provisions, obtaining necessary outages for conducting work, and turning the work over to the Railroad for its use as specified.

Applicable Standards

Pertinent provisions of the most current revision of the following standards shall apply to the Work of this Section, except as they may be modified herein, and are hereby made a part of this Specification to the extent required.

<u>Organi- zation</u>	<u>Number</u>	<u>Title</u>
ANSI	C2	National Electrical Safety Code
NFPA	70	National Electrical Code

Submittals

The Contractor shall select and develop a full arrangement of components, and demonstrate by means of engineering calculations, that all selected components are capable of meeting the design criteria for safety and operational requirements as stated in the specifications and plans.

Materials

All material shall be as specified in NOTICE TO CONTRACTOR Sections.

Construction Methods

Insulators

All insulators shall be cleaned. Only clean rags, free from any abrasive material shall be used for cleaning insulators. Wire brushes shall not be used for cleaning any insulator parts, metal or otherwise. In the completed line, all insulator assemblies and hardware shall be clean, bright and free from nicks, chips or other marks.

Hardware

All pole-line hardware shall be installed as shown on the plans and as recommended by the manufacturer. Bolts and nuts shall be properly tightened in accordance with the manufacturer's recommendations. All bolts shall be of sufficient length for a full thread beyond the nut and/or locknut, but shall not protrude beyond the nut and/or locknut more than $\frac{1}{2}$ ", excluding foundation bolts. Bolt ends shall not be cut off. Where locknuts are not used, lock washers shall be provided.

Hardware shall be installed using tools and methods specified by the manufacturer and approved by the Engineer.

Hardware shall be inspected for cleanliness and damage. Any item that does not fit, scrapes other galvanized parts during installation, or is defective shall be rejected. Replacement shall be at the Contractor's expense.

Cotter pins, when used, shall be installed with the open end toward the ground.

Connectors

Current-carrying connectors, shall be as shown on the plans and shall be installed in accordance with the manufacturer's recommendations. Connectors for copper or bronze wire shall be copper or bronze. Connectors for bi-metallic connections shall be tin plated.

Bolts in bolt-type connectors shall be lubricated as recommended by the manufacturer, and torqued to the manufacturer's recommendation, using a calibrated torque wrench.

Where practicable and available, connectors shall be factory-supplied with a corrosion inhibitor.

Wire surfaces, which are in contact with conducting surfaces of the connector, shall be thoroughly wire brushed and shall be coated with an inhibitor. When connectors are not factory-supplied with a corrosion inhibitor, the inhibitor shall be applied to the connector in the field.

Corrosion inhibitors shall be stable over a wide temperature range, adhere to cold metal surfaces, be water-repellent, be weather resistant, and be inert to copper, aluminum, zinc, tin, cadmium, steel and neoprene rubber. Grit-bearing inhibitors shall generally be used except on flat lugs, sliding surfaces or where not recommended by the connector manufacturer. Grit shall be compatible with the connector and the wire metal. The inhibitor used on copper and bronze shall be T&B "Kopr Shiel", Fargo "Fargolene", Penn-Union "Cual-Aid", Burndy "Penetrox A", or approved equal.

One typical full-tension splice for each type of conductor shall be fabricated and tested by an independent testing laboratory. The laboratory shall be approved by the Engineer prior to testing. This requirement may be waived if test documentation for similar splices is provided and found to be acceptable by the Engineer. The tensile strength and electrical conductivity of full-tension line splices shall be at least equal to the values specified in NEMA Standard CC3 for Class 1, full-tension connectors. Copper and bronze line splices shall conform to the specified standard of 95 percent tensile strength and 100 percent conductivity (minimums).

Conductors

For each length of conductor installed, a record shall be kept of the reel number from which the conductor was used. Partly used reels shall be recorded as such.

All conductors shall be handled in accordance with good overhead line practices and the manufacturer's recommendations.

Care must be taken with reels so as not to adversely influence the stringing operation. Damaged reels shall be set aside for repair before use.

Demolition and Removal

The Contractor shall disconnect, determinate, and properly dispose of the existing feeder power wire, signal power wire, and aerial ground wire to the extent shown on the plans and specifications herein. This shall include all support hardware and related components or accessories. Care shall be taken by the Contractor to prevent damage to those wires, systems and components not being demolished or removed from service. The Contractor shall properly dispose of all material being removed. Form 814A, Section 1.04.06 shall apply.

Feeder Wire, and Ground Wire Installation

Wire shall not be erected without the guy anchor assemblies being in place, ready to receive loads.

The methods of erecting the traction power feeder wires, signal power wires, aerial ground wire and cable support messengers shall be subject to approval by the Engineer.

Care shall be taken to prevent kinks in the wires and cables. The Engineer reserves the right to reject any contact wire in its entirety if it is judged that any kink will degrade current-collection performance. Bird caging of stranded wire shall be cause for rejection.

Erection tensions in all conductors shall be as shown on the plans with tolerance of plus/minus five percent.

Normally one splice will be permitted in the conductors. Additional conductor splices shall be subject to the approval by the Engineer.

No splice will be permitted within five feet of a support clamp.

Any damage to the conductors shall be reported, in writing, to the Engineer. Remedial action must be approved by the Engineer and will be performed as directed at the Contractor's expense.

At his own expense, the Contractor shall provide any temporary anchors and down guys required to facilitate overhead wire installation or construction staging.

Roller-bearing sheaves of the closed type shall be used at all support points for stringing of traction power feeder wire, signal power feeder wire and aerial ground wire. Sheaves shall be of sufficient size to accommodate the conductor without damage.

Stringing of wires shall start at an anchor location. After the initial termination is made, the conductor shall be pulled from the reel and lifted into the sheaves at each support. Sufficient tension must be maintained in the conductor during stringing to ensure that the conductor does not touch the ground or track between support points.

When the second anchor location is reached, the wire shall be tensioned above the specified erection tension by 200 lbs. This tension shall be held for approximately five minutes and then slackened to the specified erection tension before the dead-end assembly is attached.

Erection tensions shall be governed by the plans, based on the equivalent span for the tension length and temperature of the conductor.

When there is a possibility of interference at structures adjacent to overhead obstructions, conductors may be lowered with approval of the Engineer. Satisfactory clearances to the track shall be maintained at all times.

During stringing of new conductors, proper vertical and horizontal electrical clearances must be maintained from existing conductors and structures.

Final adjustment of traction power feeder wire, signal power feeder wire, and aerial ground wire to the specified stringing tension shall be made progressively, by

working any slack from the first anchor location toward the second anchor location at the other end of the run.

The tension shall be adjusted so that it will be within plus/minus five percent of the erection tension as shown on the plans.

When the proper tension has been obtained, the conductor shall be tightened to its permanent position on the supporting devices.

Temperatures of tensioned wires shall be measured by using a thermometer. The bulb of the thermometer shall be in intimate contact with the wire and shall be closely taped to the wire to prevent drafts around the bulb. The thermometer shall be read after 15 minutes of contact.

Wire temperature and wire tension shall be recorded at both ends of the tension sections. These records shall be kept for all conductors.

Bolts shall be installed in the various clips so that the nuts will be on the same side thereby providing a uniform appearance.

Method of Measurement

The Work of this Section will be measured for payment based on actual linear feet of each type of completed wire system furnished, installed and accepted.

No separate measurement will be made for insulators, demolition and removal of sections of wire but the cost thereof shall be included under the various pay items.

Ground rods, where specified, and their connections to the aerial ground wires will not be paid for separately but their cost shall be covered as a part of the price for AERIAL GROUND WIRE.

It may be necessary, from time to time, to add or to substitute assemblies called for on an erection diagram bill of material in order to meet the requirements that the Contractor provides a complete functioning system. No separate payment will be made for such changes but the cost thereof shall be included in the unit prices for installation.

Basis for Payment

This work will be paid for at the contract unit prices for the following pay items including all transportation, materials, equipment, tools and labor incidental thereto:

<u>Pay Item</u>	<u>Pay Unit</u>
SIGNAL POWER FEEDER	LF
AERIAL GROUND WIRE	LF
WIRE AND CABLE, 4/0 AWG CABLE	LF
WIRE AND CABLE, 500 KCMIL CABLE	LF

ITEM #090037A - DOWN GUYS

Description

Work under this item consists of the supply and installation of galvanized steel wire and fitting for down guys (guys assemblies) as shown on the plans and specified herein.

Applicable Standards

Pertinent provisions of the following listed and other relevant standards shall apply to the work of this Section, except as they may be modified herein:

American Society for Testing and Materials (ASTM):

A475 Zinc-Coated Steel Wire Strand

Materials

Structural steel shall be as specified for STRUCTURAL STEEL or called for on the plans.

The material used for stranded zinc-coated steel wire rope, shall be as specified for GALVANIZED STEEL WIRE, ALUMOWELD STRANDS AND WIRE ROPE.

Submittals

Relevant reports for wire to be used containing the physical and mechanical properties of all components described in this Section shall be submitted. Include the following as a minimum:

- Size
- Type
- Material
- Number of and diameter of individual wires
- Overall diameter
- Cross section area
- Weight per foot
- Rated breaking load

The Contractor shall provide certification that the zinc-coated steel wire has been designed, fabricated, rated and tested in compliance with the applicable provisions of the standards referenced in these Specifications.

Shop drawings of structural steel.

Construction Methods

Zinc-coated steel wire rope shall be cut and installed using tools and methods specified by the manufacturer.

Down guys shall be installed before loading the structures. They shall be pulled taut, and secured in place with provisions for future adjustment as required to hold the structure in proper alignment after wires are pulled to correct tension. Catenary guy anchors in soil shall not be loaded until the concrete has reached a strength of 4000 psi.

Down guy attachments shall be installed as recommended by the manufacturer.

The Contractor shall make final adjustments to the down guys as required to compensate for initial stretch.

Guy guards shall be installed as directed by the Engineer.

Method of Measurement

The work will be measured for payment by the number of Down Guys installed. There will be no separate payment for excavation, concrete, structural steel, guy guards, but the cost thereof shall be included in the unit prices for Down Guys.

Basis for Payment

This work will be paid for at the contract unit price for the following pay item which price shall include all transportation, materials, equipment, tools and labor incidental thereto:

<u>Pay Item</u>	<u>Pay Unit</u>
DOWN GUYS	EA

ITEM #0090075A - GUY ASSEMBLIES

Description:

The work of this Section covers the application design, supply fabrication and installation of guy assemblies as shown on the Contract Plans and specified herein.

Applicable Standards

1. Pertinent provisions of the following listed and other relevant standards shall apply to the work of this Section, except as they may be modified herein:
 1. American Society for Testing and Materials (ASTM):
 - A475 Zinc-Coated Steel Wire Strand
 - B416 Aluminum Clad Steel Conductors

Submittals

1. Relevant shop drawings, catalog cuts and reports for each type of wire to be used and the physical and mechanical properties of all components described in this Section shall be submitted. Include the following as a minimum:
 - Description
 - Size
 - Type
 - Material
 - Number of and diameter of individual wires
 - Overall diameter
 - Cross section area
 - Weight per unit
 - Rated breaking load/SWL
 - Initial and final modulus of elasticity
 - Coefficient of thermal expansion
 - Yield stress
 - Hardness value
2. The Contractor shall provide certification that the wire rope and components have been designed, fabricated, rated and tested in compliance with the applicable provisions of the standards referenced in these Specifications.

Materials:

1. All materials shall be new.
2. The stranded wires shall be manufactured and tested in accordance with the applicable ASTM specifications.

3. The material and physical properties of the stranded wire and wire rope shall conform to the description in Table 1 of ASTM A475.
4. The weight of coating for zinc-coated steel wire shall not be less than that specified in Table 4, under Class C of ASTM A475.
5. Aluminum clad steel wire strand shall be "Alumoweld" brand as manufactured by the Copperweld Corporation, or approved equal.
6. All fittings and hardware shall be the wire strand manufacturer's recommended types and sizes for the wire strand. In addition, conform to the drawing requirements.
7. Other fittings shall conform to ASTM A668, "Steel Forgings, Carbon and Alloy for General Industrial Use," Grade C., or ASTM A148, "Steel Castings, High Strength for Structural Purposes," Grade 80-50.
8. All material shall be hot-dip galvanized in accordance with ASTM A153.

Construction Methods:

1. Guy strands shall be cut and installed using tools and methods specified by the manufacturer, and the down guy assemblies shall be assembled and installed as recommended by the manufacturer.
2. Down guys shall be assembled and installed before the overhead wires are strung. They shall be pulled taut, and secured in place with provisions for future adjustment as required to hold the structure in proper alignment after wires are pulled to correct tension.
3. The Contractor shall make final adjustments to the down guys as required to compensate for initial stretch.

Delivery, Storage and Handling

Materials shall be protected against damage in ordinary handling and shipping. Each reel shall have a strong, weatherproof tag securely fastened to it showing the physical and mechanical properties as well as the steel type designation, ASTM designation and the name and mark of the manufacturer.

Method of Measurement:

The work will be measured for payment based on the individual guy assemblies furnished and installed complete in accordance with the Contract Documents, to the satisfaction of the Engineer.

Basis of Payment:

The guy assemblies supplied and installed shall be paid for at the contract unit price, which price shall include all transportation, material, equipment, tools and labor incidental thereto:

Pay Item

Pay Unit

Guy Assemblies

Each

- ITEM #0090080A - REMOVE 15 KV RACEWAY CONDUCTOR**
- ITEM #0090081A - REMOVE SIGNAL & COMMUNICATIONS CABLE**
- ITEM #0090082A - REMOVE 15 KV OVERHEAD CONDUCTOR**
- ITEM #0096071A - REMOVE GUY AND GUY ANCHOR ROD**
- ITEM #1003917A - REMOVE WOOD POLE**
- ITEM #1010902A - REMOVE CONCRETE HANDHOLE**
- ITEM #1014902A - REMOVE 2400 VOLT CABLE**
- ITEM #1014909A - REMOVE SECONDARY OVERHEAD CABLE**

Description:

Work under this item shall include the electrical demolition and legal disposal of materials as shown on the plans.

The work shall include all materials, equipment and labor incidental for the completion of the work as shown on the plans including, but not limited to, conduit, cable, poles, hardware.

General:

The Contractor shall satisfy himself of the conditions existing at the site and the type of equipment required to perform the work from an inspection of the site as well as from information shown on the plans.

Any failure of the Contractor to acquaint himself with available information will not relieve him from the responsibility for estimating properly the difficulty or cost of successfully performing the work.

Comply with all municipal, state and federal laws, ordinances, rules, orders and regulations that have jurisdiction and pertain to the work.

Comply with all applicable requirements of ANSI A10.6, Safety Requirements for Demolition Operations.

Protect existing work that is adjacent to work to be demolished. Leave the existing work in a safe and satisfactory condition.

The Contractor is responsible for the legal disposal of all materials and shall backfill as necessary.

92-526

ITEM#0090080A to ITEM#0090082A
 ITEM#0096071A
 ITEM#1003917A
 ITEM#1010902A
 ITEM#1014902A
 ITEM#1014909A

No material removed in this project, shall be reused for new installation, whether permanent or temporary, without prior permission of the Engineer. All these materials shall be stored in areas that will not interfere with construction of the new facility or with the railroad's daily operations. The storing areas shall be coordinated under the direction of the Engineer.

The following shall be submitted:

Demolition Plan:

Describe the proposed sequence, methods, and equipment for the demolition and disposal of each item.

Submit demolition plan, a minimum of 15 working days prior to the start of demolition work, to the Engineer.

Do not proceed with the demolition work until the Engineer has given written acceptance of the demolition plan.

Guy anchor rods shall be removed to a depth of not less than 4 feet below ground level. Removals of dead-end guys and associated pole attachments shall not be performed until removal of all anchored wires has been accomplished.

Materials:

Gravel for backfilling of excavations shall conform to Section M.02, Subsection M.02.01.2 (bank or crushed gravel), Grading A, of the Standard Specifications.

Construction Methods:

Earthwork shall be in accordance with Section 2.03 and Section 2.13 of the Standard Specifications as applicable and the applicable Special Provisions.

Method of Measurement:

The work will be measured per each, per linear foot or per lump sum, complete and accepted.

92-526

ITEM#0090080A to ITEM#0090082A
ITEM#0096071A
ITEM#1003917A
ITEM#1010902A
ITEM#1014902A
ITEM#1014909A

Basis of Payment:

The work will be paid for at the respective contract unit price or lump sum.

The prices shall include all costs to provide for the completion of the work.

The cost of gravel shall be included in the contract unit price for “Granular Fill”

Earthwork shall be paid as “Structure Excavation-Earth”

<u>Pay Item</u>	<u>Pay Unit</u>
Remove 15 Kv Raceway Conductor	Linear Foot
Remove Signal & Communications Cable	Linear Foot
Remove 15 Kv Overhead Conductor	Linear Foot
Remove Guy And Guy Anchor Rod	Each
Remove Wood Pole	Each
Remove Concrete Handhole	Each
Remove 2400 Volt Cable	Linear Foot
Remove Secondary Overhead Cable	Linear Foot

92-526

ITEM#0090080A to ITEM#0090082A
ITEM#0096071A
ITEM#1003917A
ITEM#1010902A
ITEM#1014902A
ITEM#1014909A

ITEM #0090104A - SCREW ANCHORS

Description

Work under this item consists of the fabrication and installation of screw anchor assemblies.

Materials

Screw anchors assemblies shall be capable of withstanding 15,000 ft/lbs. of installation torque for the Type 2 anchor (SGA-2 on plans).

Submittals

Shop drawings and installation procedures for screw anchor assemblies.

Construction Methods

Installation of screw anchors shall be as recommended by the manufacturer. Screw anchors shall be installed to a depth required to obtain the specified torque as well as below the specified minimum depth.

Screw anchors shall be installed in line with conductor to be terminated unless otherwise shown on the plans or instructed by the Engineer.

Construction Tolerance

Screw anchors shall be within the following tolerances unless specified otherwise on the plans:

- a. Along the track $\pm 12"$ of dimension given on the plans.
- b. Across the track $\pm 3"$ but not within 9 ft. from centerline of track.

Method of Measurement

Screw anchors will be measured for payment based on the number of linear feet of screw anchor assemblies installed.

Basis for Payment

This work will be paid for at the contract unit prices for the following pay item which price shall include all transportation, materials, equipment, tools and labor incidental thereto:

<u>Pay Item</u>	<u>Pay Unit</u>
SCREW ANCHORS	LF

ITEM #0096063A - SPECIAL FOUNDATION
ITEM #0104073A - SNOWMELTER UNIT SUBSTATION

Description

The work specified in this section consists of removing and storing an existing snowmelter unit substation with control cabinet and removal of its foundation to allow construction of an ductbank and subsequently build a new foundation and install, connect and test the snowmelter unit substation.

Materials

Concrete shall be Form 814A, Section M.03.03 Class AF@ with 4000psi minimum strength after 28 days. No retarding admixture shall be used except with the approval of the Engineer. Air entrainment shall conform to Form 814A, Section M.03.01.9(a).

Reinforcing steel shall be Grade 60 as specified in Form 814A, Section M.06.01.2. The minimum cover shall be as called for on the plans. Reinforcing steel shall be epoxy coated.

Grounding material shall be as called for on the plans.

Submittals

Certified mill certificates for reinforcing steel.

Shop drawings for reinforcing steel in accordance with Form 814A, Article 6.03.1

Proposed concrete mix.

Certified concrete cylinder test results.

Procedures for disconnecting, removing, reinstalling, connecting and testing the Snowmelter Unit Substation

Construction Methods

Removal of the Snowmelter Unit Substation shall be performed without damaging the equipment. The removed equipment shall be stored protected from weather and in a place safe from accidental damage.

Removal of the Snowmelter Unit Substation Foundation shall be performed without causing damage to adjacent structures or track. The contractor shall dispose of the removed foundation.

Backfill shall be placed in accordance with Form 814A, section 2.03.03,6.

Air entrainment in concrete is required for slabs on ground.

The snowmelter unit substation with associated control cabinet shall be re-installed in accordance with the manufacturer's instructions and nationally recognized regulations and standards.

The transformer and control cabinet shall be grounded as shown on the plans.

Erection tolerances shall be controlled so as not to impair the strength, safety, serviceability or appearance of the equipment. Changes to tolerance requirements shall not be made unless approved by the Engineer.

Special care shall be exercised during installation to avoid overloading any of the structure. Repairs or replacement of any damaged items due to overloading shall be performed to the satisfaction of the Engineer.

Shop drawings of the Snowmelter Unit Substation and control cabinet will be provided by the Engineer.

Method of Measurement

Relocate Snowmelter Unit Substation will be paid on a lump sum basis and shall include for payment purposes the removal, storing, and subsequently installing, connecting and testing the Snowmelter Unit Substation with control cabinet and the removal of its foundation.

The snowmelter unit substation foundation will be paid as Special Foundation.

Special Foundation will be paid for based on the number of cubic yards of concrete in the foundation. It shall include for payment purposes all excavation, backfill, concrete, reinforcing steel, anchor bolts, grounding net and grounding rods.

Basis for Payment

This work will be paid for at the contract lump sum or unit prices for the following pay items which price shall include all transportation, materials, equipment, tools and labor incidental thereto.

<u>Pay Item</u>	<u>Pay Unit</u>
SPECIAL FOUNDATION	CY
SNOWMELTER UNIT SUBSTATION	EA

ITEM #0096069A - REMOVAL OF CATENARY POLE STRUCTURE
ITEM #0096070A - REMOVAL OF CATENARY STRUCTURE FOUNDATION

Description

Work under these items consists of the removal of existing designated feeder support structures and their foundations, including pole extensions with cross arm.

Submittals

Contractor's proposed method of removing structures to demonstrate compliance with "Requirements for Erection, Demolition, or other Rigging Operations over or Adjacent to Railroad Right-of-Way", see Special Conditions.

Construction Method

Designated structures shall be removed from their foundations. Foundations shall be removed to a depth of not less than 4 feet below ground level.

The Contractor shall dispose of all removed structures, materials and foundations and shall backfill at removed foundations. The backfill material shall be a granular soil compacted to density equal to the surround soil.

Removal shall be performed in such a manner that it causes no unscheduled interruption of rail operations or damages existing facilities or work by others.

Method of Measurement

Removal of Catenary Structure Foundation refers to Pole 53A. It will be measured for payment based on the number of foundations removed.

Removal of Catenary Pole refers to Pole 53A and existing pole extension and cross arms on structures 1967, 1068, 1069, 1070, 1070A and 1071. They will be measured for payment based on the number of structures removed.

Basis of Payment

This work will be paid for at the contract unit prices, which shall include all transportation, materials, equipment, tools and labor incidental thereto:

<u>Pay Item</u>	<u>Pay Unit</u>
REMOVAL OF CATENARY POLE STRUCTURE	EA
REMOVAL OF CATENARY STRUCTURE FOUNDATION	EA

ITEM #0100283A - POWER CABLES AND TERMINATIONS
ITEM #1008472A - 6" RIGID METAL CONDUIT
ITEM #1008510A - 4" RIGID METAL CONDUIT (ALUMINUM)

Description

The work of this Section covers furnishing, installing and testing high voltage cables with terminators and termination kits. Application of these cables is for 60Hz single phase electric traction power systems operating at 13.8kV to ground or the 100Hz, 12.0kV ungrounded, signal power system and referred here to as Power Cables and Terminators (Site 1). The power cables are sized as shown on the plans. Also included is furnishing and installing aluminum conduits with all required fittings and supports.

Applicable Standards

Pertinent provisions of the following listed standards shall apply to the work of this Section, except as they may be modified herein, and are hereby made a part of this Specification to the extent required.

<u>Organi- zation</u>	<u>Number</u>	<u>Title</u>
ICEA	S-68-516	Ethylene-Propylene-Rubber-Insulated Wire and Cable for Transmission and Distribution of Electrical Energy
IEEE	48	IEEE Standard Test Procedures and Requirements for High-Voltage Alternating-Current Cable Terminations
ASTM	B-8	Concentric-Lay-Stranded Copper Conductors
NFPA	70	National Electrical Code
UL	1072	Medium-Voltage (Type MV) Solid-Dielectric Cables
AEIC	CS6	Specification for Ethylene Propylene Rubber Insulated Shielded Power Cables Rated 5 Through 69kV
NEMA	WC 26	Wire and Cable Packaging

Submittals

The Contractor shall submit data for approval prior to cable and wire manufacture. Included as a minimum shall be:

Physical Characteristics and Parameters:

- Size
- Type and class
- Materials (Insulation and Jacketing)
- Number of and diameter of individual wires
- Overall diameter
- Cross section area
- Weight per foot
- Maximum pulling tension
- Minimum bending radius for pulling and training
- Maximum sidewall pressure

Electrical Characteristics:

- Rated current carrying size (AWG/kcmil)
- Resistance per unit length
- Details of metallic shield design

Design and production test plan, test procedures and certified test reports.

The Contractor shall provide samples of conductors/cables, copies of material/ procurement specifications, installation guide, storage and handling procedures.

Prior to making of pothead, or stresscone termination the contractor shall submit to the Engineer for approval, the name of each individual who will perform this type of work including the background of each such individual on similar previous projects.

Materials

Cable construction standards, definitions of terms and conductor insulation shall be in strict accordance with applicable publications of ICEA for the cable provided. Insulated cables shall have Class B or C stranding as noted. Conductors for insulated cables shall be copper. Insulated Feeder Cable - 35kV, 133 percent insulation level, 750kcmil cables for the 13.8kV, 60Hz traction system shall be low-smoke, ozone resistant, ethylene-propylene rubber insulated cable conforming to ICEA S-68-516. Cable shall be single conductor, employing concentric class B stranded copper. Cable shall have conductor and insulation shielding. The insulation shield shall include nonmagnetic metal tape or wire strands applied over or embedded in the non-metallic covering. The metallic shield shall be designed to carry the maximum ground fault current. The cable shall be rated for 90 degrees C operating temperature and 110 degrees C hot spot temperature. Cable rated higher than 90 degrees C cannot be used in standard PVC conduit. The cable jacket shall be an extra heavy-duty, flame retardant, ozone resistant, non-halogen, low-smoke compound meeting the requirements of ICEA S-68-516, Part 4. The cables shall be able to withstand frequent overvoltages, switching surges, harmonics, highly fluctuating loads and short circuits, normally encountered daily in traction power systems.

Insulated Signal Cable – 25kV, 133 percent insulation level, 500kcmil cables for the 12.0kV, 100 Hz signal power system shall be low-smoke, ozone resistant, ethylene-propylene rubber insulated cable conforming to ICEA S-68-516. Cable shall be single conductor, employing concentric class B stranded copper. Cable shall have conductor and insulation shielding. The insulation shield shall include nonmagnetic metal tape or wire strands applied over or embedded in the non-metallic covering. The metallic shield shall be designed to carry the maximum ground fault current. The cable shall be rated for 90 degrees C operating temperature and 110 degrees C hot spot temperature. Cable rated higher than 90 degrees C cannot be used in standard PVC conduit. The cable jacket shall be an extra heavy-duty, flame retardant, ozone resistant, non-halogen, low-smoke compound meeting the requirements of ICEA S-68-516, Part 4. The cables shall be able to withstand frequent overvoltages, switching surges, harmonics, highly fluctuating loads and short circuits, normally encountered daily in traction power systems.

Insulated Snowmelter Cable - 35kV, 133 percent insulation level, 1/0 AWG copper cables for the 13kV, 60Hz traction system shall be, ozone resistant, ethylene-propylene rubber insulated cable conforming to ICEA S-68-516. Cable shall be single conductor, employing concentric class B stranded copper. Cable shall have conductor and insulation shielding. The insulation shield shall include nonmagnetic metal tape or wire strands applied over or embedded in the non-metallic covering. The metallic shield shall be designed to carry the maximum ground fault current. The cable shall be rated at a 90 degree C operating temperature and 130 degrees C hot spot temperature. Cable rated higher than 90 degrees C cannot be used in standard PVC conduit. The cable jacket shall be an extra heavy-duty compound meeting the requirements of ICEA S-68-516, Part 4. The cables shall be able to withstand frequent overvoltages, switching surges, harmonics, highly fluctuating loads and short circuits, normally encountered daily in traction power systems. Snowmelter return conductors shall be 600V, 1/0 AWG, single conductor cables with ethylene-propylene rubber insulation. This cable shall be connected from the H2 connection of the snowmelter to the aerial ground wire and run in the same conduit as the supply conductor.

Finished cables shall pass partial discharge test specified in AEIC CS6 and shall meet UL 1072. The cables shall be guaranteed against failure due to workmanship and materials for a period of at least five years. The following information shall be printed on the jacket, using contrasting color ink, at not more than 2' intervals:

- Manufacturer's name
- Temperature rating
- Year of manufacture
- Conductor size
- Voltage rating
- Insulation type and thickness
- Jacket type and thickness
- UL listing

High-voltage Termination - High-voltage outdoor terminations shall be of the wet-process porcelain insulator type glazed inside and outside, as shown on the plans. Terminators shall be applied to single-conductor cables that are exposed to the environment and rated for 35kV, 200kV BIL. The terminator and all components shall be the product of one

manufacturer and furnished in a package or kit form compatible with the insulator and conductor material of the cable. The terminator shall comply with all requirements of IEEE 48, Class 1. However, the terminator shall not exude any filler compound under either test or service. The terminator shall consist of a porcelain insulator, cable connectorhoodnut assembly, and aerial lug as required, metal body and supporting bracket, sealed cable entrance, internal stress relief device for shielded cable, and insulating filler compound or material and associated assembly and mounting hardware. Cable supports shall be provided to support the cables between the conduits and potheads as required. Stress cones shall be used for indoor cable terminations.

Connectors and Terminals - Connectors and terminals shall be designed and approved for use with the associated conductor material and shall provide uniform compression over the entire contact surface. Solderless terminal lugs shall be used on all stranded conductors.

Reels and Packing

The cable shall be packaged, furnished and shipped on returnable reels in accordance with NEMA Standard WC 26. Reels shall be constructed of materials which shall provide protection to the cable during shipment and handling.

A watertight seal shall be applied to each end of the cable to prevent the entrance of moisture during transit or outdoor storage.

A durable label shall be securely attached to each flange of each reel. Each label shall indicate the purchase order number, name of manufacturer, reel number, length of cable on reel, description of cable, weight of reel, rolling direction, and source of manufacture.

Conduits

Rigid metal conduit shall be of aluminum and as specified in BASIC ELECTRICAL MATERIALS AND METHODS.

Construction Methods

Prior to pulling power cables of this Section, the Contractor shall perform pulling calculations to determine the direction of pull, and maximum expected pulling tensions based on setup, length of pull, number of bends and pull points. These calculations shall be submitted to the Engineer for review at least 45 days prior to intended pull. Any deficiencies in the calculation shall be resolved prior to work being performed.

Care shall be exercised in pulling cables in conduit to avoid kinking, putting undue stress on the cable, compressing, distorting or otherwise abrading cable insulation. A lubricating compound shall be used while pulling cables. Cable pulling tension and cable sidewall pressure applied during the pulling process shall not exceed the manufacturer's written recommendations. Rollers, jam and quadrant blocks shall be utilized as required to facilitate cable installation. A dynamometer shall be used for all pulls.

Cable pull lengths shall be maximized so as to minimize splices. Splices shall be allowed only where accessible in manholes.

Care shall be exercised in preventing access of water and vermin into the cable vault/manhole by sealing the cable entrances.

Terminations of insulated traction power cables, snowmelter cables, and insulated signal power cables shall be protected from accidental contact, deterioration of coverings, and moisture, by the use of terminating devices and materials. Terminations shall be made using materials and methods as indicated or specified herein, or as designated by the written instruction of the cable manufacturer and termination kit manufacturer. Terminations shall be rated and be capable of withstanding test voltages in accordance with the IEEE 48. Terminations of single cables shall include the securing and sealing of the sheath and insulation of the cable conductors, stress relief, and grounding of cable shields of shielded cable. Cables and cable terminations shall be adequately supported so as to avoid any excessive strain on the termination and the conductor connection.

Method of Measurement

The work of this Section shall be measured based on the number of linear feet of Rigid Metal conduits installed. Power Cables and Terminators will be paid on a lump sum basis.

Basis for Payment

This work of this Section will be paid for at the contract lump sum or unit prices for the following pay items which prices shall include all transportation, materials, equipment, tools and labor incidental thereto.

<u>Pay Item</u>	<u>Pay Unit</u>
POWER CABLES AND TERMINATIONS	LS
6" RIGID METAL CONDUIT	LF
4" RIGID METAL CONDUIT (ALUMINUM)	LF

ITEM #100780A – CRANES

Article 6.03.01 - Description:

Work under this item shall conform to the requirements of Section 6.03, supplemented and amended as follows:

This special provision provides requirements for the erection of the structural steel truss of Segment 2 within the New Haven Interlocking and Rail Yard. A specific erection sequence has been developed for completing the erection of the truss by the use of a single crane (hereinafter referred to as “the crane”), as shown on the Structure Drawings. The crane has a sufficient load and movement capacity to lift and move the fully assembled truss segment from temporary supports south of the Proposed Pier 2 to its final position over the Interlocking and Main Line Tracks. The fully assembled truss is the completed structure of Segment 2, including all components of the truss, remain-in-place forms, inspection platforms, proposed utilities and drainage and protective shielding/work platforms, but exclusive of the concrete bridge deck, as indicated on the plans and in these specifications. Additional permanent and/or temporary components may be included in the lift as determined by the Contractor and approved by the Engineer, with the purpose being to minimize the work required over the tracks. No temporary bents or towers will be allowed between Proposed Piers 1 and 2.

This item shall consist of all work necessary and required to complete the following: securing the crane for use on the project; mobilization and assembly of the crane; completion of the lifting and moving of the proposed truss segment into its final position; and disassembling and demobilization of the crane and the restoration of the site to its original condition.

For additional information related to the use of the crane see, “Notice to Contractor – Erection of Structural Steel Truss (Segment 2)” and the Structure Drawings.

This item shall also include, but not necessarily be limited to, the following work required to incorporate the crane into the contract:

1. Providing all equipment for lifting and moving the fully assembled proposed truss (Segment 2) from the temporary location to the proposed location, as indicated on the plans and in these specifications.
2. Providing all materials, equipment, tools, labor, transportation, including any temporary works that may be required for mobilizing, assembling, completing the lifting and moving of the truss, and disassembling and demobilizing the crane.
3. Providing all equipment, materials and temporary shoring for the protection of the existing and proposed railroad tracks, as may be required, existing utilities, including drainage systems and existing structures impacted by the work included under this item. The work also includes the protection/relocation of utilities within the foundation limits of the crane and the crane work areas as required. The Contractor is responsible for the coordination with the owner of the facility impacted, and the design and construction required to relocate/protect the utilities as approved by the owner of the utility and the Engineer.
4. The use of the crane will require a foundation analysis and design by a geotechnical

engineer employed by the Contractor, including but not limited to determination of the soil bearing capacity and settlement analysis for the construction conditions covered under this item.

5. The results of the foundation analysis may require complete foundations and/or foundation improvements for the safe operation of the crane and all other equipment required. The Contractor is responsible for determining the foundation requirements, and for providing all engineering analysis and design services required.
6. Provide all materials, labor, equipment, and incidentals required to construct any foundations/foundation improvements required.
7. Hauling and legal disposal of all excavated materials from the foundation improvements, including the removal of any existing masonry, timbers, boulders, steel piles, and all other materials including natural and/or man made obstructions, including contaminated materials.
8. This item will also include the analysis, design, furnishing, fabricating, delivering, installing, removal, and disposal of any foundation improvements, as well as the restoration of the work area at the crane to the original condition in a timely manner when the work covered under this item is completed
9. Recording and documenting any foundation improvements made.
10. The Contractor shall provide all materials, equipment, tools, labor, transportation, operations and all work incidental to completing the work under this item.

Working drawings and computations prepared by the Contractor and stamped by a Professional Engineer licensed in the State of Connecticut, shall be submitted to the Engineer, as required, for any and all work required to complete the work covered under this item, including but not limited to the following:

- Crane layout drawings, including loading charts and computations.
- Crane detail and assembly drawings, catalog cuts, parts listing.
- Crane rigging working drawings and computations, including the layout and design and detailing of the attachment of the rigging to the proposed truss.
- Structural analysis and design for all components required for the operation of the crane as required.
- Crane foundation analysis and design and working drawings.
- Utility relocation/protection drawings.

The Contractor shall provide sufficient copies of all submittals to include distribution of the submittals to those parties identified elsewhere in these specifications and Metro-North Railroad, Amtrak and ConnDOT - Rails Unit. The Contractor may have to provide additional copies of the submittals as directed by the Engineer. The Department reserves the right to approve the use of any and all Professional Engineers performing the work.

Article 6.03.02 - Materials:

Delete the entire article and replace with the following:

The materials for this work shall conform to the requirements of the Standard Specifications Form 814A, these Special Provisions, and additional specifications and codes as required by the Department, the crane manufacturer, supplier and the Contractor's Engineer and as deemed necessary by the Contractor.

Foundation Improvements:

All materials used for any foundation improvements shall conform to Division III, Materials Section of Form 814A as amended by the Special Provisions.

Article 6.03.03 - Construction Methods:

Add the following to Subarticle 1 – Shop Drawings:

The contractor shall submit working drawings to the Engineer for approval in accordance with Article 1.05.02(2). The working drawings shall be prepared, sealed and signed by a Connecticut Licensed Professional Engineer. These drawings shall include, but not be limited to, the following information:

A layout and work area plan for the operation of the crane to lift and move the proposed truss into its final position, including timetable and sequencing of the work. This shall include the sequencing and timetable to move the crane away from the tracks after the truss has been placed in its final position.

The plan shall include complete details of all materials and parts of the crane, crane assembly details including the assembly sequencing and the required work area for the assembly, assembly time schedule, equipment used for assembling the crane, rigging member sizes, elevations, sections, attachment points, details of method of detaching rigging after setting, and lateral restraint to be used during the pick. It shall include the crane pick schedule, crane capacity charts, operators experience, crane certification, crane certification test results, monitoring procedures for the truss as well as the crane and foundation during the pick, rigging design including computations, wind load analysis, results of preloading the crane work area, and the approval of the crane owner of all foundation analysis and improvement designs and results of preloading. Sufficient crane charts including safe working loads and radii, factors of safety and any other crane capacity information as deemed necessary by the Contractor, his engineer, the crane manufacturer and regulations and codes.

It shall include foundation analysis results including allowable bearing pressures and predicted settlements, dimensions, sheeting for excavations, field measurements, utility relocation or protection plans. The plan shall be accompanied by computations which shall include field measurements, foundation analysis results including allowable bearing pressure and predicted settlements, analysis and design of any required foundation improvements, crane area preload procedure. The Contractor shall submit, in addition to the aforementioned working drawings, fully checked design computations prepared by a Professional Engineer licensed by the State of Connecticut with experience in this type of work.

In addition to these submittals, the Contractor shall submit a full report detailing the results of the preloading by the crane prior to lifting and moving the truss into its final position. The Contractor shall allow sufficient time for the Department to review this submittal, prior to completing the truss erection.

The Contractor shall develop contingency plans that can be used if the truss cannot be set into its final position and must be brought back to its staging area. This plan must be submitted to the Engineer for review.

Add the following general requirements:

Protection of Coated Structural Steel: All fully coated and cured assemblies shall be protected from handling and shipping damage with the prudent use of padded slings, dunnage, separators and tie downs. Loading procedures and sequences shall be designed to protect all coated surfaces.

Erection marks for field identification of members and weight marks shall be affixed in such a manner as to facilitate removal upon final assembly without damage to the coating system.

Add the following subarticle:

39 – High Capacity Crane

(a) Securing the Crane: The Contractor shall secure the use of a single crane with a sufficient load and movement capacity to lift and move the fully assembled structural steel truss of Segment 2 from temporary supports south of Proposed Pier 2 to the final location over the Interlocking and Mainline Tracks, as shown on the plans. The awarding of the contract will be contingent upon verification that the Contractor has secured a crane capable of completing the erection of the fully assembled truss without future modifications or waivers of the Metro-North Railroad requirement that the crane be capable of completing the operation using 150% of the load. The crane shall be provided by a company experienced in this type of work.

(b) Crane Foundation: The Contractor shall retain an experienced geotechnical engineer to analyze the foundation conditions and requirements in consultation with the owner of the crane to be used. The Contractor shall submit the resume of the Geotechnical Engineer he proposes to use for this work to the Department for approval, prior to beginning the work. The geotechnical engineer shall determine foundations required for the safe operation of the crane as required for the completion of the contract. The geotechnical engineer shall be a Professional Engineer licensed in the State of Connecticut, experienced in analysis and design of foundations for large construction loads. The geotechnical engineer shall perform the analysis and design based on loadings, bearing pressures, and settlement requirements, etc. provided by the owner of the crane to be used. The foundation analysis and the proposed crane foundation design shall be submitted to the Engineer for review. Any and all foundations required to adequately support the crane shall meet the requirements of the crane owner.

The Contractor shall submit working drawings for the as-built foundations. Drawings shall be on Mylar sheets of approved size and shall be sealed by a Registered Land Surveyor in the State of Connecticut. The Contractor shall note that limited subsurface investigations have been completed in the areas designated for the placement of the crane as shown on the "Erection

Sequence (Segment 2)" drawings. The existing subsurface borings are shown in the contract drawings in the vicinity of the bridge and work area. The Contractor shall perform additional subsurface investigations that are required to complete the analysis and design. The borings shall be coordinated with Metro-North, Amtrak, and Department and shall be performed at no cost to the State. The results of the borings shall be provided to the Engineer for review.

(c) Existing Utilities: Prior to performing any work adjacent to or above any existing utilities, including drainage systems, the Contractor shall notify the owner of the facility to coordinate the work. For utilities that are impacted by the crane, the Contractor is responsible for providing protective measures to insure that the facility it is not damaged. The Contractor may elect to either temporarily or permanently relocate the facility in allowable locations as shown on the plans, and as approved by the owner of the facility and the property owner. All work performed by the Contractor shall be in accordance with the requirements of the owner of the facility involved.

If existing service lines, utilities, and utility structures to remain in service are uncovered or encountered during these operations, the Contractor shall relocate them, protect them from damage and provide support if necessary and as required. There following charted utilities are within the limits of the proposed locations of the crane foundations, as shown on the plans as follows: water mains, sanitary sewer main, underground electric line, propane gas line and tank, overhead electric and communications wires on poles and drainage system.

Should uncharted or incorrectly charted piping or other utilities be encountered during this work, the Contractor shall immediately notify the Engineer and the utility owner. The Contractor shall cooperate with the utility owner in keeping their respective service, utilities, and facilities in operation. The Contractor shall perform additional subsurface investigations to verify that the utilities with in the influence of the crane have been adequately located and accounted for.

The Contractor is responsible for maintaining and protecting all existing facilities and shall repair any facility damaged due to his operations to the satisfaction of the Engineer and the owner of the facility, at no cost to the State.

The Contractor shall excavate with the utmost care in the vicinity of existing facilities to prevent damage. Hand digging shall be employed as required and as directed by the Engineer.

(d) Preloading: The Contractor shall survey the area to be used by the crane for completing the erection of the truss segment after all foundation improvements have been made. The area shall be preloaded to at least 125% of the intended loads during the full operation of the crane. The area shall be resurveyed and the results submitted to the geotechnical engineer, the crane owner and the Engineer for review. The Contractor shall provide any other additional data as required. The Contractor shall be responsible for correcting the foundation due to uneven settlement as a result of the preloading so as to insure that the operation of the crane is within the tolerances of the crane owner.

(e) Equipment: The equipment shall be in good working condition. No leaking, broken, temporarily repaired or missing parts will be allowed.

The Contractor shall have on the project site replacement parts for all major mechanical and electrical components of the crane and any non-major parts that are not locally readily available

within 30 minutes during the operation of lifting and moving the truss segment into place. The Contractor shall provide proof of availability of any part as requested by the Engineer. The parts list shall be as approved and as ordered by the Engineer.

(f) Crane Operation: The crane shall be operated by a licensed operator(s) with a minimum of 10 years experience in lifts of comparable weight at the proposed radius, and successful completion of at least three lifts of comparable weight at the proposed radius. At the time of award of the contract, the crane shall be capable of making the lift as required without future modifications or waivers of Metro-North load requirements, including any required capacity chart increases above the pick weight of any governing agencies, as stated in the Special Provisions. The pick shall be performed with a heavy-duty crane with a demonstrated capacity chart in accordance with SAE J 786 and J 987. All equipment shall be maintained in satisfactory working condition and shall be operated by competent and experienced personnel throughout the operation.

Vibration or excessive wheel loads shall not be allowed within the immediate vicinity of any railroad tracks.

Track outages are required for the Contractor's work on and adjacent to the railroad right-of-way. Metro-North Railroad will determine the work that requires track outages. The Contractor shall coordinate track outages required with Metro-North Railroad.

The Contractor is required to comply with FAA requirements regarding the use of temporary cranes so that the Determination of No Hazard is granted. The markings and lights are to be included in the general cost of the project.

(g) Miscellaneous: If for any reason the truss can not be placed onto the final proposed bearings during the allowable railroad outage time, the Contractor shall be prepared to place the truss onto proposed Piers 1 and 2 on temporary supports. This will require the subsequent jacking of the truss onto its final bearings.

The Contractor is made aware that the location of the crane operation is within the 100 year flood plane, as shown on the Roadway Drawings. If necessary, the Contractor shall be prepared to follow the requirements of the "Best Management Practices for the Protection of the Environment", contained within the specifications.

Article 6.03.04 – Method of Measurement:

Add the following after the third paragraph:

The Contractor will be paid for the work under this item as follows: All labor, materials, equipment, parts, and incidentals required for the analysis, design, review, approval, furnishing, fabricating, transporting, delivery, excavation, handling, treatment, disposal, installation, preloading, measuring, adjusting, repairing, removal, treatment, and disposal of, or any other item of work associated with, any crane will not be measured for payment, but will be included under this item.

The work included under this item will be paid for upon the completion of the following milestones:

- Securing the Crane.
- Mobilization and Assembly of the Crane.
- Completion of the Lifting and Moving of the Proposed Structural Steel Truss (Segment 2).
- Disassembly and Demobilization of the Crane and Restoring the Site.

The Contractor will be paid at each milestone an amount that is based on his actual costs. Immediately after the Notice to Proceed, the Contractor shall submit to the Engineer for approval, a "Schedule of Values" that details the portion of the bid amount to be included under each milestone.

Article 6.03.05 - Basis of Payment:

Add the following after the second paragraph:

No additional payment will be made for engineering services performed by the Contractor and/or his engineers as required to incorporate the crane into the contract, in accordance with this specification and as directed by the Engineer. These services include but are not limited to structural, geotechnical, including subsurface investigations that the Contractor deems necessary to adequately design the proposed crane foundations.

No additional payment will be made for any foundation improvements required, either by the Engineer or the owner of the crane. Any foundation improvements required will be included in the unit price for structural steel completed in place.

No additional payment will be made for any utility protection or relocation associated with the crane foundation requirements or crane pick.

Immediately after the award of the contract, and included in the pay item for "Cranes", the Contractor may submit a request for payment for the full amount of the deposit that the Contractor has placed with the crane supplier to secure the crane. The Contractor shall submit with the request for this payment sufficient evidence of the amount and acceptance by the crane owner of the amount for the sole purpose of securing the crane for use on this project. The Contractor is advised that no additional payment will be made associated with any penalties invoiced by the crane company resulting from the Contractor rescheduling the time frame for use of the crane which are due to the Contractor's inability to progress the work in a timely manner.

ITEM NO. 101000A - ENVIRONMENTAL HEALTH AND SAFETY

Description:

Under this item, the Contractor shall establish protocols and provide procedures to protect worker's health and safety as it relates to the proposed construction activities when performed in the presence of regulated substances, Resource Conservation and Recovery Act (RCRA) hazardous wastes, Toxic Substance Control Act (TSCA) wastes, Connecticut Regulated Waste (CRW), OSHA Hazardous Materials or otherwise environmentally sensitive conditions. Work under this Item consists of the development and implementation of a written Health and Safety Plan (HASP) which addresses the relative risk of exposure to documented hazards present within the project limits. The HASP shall establish health and safety protocols which 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.

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 referenced above to develop the HASP. A list of documents containing this data is found in "Notice to Contractor."

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 implementation of the HASP throughout the performance of work within the limits of the Areas of Environmental Concern, 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 shall begin until a HASP is submitted and accepted by the ENGINEER. However the Contract time, in accordance with Article 1.03.08 of the CTDOT Standard Specification Form 814A, will begin on the date stipulated in the Notice to Proceed.**

Applicable Standards:

Pertinent provisions of the following relevant standards shall apply to the work of this item, except as they may be modified herein. The work performed under this contract shall comply with all applicable Federal, State and local health and safety requirements. This includes, but is not limited to: Occupational Safety and Health Administration (OSHA) General Industry Standards 29 CFR 1910; the Construction Industry Standards 29 CFR 1926, especially Section 65 "Hazardous Waste Site Operations and Emergency Response"; U.S. Environmental Protection Agency (USEPA) hazardous waste requirements 40 CFR 260-270; and the State of Connecticut Hazardous Waste

(CGS 22a-114-134, inclusive). Matters of interpretation of standards shall be submitted to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations and referenced documents may vary, the most stringent requirements shall be followed.

Regulatory Requirements

All construction related activities performed by the Contractor within the limits of Areas of Environmental Concern, as identified in the Contract Documents, or in other areas where site conditions may pose a risk to worker health and safety and/or environment shall be performed in conformance with Title 29 of the Code of Federal Regulations, Part 1926 (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.

Special Requirements:

The Contractor shall have the HASP 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 Contractor shall provide a competent Health and Safety Officer (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 at hazardous waste sites; 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:

1. Directing and implementing the HASP.
2. 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 (20 CFR 1926.21). All personnel shall be adequately trained in procedures outlined in the Contractor's written

HASP.

3. Authorizing Stop Work Orders which shall be executed upon the determination of an imminent health and safety concern.
4. Contacting the Contractor's safety management personnel 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.
5. Authorizing work to resume, upon approval from the Contractor's safety management personnel.
6. Directing activities, as defined in the Contractor's written HASP, during emergency situations; and
7. Providing personal monitoring where applicable, and as identified in the HASP.

Submittals:

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

1. The development costs associated with preparing the Health and Safety Plan (HASP) in accordance with these Specifications.
2. The cost per month for the duration of the project to implement the HASP and provide the services of the Health and Safety Manager (HSM) and the Health and Safety Officer (HSO).
3. Qualifications of the Contractor's HSM and HSO.

If the lump sum bid price breakdown is unacceptable to the Engineer, then substantiation showing that the costs submitted are reasonable may be required.

The following shall be submitted to the Engineer within two (2) weeks of Notice to Proceed.

- A. Health and Safety Plan (HASP) prepared by or, at a minimum, reviewed by a Certified Industrial Hygienist (CIH), Certified Hazardous Material Manager (CHMM), or Certified Safety Professional (CSP) and bearing the signature of said qualified person (i.e., CIH, CHMM or CSP) indicating that the HASP meets the minimum requirements of 29 CFR 1910.120 and 29 CFR 1926.65. Submit the HASP and Specialized Contractor's HASP (s), if applicable, to the Engineer for his review and acceptance. The Engineer shall review the HASP(s) within four (4) weeks of submittal and shall provide written comments as to

deficiencies in and/or exceptions to the plan(s), if any, to assure consistency with applicable standards, policies and practices and appropriateness given potential or known site conditions. The Contractor shall not be allowed to commence work activities in Areas of Environmental Concern, as shown on the plans, and where site conditions exist which may pose a risk to worker health and safety and/or the environment, until such time as the HASP has been reviewed and accepted by the Engineer. No claim for delay in the progress of work will be honored for failure by the Contractor to submit a HASP which is acceptable to the Engineer.

- B. Prior to initiation of any construction activities in which contact with controlled material is likely, submit a list of personnel expected to be engaged in site activities and certify that said personnel have completed the appropriate training 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.
- C. The Contractor shall submit for review the 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.

Health and Safety Plan (HASP) Provisions:

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. Revisions shall require the review and acceptance by the Engineer prior to the implementation of such changes.

The HASP maintained on-site by the Contractor, shall be kept current with construction activities and site conditions under this contract:

A. Contractor's Responsibility

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.

The Contractor shall be responsible for the health and safety of his employees and subcontractors. The Engineer will have prepared a site safety and health plan which is compatible with the Contractor's plan and will be responsible for the health and safety of all Project Inspectors, including ConnDOT and Consulting Engineers.

If deficiencies in the Contractor's operations are observed by the Engineer, 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.

B. Safety and Health Program

OSHA standard 29 CFR 1910.120(b)/1926.65(b) requires employers to develop and implement a written Safety and Health Program for their employees involved in hazardous waste operations. The HASP shall interface with the employer'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.

- statement of safety and health policy
- site description and contamination characterization
- safety and health risk analysis
- activity hazard analyses
- staff organization, qualifications and responsibilities
- employee training assignments
- personal protective equipment
- medical surveillance program
- exposure monitoring/air sampling program
- heat/cold stress monitoring
- standard operating safety procedures, engineering controls and work practices
- site control measures
- personal hygiene, sanitation, and decontamination
- equipment decontamination
- emergency equipment and first aid requirements
- emergency response plan
- spill containment program
- logs, reports and record keeping
- inspection/audits
- confined space entry procedures

C. Site-Specific Safety and Health Plan Requirements

General Requirements for Preparation and Implementation: The Contractor shall prepare a HASP covering all on-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 Contractor shall be responsible for the development, implementation and oversight of the HASP. 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 requirements and procedures based upon site-specific conditions. 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.

Review of HASP: The HASP shall be submitted to the Engineer within 2 weeks of Notice to Proceed. Prior to submittal, the HASP shall be signed and dated by the Contractor's certified personnel (identified under the Special Requirements subsection) responsible for its preparation. The Engineer will review the Contractor's HASP to determine if it meets the minimum requirements of these Specifications. Non-conformance items identified in the HASP 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 maintain a copy of the written Safety and Health Program and HASP on-site. As work proceeds, the HASP shall be adapted to new situations and new conditions. All changes and modifications to the HASP shall be signed by the Contractor's certified personnel. Should any unforeseen hazard become evident during the performance of the work, the Health and Safety Officer (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 necessary action to re-establish and maintain safe working conditions in order to safeguard on-site personnel, visitors, the public and the environment.

D. 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.

E. Safety and Health Risk 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.

F. Staff Organization, Qualifications and Responsibilities

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: a Team Leader, Scientific Advisor, Site Safety Officer, Public Information Officer, Security Officer, Record Keeper, Financial Officer, Field Team Leader, and Field Team members.

G. 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.

H. 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 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 and maintain all PPE.

I. Medical Surveillance Program

All on-site Contractor personnel engaged in CFR 1920.120/1926.65 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 1920.120/1926.65 operations at the site.

J. 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 Health and Safety Plan. The Contractor's CIH shall specify exposure monitoring/air sampling requirements after a careful review of the contaminants of concern and planned site activities.

K. Heat/Cold Stress Monitoring

The Contractor's CIH shall establish heat/cold stress monitoring program for on-site activities. Details of the monitoring program, including work/rest schedules and physiological monitoring requirements, shall be described in the HASP. All personnel shall be trained to recognize the symptoms of heat and cold stress and related ailments. The Contractor shall designate, in writing, the SSO and alternate persons to be responsible for the heat/cold stress monitoring program.

L. Standard Operating Procedures.

The Contractor shall outline SOPs for preventing accidents and protecting personnel from injury and occupational illness for all operations having a significant accident potential. The Contractor shall identify engineering controls and safe work practices to be utilized.

M. Site and Control Layout

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). **No person shall be allowed entry into the exclusion zone or contamination reduction zone unless they meet the requirements set forth in these specifications.**

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

N. 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.

O. 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 with certified first aid/CPR training on-site at all times during site operations.

P. Emergency Response Plan and Spill Containment Program

The Contractor shall establish procedures 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.

Q. 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 in duplicate by the Contractor.

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.

Worker Protection 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:

The Contractor shall be responsible for the implementation of the HASP throughout the performance of the work within the limits of the Areas of Environmental Concern, as indicated in the Contract

Documents, by the Engineer, or by the HASP. In work locations and areas identified as having a potential risk to worker safety and health, the Contractor shall be prepared to immediately implement the appropriate health and safety measures, including but not limited to the use of PPE, and engineering and administrative controls. The Contractor shall be responsible for the Health and Safety of his employees and subcontractors during the progress of the work.

Method of Measurement:

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

1. Upon acceptance of the HASP, the lump sum development cost will be certified for payment.
2. After acceptance of the HASP, the Contractor shall on a monthly basis demonstrate to the Engineer that the HASP has been kept current and is being implemented, at such time the monthly cost will be certified for payment.
3. Any month where the HASP is found not to be current or 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.
4. 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 revise, monitor and follow the HASP. Such costs include providing the services of the HSM and HSO, training, chemical protective clothing (CPC), personal protective equipment (PPE), disposal of PPE and CPC, medical surveillance, decontamination facilities, engineering control, 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 #101107A - CONTAMINATED MATERIALS EXCAVATION

Description:

Work under this Item is intended to provide specific procedural requirements to be followed during the excavation of contaminated materials including, but not limited to soils, ballast and railroad ties from within the Areas of Environmental Concern and on this project. This Specification is intended to supplement the Standard Specifications and Special Provisions including, but not limited to specifications for earth excavation, trench excavation, rock in trench excavation, structure excavation and structure excavation - earth (complete) whenever contaminated materials are encountered and shall include: construction of the waste stockpile area (WSA); loading, transporting and stockpiling materials at the waste stockpile area; and covering, securing, and maintaining the stockpiled materials throughout the duration of the project. All materials excavated from within the Areas of Environmental Concern are to be considered contaminated materials.

Such work is anticipated in conjunction with all excavation operations within the project Areas of Environmental Concern, as shown in the Contract Documents. Soil contamination has been documented to exist within the project limits. Such contamination generally consists of total petroleum hydrocarbons (TPH), polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs) and RCRA metals. Soil and groundwater sampling analytical results are presented in the Task 310 Remedial Management Plan.

Where contaminated soils are excavated, such soil will not be reusable as backfill, unless authorized by the Engineer in writing, and will require special handling, disposal and documentation procedures. Excavated railroad ties shall not be reused as backfill. It is anticipated that the quantity of excavated contaminated materials that will be suitable for on-site reuse will be limited based on documented contaminant levels.

Applicable Standards:

Pertinent provisions of the following listed and other relevant standards shall apply to the work Item, except as they may be modified herein.

- A. Protection of Environment, Title 40, Code of Federal Regulations (CFR)
- B. Transportation, Title 49, Code of Federal Regulations (CFR)
- C. Connecticut Department of Environmental Protection Remediation Standard Regulations, Section 22a-133k-1 through 22a-133k-3.

Materials:

Plastic Sheet: Polyethylene plastic sheeting for underlayment and covering excavated material shall be a thickness of 10 mil and a minimum width of ten (10) feet.

Sand Bags: Sand bags used to secure polyethylene sheeting soil covers shall have a minimum weight of 30 pounds.

Steel Drums: Steel Drums for the purpose of containerizing contaminated personal protective equipment (PPE) shall be DOT shippable 17-H type, unless otherwise mandated by material characterization or applicable regulations.

Sorbent Boom: Shall be eight (8) inch in diameter and ten (10) feet long and possess petrophilic and hydrophilic properties. Sorbent booms shall also have devices, (i.e. clips, clasps, etc.), for connection to additional lengths of boom.

Plastic Tarpaulin: Polyethylene plastic tarpaulin shall be constructed of woven material, be waterproof and rip and tear resistant.

Construction Blocks: Construction blocks shall be solid precast rectangular concrete blocks 72 inches in length, 36 inches in height, and 24 inches in depth.

Construction Methods:

A. General

When contaminated materials are encountered during the course of the work, health and safety provisions shall conform to Items in pertinent articles of the Contract Documents. Provisions may include the use of chemical protective clothing, personal protective equipment, implementation of engineering controls, air and personal monitoring, and decontamination procedures.

Unless otherwise directed by the Engineer, materials removed from various excavations within Areas of Environmental Concern shall be transported directly from their point of origin on the project site to the WSA. The excavated contaminated materials shall be placed on and covered with polyethylene sheeting as shown on the Contract Drawings. Bins constructed of concrete construction blocks or other similar material shall be erected on the WSA for the purpose of segregating contaminated materials excavated from different locales within the Areas of Environmental Concern. Excavated railroad ties shall be segregated from other excavated materials within the WSA. The Engineer will sample the stockpiled contaminated materials, including the soils and railroad ties for waste characterization determinations for re-use or disposal, to meet the requirements of the treatment/recycling/disposal facilities submitted by the Contractor for the Engineer review. The Contractor is hereby notified that laboratory turnaround time is expected to be fourteen (14) working days. **No delay will be considered based upon the Contractor's failure to accommodate the laboratory turnaround time as identified above.**

B. Transportation and Stockpiling

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

- Transport vehicles must be free from leaks and discharge openings must be securely closed during transportation.

- Transported soils are to be covered prior to leaving the point of generation and are to remain covered until the arrival at the WSA;
- All vehicles departing the site are properly logged to show the vehicle identification, driver's name, time of departure, destination, and approximate volume and content of materials carried;
- No material shall leave the site until there is adequate lay down area prepared in the WSA; and,
- Documentation must be maintained indicating that all applicable laws have been satisfied and that the materials have been successfully transported and received at the WSA.

The WSA shall be constructed at the location directed by the Engineer, as specified herein, and as shown on the Contract Drawings.

Construction of the WSA shall be completed prior to the initiation of construction activities generating Contaminated 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 activities.

The proposed location of the waste stockpile area shall be cleared of any debris, vegetation and objectionable materials which may result in damage to the polyethylene sheeting underlayment prior to stockpiling excavated contaminated materials.

All excavated contaminated materials shall be underlain by plastic polyethylene sheeting to ensure that seepage of material or water from the designated WSA is prevented. Measures shall be implemented to divert rainfall away from the waste stockpile area.

Each stockpile, when not in active use, shall be securely covered with plastic polyethylene sheeting of sufficient size to prevent the generation of dust and infiltration of precipitation. The plastic sheeting shall be secured with sandbags to prevent wind erosion.

Placement of sorbent boom along the perimeter of the waste pile shall be conducted only when soil is saturated with petroleum product.

Excavated materials shall be staged in waste stockpiles not exceeding 100 cubic yards.

Disposable chemical protective clothing (CPC) and personal protective equipment (PPE), i.e.; disposable coveralls, gloves, etc., which come in direct contact with contaminated or potentially contaminated material shall be placed into new or reconditioned 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 waste stockpile area until the material is disposed.

C. Waste Stockpile Area Maintenance

The Contractor shall provide all necessary materials, equipment, tools and labor incidental thereto for activities anticipated to occur within the waste stockpile area. Such activities include, but are not limited to, handling and management of stockpiled waste and drummed CPC/PPE, loading contaminated soil

onto transport vehicles for on-site reuse or off-site disposal, uncovering and recovering waste stockpiles, maintenance of waste stockpile area, replacement of damaged components (i.e. sand bags, plastic polyethylene sheeting, etc.) and waste inventory record management. The Contractor shall manage all soils handled in the waste stockpile area to minimize tracking of potential contaminated materials across the site and off-site, and minimize dust generation. Dust minimization techniques may include the use of fine water sprays and covering of high traffic areas.

Each stockpile shall be securely covered when not in active use with a plastic sheet of sufficient size to prevent generation of dust and infiltration of precipitation. The plastic sheet shall be secured with sandbags to prevent wind erosion.

The staged stockpiles shall be inspected daily by the Contractor to ensure that the cover and containment have not been damaged and that there is no apparent leakage from the pile. If the plastic cover has been damaged, or there is evidence of leakage from the piles, the Contractor shall replace the cover or containment as needed to prevent the release of materials to the environment from the piles.

Drummed waste CPC/PPE shall be staged in an area away from equipment traffic to prevent damage to drums. Stacking of drums is not allowed.

An inventory of stockpiled waste materials and drummed CPC/PPE shall be conducted on a daily basis. Inventory records shall indicate the approximate volume of waste material/drums stockpiled per day, the approximate volume of waste material/drums stockpiled to date, waste material/drums loaded and transported off-site for disposal, any materials loaded and transported for off-site reuse, and identification of waste stockpiles relative to their points of generation.

Following the removal of all stockpiled contaminated material, soil residue shall be removed from all surfaces of the WSA as directed by the Engineer. This operation shall be accomplished using dry methods such as shovels, brooms, mechanical sweepers, or a combination thereof. Residue shall be disposed of as Contaminated Materials.

Following removal of all residual Contaminated Materials, the Contractor shall dismantle the WSA. 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 Standard Specifications and all applicable Federal, State, and local regulations.

D. Dewatering

Dewatering activities shall conform to Items in pertinent articles of the Standard Specification and Special Provisions.

Method of Measurement:

The work of Contaminated Material Excavation will be measured for payment by the number of cubic yards of material excavated within the project payment limits and taken to the waste stockpile area. Payment limits shall conform to Items in pertinent articles of the Standard Specifications and Provisions.

Basis of Payment:

This work shall be paid for at the Contract unit price per cubic yard for “CONTAMINATED MATERIAL EXCAVATION”, which price shall be in addition to the Contract unit price for STRUCTURE EXCAVATION, TRENCH EXCAVATION, EARTH EXCAVATION, and ROCK (CONCRETE) EXCAVATION. The unit price shall include: constructing a suitable waste stockpile areas in the locations designated on the Contract plans; loading, transporting and stockpiling materials at the WSA including railroad ties; covering, securing and maintaining the WSA throughout the duration of the project; and dismantling of the WSA upon project completion.

Disposal of contaminated materials, railroad ties and handling and disposal of contaminated groundwater will be paid for under separate Contract Items.

<u>Pay Item</u>	<u>Pay Unit</u>
Contaminated Materials Excavation	C.Y.

ITEM NO. 101130A - ENVIRONMENTAL WORK - SOLIDIFICATION

Description:

Under this Item, the Contractor shall be responsible for the solidification of controlled materials containing free draining liquids, which may be necessary during the performance of work operations prior to off-site disposal. Controlled materials which have been transported to the Waste Stockpile Area (WSA) shall be dewatered prior to the addition of solidification material. If dewatering procedures shall hinder the use of the WSA and construction operations, solidification of the materials shall be performed without delay and as directed by the Engineer.

The Contractor shall submit within seven (7) days from award of Contract, for the Engineer's review, a detailed methodology and plan of operation for the solidification of materials.

Materials:

The materials used for solidification shall be a naturally occurring material such as diatomaceous earth (Speedy Dry® or Ultrasorb 248®) or other material as approved by the Engineer. Said material shall be in a dry state prior to use in solidification operations. No polymers or other synthetic materials shall be allowed.

Construction Methods:

The Contractor shall submit, for the Engineer's review, a detailed methodology and plan of operation for the solidification of controlled materials including a schematic sketch of the proposed operations and a detailed description of equipment and materials. The Contractor shall also include his planned methods to remove or drain away free water prior to the addition of any solidification materials to controlled materials. The methodology shall completely describe the Contractor's proposed plan for removal of free liquids (as determined by ASTM) from the excavated materials. Should solidification fail to eliminate free liquids as proposed, the Contractor will be required to revise the solidification plan at no additional cost to the State.

Upon visual examination, if controlled materials have free liquids present, the Contractor may, with concurrence of the Engineer, add dry materials to absorb free standing liquids, utilizing a methodology accepted by the Engineer. The Contractor shall dewater contaminated materials prior to the addition of solidification materials to the acceptance of the Engineer. All dewatering fluids shall be conveyed to the groundwater treatment facility. Solidification procedures shall be subject to monitoring by the Engineer.

The maximum quantity of solidification material that may be used by the Contractor shall be limited to twenty (20) percent, by volume, of the material being solidified. Should this procedure be demonstrated as not effective in the elimination of the presence of free standing liquids, alternative methods for the solidification of the material shall be employed. If alternative methods of

solidification are required, the Contractor shall submit the additional costs and proposed alternative to the Engineer for review. No alternative methods of solidification shall be initiated until reviewed and accepted by the Engineer.

Method of Measurement:

This work shall be measured for payment as the actual weight, in tons, of solidification material used by the Contractor. The Contractor shall demonstrate the amount of solidification material used by the original weight tickets from a certified scale. The weight tickets shall show the weight of the material brought to the site and subsequently used in solidification operations.

Basis of Payment:

This work shall be paid for at the Contract unit price per ton for "ENVIRONMENTAL WORK - SOLIDIFICATION" used and accepted by the Engineer. Such price shall include all work, labor, materials, tools, and equipment incidental to the work including transportation of the materials to the project site and the addition of solidification material to excavated materials.

Pay Item

Pay Unit

Environmental Work - Solidification

Ton

ITEM NO. 0101133A - DISPOSAL OF CONTAMINATED RAILROAD TIES

Description:

Work under this Item shall consist of the loading, transportation and final off-site disposal/recycling/treatment of contaminated railroad ties (excluding concrete), hereinafter also called "controlled railroad ties", which have been generated from various excavations within the Areas of Environmental Concern.

Contaminated railroad ties are those excavated from Areas of Environmental Concern or Hazardous Areas of Environmental Concern, that analytically are proven to contain regulated chemical compounds consisting of non-hazardous leachable concentrations of petroleum hydrocarbons, creosols volatile organic compounds, polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and RCRA metals above regulatory criteria levels. Such railroad ties, after proper characterization by the Engineer, shall be taken from the waste stockpile area, loaded, transported to and treated/recycled/disposed of at a permitted treatment/recycle/disposal facility.

The Contractor must utilize one of the following ConnDOT approved treatment/recycle/disposal facilities for the disposal of non-hazardous controlled railroad ties.

Aroostook & Bangor Resources, Inc. P.O. Box 229 Mattawamkeag, ME 04459 (207)736-3011; Marc	Clean Harbors of Connecticut 51 Broderick Road Bristol, CT 06010 (203)224-7600; John Mullen
Chemical Waste Management of NY 1550 Balmer Road Model City, NY 14107 (716)753-8231; Gigi	Logano Transportation P.O. Box 186 Portland, CT 06480 (800)272-3867; Billy
Clean Harbors Environmental Service 37 Rumery Road South Portland, ME 04106 (207)883-3325; Doug Gleason	American Waste Services One American Way Warren, OH 44484 (330)856-8800; Ray Veronneau

The apparent low bidder shall submit in writing, within fourteen days after Bid opening, (1) the name of the treatment/recycle/disposal facility which the bidder, if it is awarded the Contract, will use to receive controlled railroad ties from this project, and (2) the information specified under the heading "Submittals" within this Specification. Any other Contractor which the Department may subsequently designate as the apparent lowest bidder shall make the aforementioned submissions

within fourteen (14) days from the date on which the Department notifies the Contractor that it has become the apparent lowest bidder. If, however, the Department deems it is necessary for such a subsequent-designated Contractor to make said submissions within a shorter period of time, the Contractor shall make those submissions within the time designated by the Department.

No facility may be substituted for the one designated in the Contractor's submittal unless the Department deems that the selected facility is not available to receive the project materials at the time of project construction. In the latter case, the Department will supply the Contractor with the name(s) of other acceptable treatment/recycle/disposal facilities.

Submittals:

The apparent low bidder (or any subsequently-designated apparent low bidder) shall submit in writing the name of the treatment/recycling/disposal facility which the Contractor intends to utilize to receive controlled railroad ties as specified under this Item. Along with the name of its chosen treatment/recycling/disposal facility, the Contractor shall submit a letter from an authorized representative of each said facility, which letter shall include a statement of the facility's intent to accept from the Contractor specified controlled railroad ties:

- a. In quantities set forth in the Contract Documents;
- b. At the unit price and unit of measure stated in numerical values (utilized by the treatment/recycling/disposal facility) which will not change for the duration of this Contract; and,
- c. A copy of the facility acceptance criteria and facility sampling frequency requirements.

Said intent will be subject to and dependent upon the facility's subsequent evaluation of waste characterization determination documentation to be provided to the Contractor by the Engineer.

Failure to comply with all of the above requirements may result in the rejection of the bid.

It is suggested, though not required, that the apparent low bidder submit the above referenced documentation identifying the proposed treatment/recycling/disposal facility as far in advance of the deadlines for these submissions as possible. This would allow time, prior to the deadline, for possible comment by the Department and possible correction by the bidder of any waivable technical defects in said documentation. It must be understood, however, that the Department does not hereby take on any obligation to waive such defects or give the bidder early notice of such defects.

Materials: None

Construction Methods:

A. Contaminated Railroad Tie Disposal

The Engineer shall sample railroad ties stored at the waste stockpile area at a frequency established by the selected treatment/recycling/disposal facility. Samples shall be submitted to a Connecticut Department of Public Health certified laboratory for final waste characterization determination. The Contractor is hereby notified that laboratory turnaround time is expected to be fourteen (14) working days. Upon receipt, the Engineer will make available to the Contractor the results of the final waste characterization determinations and will assist in the coordination with the treatment/recycling/disposal facility for acceptance. **No delay will be considered based upon the facility failing to meet the Contractor's production schedule or based upon the Contractor's failure to accommodate the laboratory turnaround time as identified above.**

Upon receipt of the final approval from the facility, the Contractor shall forward a copy of the approval to the Engineer and the Contractor shall arrange for the loading, transport and treatment/recycling/disposal of the controlled railroad ties in accordance with all Federal and State regulations.

All manifests or bills of lading utilized to accompany the transportation of the controlled railroad ties shall be prepared by the Contractor and signed by an authorized ConnDOT 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 site.

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

B. Contaminated Railroad Ties 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 railroad ties off-site:

Transported controlled railroad ties are to be covered 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 controlled railroad ties being transported has agreed to accept the type and quantity of waste; and,

Documentation must be maintained indicating that all applicable laws have been satisfied and that the materials have been successfully transported and received at the treatment/recycling/disposal facility.

C. Equipment Decontamination

The Contractor shall be responsible for decontamination of excavation equipment, hand tools and other items which come into contact with contaminated materials as a result of executing work under this Item at the site prior to off-site mobilization. The decontamination procedure shall include as a minimum:

- Removal of heavy particulate via scrub with a stiff brush or power washer;
- Scrub with a stiff brush with a phosphate-free, industrial grade detergent solution such as Alconox or Sparkleen; and,
- Rinse with clean water.

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

Method of Measurement:

The work of " DISPOSAL OF CONTAMINATED RAILROAD TIES" 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 permanent scales at the treatment/recycling/disposal facility. Total weight will be the summation of weigh bills issued by the facility specific to this project.

The disposal of railroad ties, originally anticipated to be controlled railroad ties, but determined by characterization sampling not to contain concentrations of regulated chemicals (i.e. non-contaminated materials) will not be measured for payment under this Item but will be considered as

surplus bulky waste and shall be handled in accordance with applicable provisions of the Standard Specifications.

The collection and disposal of materials and liquids generated during equipment decontamination activities will not be measured for separate payment.

Basis of Payment:

This work shall be paid for at the Contract unit price per ton, for "DISPOSAL OF CONTAMINATED RAILROAD TIES" which price shall include the loading and transportation of controlled railroad ties from the waste stockpile area to the treatment/recycling/disposal facility and the treatment/recycling/ disposal of controlled railroad ties; the preparation of manifests and fees paid; and all equipment, materials, tools, and labor incidental to loading, transporting, and treating/recycling/disposal of controlled railroad ties.

No separate payment shall be made for the disposal of materials not found to be controlled railroad ties based upon characterization sampling results. The cost of such disposal shall be considered as incidental work to structure excavation, bulky waste disposal, earth excavation, rock (concrete) excavation, and trench excavation materials.

No separate payment shall be made for the disposal of wastes generated in conjunction with equipment decontamination. The cost of such disposal shall be considered as incidental to the work of "DISPOSAL OF CONTAMINATED RAILROAD TIES".

<u>Pay Item</u>	<u>Pay Unit</u>
Disposal of Contaminated Railroad Ties	Ton

ITEM #202003A - EARTH EXCAVATION

Section 2.02 is supplemented and amended as follows:

Articles 2.02.01 – Description:

Add the following:

Included in this item is the dewatering and handling contaminated water from the excavation and conveyance to the temporary groundwater treatment system.

All excavated material within the limits of environmental concern shall be considered a Controlled Material and transported to the waste stockpile area. See “Controlled Material Excavation”, “Disposal of Controlled Materials”, and “Management of Re-Usable Controlled Materials” Specifications.

The Contractor shall be aware that there are designated archaeological sites within the yard. Excavations shall follow the requirements of Article 1.10.06 of the Standard Specification Form 814A.

Roadway excavation shall include removal of material to the limits required for the placement of lightweight fill.

Article 2.02.04 – Method of Measurement:

Add the following:

Excavations beyond the payment limits will be considered “Unauthorized Excavation” and will not be paid for. Any soil generated by unauthorized excavations will be stockpiled separately and the Contractor shall assume the additional costs of environmental testing, stockpiling, off-site disposal of controlled and/or clean soils, and placement and compaction of suitable backfill.

Article 2.02.05 – Basis of Payment:

Add the following:

The disposal of materials excavated under this item determined to be non-contaminated shall be included in the Earth Excavation item.

The cost for handling and disposal of contaminated excavated material will not be paid for under this Section, but will be paid for under the items, “Controlled Material Excavation”, “Disposal of Controlled Materials”. The transport and placement of suitable reusable controlled materials will not be paid under this Section, but will be paid for under the item “Management of Re-Usable Controlled Material”.

Removal of material for the placement of lightweight fill shall be paid for at the contract unit price per cubic yard for “Earth Excavation.”

ITEM NO. 202315A - DISPOSAL OF CONTROLLED MATERIALS

Description:

Work under this Item shall consist of the loading, transportation and final off-site disposal/recycling/treatment of contaminated materials (excluding dewatering fluids, railroad ties and bulky waste), hereinafter also called "controlled materials", which have been generated from various excavations within the Areas of Environmental Concern and determined to be contaminated at non-hazardous levels. Materials excavated from Areas of Environmental Concern are soils containing regulated chemical compounds consisting of non-hazardous concentrations of petroleum hydrocarbons (TPH), polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs) and RCRA metals. Such materials, after proper characterization by the Engineer, shall be taken from the waste stockpile area, loaded, transported to and treated/recycled/disposed of at a permitted treatment/recycle/disposal facility listed herein.

The Contractor must utilize one of the following ConnDOT approved treatment/recycle/disposal facilities for the disposal of non-hazardous waste soil:

Phoenix Soil LLC P.O. Box 1750 Waterbury, CT 06721 (800) 586-4774	Waste Management of New Hampshire P.O. Box 27065 97 Rochester Neck Road Gonic, NH 03839 (603) 330-0217
ESMI of New York 304 Towpath Road Fort Edward, New York 12828 (800) 511-3764	ESMI of New Hampshire 67 International Drive Loudon, New Hampshire 03301 (800) 950-7645

The apparent low bidder shall submit in writing, within fourteen days after Bid opening, (1) the name of the treatment/recycle/disposal facilities (from the above lists) which the bidder, if it is awarded the Contract, will use to receive controlled material from this project, and (2) the information specified under the heading "Submittals" within this Specification. Any other Contractor which the Department may subsequently designate as the apparent lowest bidder shall make the aforementioned submissions within fourteen (14) days from the date on which the Department notifies the Contractor that it has become the apparent lowest bidder. If, however, the Department deems it is necessary for such a subsequent-designated Contractor to make said submissions within a shorter period of time, the Contractor shall make those submissions within the time designated by the Department.

No facility may be substituted for the one designated in the Contractor's submittal unless the

Department deems that the selected facility is not available to receive the project materials at the time of project construction. In the latter case, the Department will supply the Contractor with the name(s) of other acceptable treatment/recycle/disposal facilities.

Submittals:

The apparent low bidder (or any subsequently-designated apparent low bidder) shall submit in writing the name of the treatment/recycling/disposal facility which the Contractor intends to utilize to receive controlled materials as specified under this Item. Along with the name of its chosen treatment/recycling/disposal facility, the Contractor shall submit a letter from an authorized representative of each said facility, which letter shall include a statement of the facility 's intent to accept from the Contractor specified controlled materials:

- a. In quantities set forth in the Contract Documents;
- b. At the unit price and unit of measure stated in numerical values (utilized by the treatment/recycling/disposal facility) which will not change for the duration of this Contract; and,
- c. A copy of the facility acceptance criteria and facility sampling frequency requirements.

Said intent will be subject to and dependent upon the facility 's subsequent evaluation of waste characterization determination documentation to be provided to the Contractor by the Engineer.

Failure to comply with all of the above requirements may result in the rejection of the bid.

It is suggested, though not required, that the apparent low bidder submit the above referenced documentation identifying the proposed treatment/recycling/disposal facility as far in advance of the deadlines for these submissions as possible. This would allow time, prior to the deadline, for possible comment by the Department and possible correction by the bidder of any waivable technical defects in said documentation. It must be understood, however, that the Department does not hereby take on any obligation to waive such defects or give the bidder early notice of such defects.

Materials: None

Construction Methods:

A. Material Disposal

The Engineer shall sample materials stored at the waste stockpile area at a frequency established by the selected treatment/recycling/disposal facility. Samples shall be submitted to a Connecticut Department of Public Health certified laboratory for final waste characterization determination. The

Contractor is hereby notified that laboratory turnaround time is expected to be fourteen (14) working days. Upon receipt, the Engineer will make available to the Contractor the results of the final waste characterization determinations and will assist in the coordination with the treatment/recycling/disposal facility for acceptance. **No delay will be considered based upon the facility failing to meet the Contractor's production schedule or based upon the Contractor's failure to accommodate the laboratory turnaround time as identified above.**

Upon receipt of the final approval from the facility, the Contractor shall forward a copy of the approval to the Engineer and the Contractor shall arrange for the loading, transport and treatment/recycling/disposal of the materials in accordance with all Federal and State regulations.

All manifests or bills of lading utilized to accompany the transportation of the waste material shall be prepared by the Contractor and signed by an authorized ConnDOT 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 site.

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

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 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; and,
- Documentation must be maintained indicating that all applicable laws have been satisfied and that the materials have been successfully transported and received at the treatment/recycling/disposal facility.

C. Equipment Decontamination

The Contractor shall be responsible for decontamination of excavation equipment, hand tools and other items which come into contact with contaminated materials as a result of executing work under this Item at the site prior to off-site mobilization. The decontamination procedure shall include as a minimum:

- Removal of heavy particulates via scrub with a stiff brush or power washer;
- Scrub with a stiff brush with a phosphate-free, industrial grade detergent solution such as Alconox or Sparkleen; and,
- Rinse with clean water.

The Contractor shall be responsible for the collection and treatment/recycling/disposal of all liquid and solid wastes generated by 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 permanent scales at the treatment/recycling/disposal facility. Total weight will be the summation of weigh bills issued by the facility specific to this project.

The disposal of excavated materials, originally anticipated to be controlled materials, but determined by characterization sampling not to contain concentrations of regulated chemicals (i.e. non-contaminated materials) will not be measured for payment under this Item but will be considered as surplus excavated materials and shall be handled in accordance with applicable provisions of the Standard Specifications.

The collection and disposal of materials and liquids generated during equipment decontamination activities will not be measured for separate payment.

Basis of Payment:

This work shall be paid for at the Contract unit price per ton, for "DISPOSAL OF CONTROLLED MATERIALS" which price shall include the loading and transportation of controlled materials excluding railroad ties from the waste stockpile area to the treatment/recycling/disposal facility and the treatment/recycling/ disposal of controlled materials; the preparation of manifests and fees paid; and all equipment, materials, tools, and labor incidental to loading, transporting, and treating/recycling/disposal of materials.

No separate payment shall be made for the disposal of materials not found to be controlled materials based upon characterization sampling results. The cost of such disposal shall be considered as incidental work to structure excavation, earth excavation, rock (concrete) excavation, and trench excavation materials.

No separate payment shall be made for the disposal of wastes generated in conjunction with equipment decontamination. The cost of such disposal shall be considered as incidental to the work of "DISPOSAL OF CONTROLLED MATERIALS".

<u>Pav Item</u>	<u>Pav Unit</u>
Disposal of Controlled Materials	Ton

ITEM NO. 202318A MANAGEMENT OF REUSABLE CONTROLLED MATERIAL

Description

Work under this Section shall include all materials, equipment, tools and labor required to load, transport and place material which has been determined reusable from the waste stockpile area to the re-use staging area or re-fill areas located within the project limits. In addition, this item also includes loading, transporting and placement of material determined reusable from the re-use staging area to re-fill areas located within the project limits.

“Reusable controlled material” is defined as soil which, based on analytical characterization, contains contaminant concentrations in excess of the applicable analytical detection limits, but below the CTDEP Industrial and Commercial Direct Exposure and “GB” Pollutant Mobility criteria, and does not exhibit characteristics of a hazardous waste.

Fill area locations shall be such that, when placed, the material will be located above the groundwater table, as defined by the CTDEP Remediation Site Regulations (RSR) Section 22a-133k-1(a) promulgated January, 1996.

In addition, all reusable controlled material placed between Wingwalls 2A and 2B shall meet the requirements of Form 814 Section 2.02.03, Roadway Excavation, Formation of Embankment and Disposal of Surplus Material, with the additional requirements that the material shall have an organic content of <1%, a plasticity index (PI) of <6 and that the moisture content shall be adjusted so that it is <3% greater than optimum.

Materials - Not Applicable

Construction Methods

Controlled material stored within the waste stockpile areas which is determined to be reusable following analytical testing and as directed by the Engineer shall be loaded, transported and placed at the refill areas located within the project limits or shall be loaded, transported and placed at the reuse staging area as shown on the Contract Plans to be stored for later use.

All material stockpiled at the reuse staging area shall be securely covered when not in active use with minimum 10 millimeter thick polyethylene plastic tarpaulins of sufficient size to prevent generation of dust and infiltration of precipitation. A minimum overlap of 3 feet shall be provided when utilizing multiple tarpaulins. The tarpaulins shall be secured with sandbags at all joints and at the bottom of the stockpile to prevent wind erosion.

Excess reusable controlled material for which there is, or will be in the future, no suitable refill location shall be characterized as a controlled material and shall be disposed of in accordance with provisions outlined in Item 0202315A, “Disposal of Controlled Materials.”

The placement of reusable controlled material shall conform to the requirements of RCRA 22a-133k-2 (h) and shall be, under the direction of the Engineer. The contractor shall document the placement of all re-use materials and provide a fill or re-grading plan (with contours at a minimum of two feet).

The placement of reusable controlled material between Wingwalls 2A and 2B shall conform to the requirements of Form 814A Section 2.02.03.

Method of Measurement

The work of “Management of Reusable Controlled Material” shall be measured for payment by the total cubic yards of material loaded and transported from the waste stockpile area and placed at the reuse staging area, loading and transportation of the material from the reuse staging area and placement of the material at the refill areas located within the project limits. The payment for work under this Section does not include the management of material excavated by the Contractor from locations beyond specified excavation limits.

The disposal of excess reusable controlled materials for which there is no suitable refill location within the project limits will not be measured for payment under this Section. Measurement and payment for disposal of this excess material shall be handled under Item 0202315A, “Disposal of Controlled Material”.

The cost of labor, equipment and materials associated with decontamination of soil handling equipment and the collection and disposal/recycling/treatment of liquids and solids generated as a result of such decontamination will not be measured for separate payment.

The cost of labor, equipment and materials associated with documentation of placement of reusable material will not be measured for separate payment.

The cost of labor, equipment and materials associated with conforming to the requirements of Form 814A Section 2.02.03 for all reusable controlled material placed between Wingwalls 2A and 2B will not be measured for separate payment.

The cost of consolidating previously tested individual waste stockpiles that have been deemed reusable will not be measured for separate payment.

Basis of Payment

Work under this Section shall be paid for at the contract unit price per cubic yard for “Management of Reusable Controlled Material” which price shall include all materials, equipment, tools and labor necessary to load and transport reusable controlled materials from the waste stockpile area to the re-use staging area or directly to the re-fill areas located within the project limits, as well as all materials, equipment, tools and labor necessary for loading, transporting and placement of material from the re-use staging area to the re-fill areas located within the project limits.

No separate payment shall be made for the off-site treatment/recycling/disposal of excess reusable controlled material under this Section. The cost of such disposal shall be handled under Item 202315A, "Disposal of Controlled Material".

No separate payment shall be made for the documentation of the placement of reusable material. The cost of documentation of the placement of reusable controlled material shall be considered as incidental to work under this section.

No separate payment shall be made for the decontamination of soil handling equipment or the treatment/recycling/disposal of wastes generated in conjunction with such decontamination or the disposal of personal protection equipment (PPE) and chemical protective clothing. The cost of decontamination and treatment/recycling/disposal shall be considered as incidental to work under this Section.

No separate payment shall be made for conforming to the requirements of Form 814A Section 2.02.03 for all reusable controlled material placed between Wingwalls 2A and 2B.

No separate payment shall be made for consolidating previously tested individual waste stockpiles that have been deemed reusable

<u>Pay Item</u>	<u>Pay Unit</u>
Management of Reusable Controlled Materials	C.Y.

ITEM #202528A - REMOVAL OF RAILROAD TRACKS

Description:

Work under this item shall consist of removing and disposing of existing railroad trackwork, including track rail, ties and all other track work appurtenances; all power and signal materials and supports, including cable, wire, conduit, track connections, rail bonding, cantenary structures and all other associated appurtenances, at locations and within the limits as indicated on the plans, or as directed by the Engineer, which are required to be removed to allow for the proposed substructure construction. Ballast shall be removed under the item "Earth Excavation".

Materials:

The Contractor shall comply with provisions of Codes, Specifications, Standards, and recommended practices of the most recent edition and addenda thereto of:

AREMA Manual: American Railway Engineering and Maintenance of Way Association, Manual for Railway Engineering.

MNRR: Metro-North Railroad

Amtrak: National Railroad Passenger Corporation

Construction Methods:

The Contractor's attention is directed to the fact that the tracks to be removed are now in operation. The Contractor shall remove tracks and any appurtenances, only at such times and under such conditions as has been approved by the Engineer prior to starting such work. The coordination of this work is the complete responsibility of the Contractor.

Rails shall be cut at the limit of removal. Demolition and removal of work shall be carried out in a systematic manner, with the least possible disturbance to existing traffic on adjacent tracks. Trackwork removal shall include all rails, ties, concrete and hardware. Track work to remain that has been damaged due to the Contractor's operations shall be repaired by the Contractor to the satisfaction of Metro-North Railroad and/or Amtrak as required, and the Engineer at no additional cost to the State. Voids created by trackwork removal outside the limits of the proposed temporary sheet piling for the substructure construction shall be backfilled with subbase and surfaced with 6 inches of granular fill.

All cross ties and switch ties to be removed by the Contractor shall be transported to the waste stockpile area for environmental testing by others. Disposal of the tested ties determined to be contaminated shall not be covered under this item but shall be covered under the item "Disposal of Contaminated Railroad Ties". Railroad ties determined not be contaminated shall be disposed under the item "Earth Excavation".

The Contractor shall remove track materials from existing track where shown on Contract Drawings or as directed by the Engineer. These items shall become the Contractor's property and the Contractor shall dispose of these materials, off ConnDOT property at a legal dumpsite.

Method of Measurement:

This item shall be measured for payment by the actual number of linear feet of railroad tracks removed measured along the centerline of tracks, including disposal of all trackwork materials.

Basis of Payment:

This work will be paid for at the contract unit price per linear foot for "Removal of Railroad Tracks", which price shall include removal of track and hardware, disposal of materials, and for all labor, tools equipment and incidentals necessary to complete the work.

Ballast and subballast materials which must be excavated in the vicinity of track removal shall be considered contaminated and shall be paid for under the item "Controlled Material Excavation".

Backfill shall be paid for under the applicable.

Disposal of contaminated railroad ties shall be paid for under the item "Disposal of Contaminated Railroad Ties".

ITEM #202636A – VIBRATING WIRE PIEZOMETERS

Description:

Work under this item shall consist of furnishing, installing, maintaining and protecting from damage vibrating wire piezometers, in accordance with the dimensions and details shown on the plans and in accordance with these specifications.

Quality Assurance

A factory calibration shall be conducted on all instruments prior to shipment. Certification shall be provided to indicate that the test equipment used for this purpose is calibrated and maintained in accordance with the test equipment manufacturer's calibration requirements and that, where applicable, calibrations are traceable to the National Institute of Standards and Technology.

Submittals

Contractor shall submit resumes of geotechnical instrumentation personnel, sufficient to define details of direct site experience, to the Engineer for review.

Contractor shall submit detailed step-by-step procedures for vibrating wire piezometer installation to the Engineer for review.

Contractor shall submit to the Engineer, copy of factory calibration, manufacturer's test equipment certification, and warranty for each portable readout unit furnished.

Contractor shall submit to the Engineer, the as-built instrument location.

Materials:

Provide vibrating wire piezometers, signal cable and readout unit as manufactured by Slope Indicator Co., Seattle, WA or acceptable equivalent.

The vibrating wire piezometers shall be model 52611030 (7 bar) as manufactured by Slope Indicator Co. or acceptable equivalent.

Signal cable shall be model 50613524 as manufactured by Slope Indicator Co. or acceptable equivalent, of sufficient length to extend to the terminal boxes at the readout locations indicated on the plans.

Readout unit shall be Datamate MP, model 57710999, as manufactured by Slope Indicator Co. or acceptable equivalent. Readout unit shall be capable of obtaining both the vibrating wire and thermistor readings. Readout unit shall include a battery charger.

Filter sand shall conform to ASTM C778, 20-30 sand.

Special grout type A shall include uniform sized fine ground or powdered non-drilling mud grade bentonite, for use in sealing and grouting well casings. A polymer based thixotropic additive may be added to the mix if recommended by the manufacturer. Special Grout Type A shall

have a mixed specific gravity, prior to placement within the piezometer borehole, between 1.03 and 1.10.

Construction Methods:

The Contractor shall install the vibrating wire piezometers at the locations and elevations shown on the plans.

Th piezometers shall be installed in borings drilled without the use of bentonite drilling mud.

A split-spoon sample shall be taken at the piezometer elevation and submitted to the Engineer.

Installation procedures shall be such that all steps in the procedure can be quality assured. Volumes of each increment of backfilling with sand and granular bentonite shall be small enough such that no bridging occurs, and the depth to the top of each increment shall be checked after placement.

Prior to insertion of the piezometer in the borehole, the piezometer and cavity between the filter and diaphragm shall be saturated with clean water and a reading shall be taken of the vibrating wire transducer, thermistor and corresponding barometric pressure. Saturation shall be maintained throughout the installation.

After insertion of the piezometer a check shall be made to ensure that the piezometer reading agrees with the water head, and the elevation of the diaphragm shall be recorded.

The depth to the top of the granular bentonite shall be checked.

Install roadway box at ground surface.

After completion of installation a post installation acceptance test shall be performed to verify that the piezometer functions correctly.

After completion of installation, the as-built location in horizontal position shall be determined to an accuracy of ±1 foot, and the elevation of the piezometer diaphragm to an accuracy of ±1 inch.

Method of Measurement:

This work shall be measured for payment by the number of vibrating wire piezometers installed and accepted. This item includes everything necessary to drill, install, read and protect the vibrating wire piezometers.

Basis of Payment:

This work will be paid for at the contract unit price for “Vibrating Wire Piezometers”.

<u>Pay Item</u>	<u>Pay Unit</u>
Vibrating Wire Piezometer	Each

ITEM #203004A - STRUCTURE EXCAVATION - EARTH (COMPLETE)

Article 2.03.01 Description:

Add the following:

Included in this item is the dewatering and handling contaminated water from the excavation and conveyance to the temporary groundwater treatment system.

All excavated material within the limits of environmental concern shall be considered a Controlled Material and transported to the waste stockpile area. See "Controlled Material Excavation", "Disposal of Controlled Materials", and "Management of Re-Usable Controlled Materials" Specifications.

The Contractor shall be aware that there are designated archaeological sites within the yard. Excavations shall follow the requirements of Article 1.10.06 of the Standard Specification Form 814A.

Article 2.03.04 Method of Measurements:

Add the following:

Excavations beyond the payment limits will be considered "Unauthorized Excavation" and will not be paid for. Any soil generated by unauthorized excavations will be stockpiled separately. And the contractor shall assume the additional costs of environmental testing, stockpiling, off-site disposal of controlled and/or clean soils, and placement and compaction of suitable backfill.

Article 2.03.05 Basis of Payment:

Add the following:

The disposal of materials excavated under this item determined to be non-contaminated shall be included in the Structure Excavation-Earth (Complete) item.

The cost for handling and disposal of contaminated excavated material will not be paid for under this Section, but will be paid for under the items, "Controlled Material Excavation", "Disposal of Controlled Materials". The transport and placement of suitable reusable controlled material will not be paid under this Section, but will be paid for under the item "Management of Re-Usable Controlled Material".

ITEM NO. 0204210A - HANDLING CONTAMINATED GROUNDWATER

Description:

Under this item, the Contractor shall be responsible for designing, procuring, installing, operating, maintaining, cleaning and dismantling of a temporary groundwater treatment system to treat contaminated groundwater which will be generated during dewatering operations, as required within the project limits or by the Engineer. The Contractor shall be responsible for securing all necessary State and local permits, including required fees for permitting and discharging. This specification is performance based. It is anticipated that this work will involve specialty services and/or proprietary products.

Submittals:

The Contractor shall be responsible to design, procure and install materials and equipment suitable for the specified service conditions and shall submit a detailed drawing and specifications of the proposed system stamped by a Professional Engineer licensed in the State of Connecticut and shop drawings of all materials and equipment within sixty (60) days of award of contract. The Contractor shall submit working drawings showing the connection of the groundwater treatment system to the existing effluent line. The Contractor shall utilize one of the following specialty contractors:

Earth Technology
86 Leonardo Drive
North Haven, CT 06473
Phone (203) 230-2040

American Environmental Technologies
3 Trowbridge Drive
Bethel, CT 06801
Phone (203) 744-3477

EnviroShield Inc.
P. O. Box 1296
250 Moffitt Street
Stratford, CT 06615
Phone (203) 380-5644

Handex
569 Main Street
Monroe, CT 06468
Phone (203) 261-2673

Consulting Environmental Engineers, Inc.
100 Shield Street
West Hartford, CT 06110
(860) 953-0023

Within twenty (20) calendar days of the award of the contract, the Contractor shall submit to the Engineer written quotes from all five (5) environmental specialty contractors listed above, for the design, procurement, installation, operation, maintenance, and cleaning of the groundwater treatment system for the duration of the project and decontamination, demobilization, and dismantlement of the groundwater treatment system at the completion of the project.

The following information should be included in the submittal:

- Name, address and telephone and fax numbers of the firm
- Qualifications of the firm, including experience in designing, installing, operating, maintaining and cleaning a contaminated groundwater treatment system
- Resumes of key personnel to be assigned to the project
- Installation Fees
- Maintenance Fees
- Operation Fees
- Demobilization and Dismantling Fees

The Engineer will review the proposals submitted and notify the Contractor in writing of the firm(s) acceptance within ten (10) calendar days of receipt of the proposals.

The Engineer shall review the proposed design within three (3) weeks of submittal and shall provide comments as to deficiencies in the design, if any. The Contractor shall be responsible for addressing all deficiencies, including, but not limited to system redesign. The Contractor shall not be allowed to commence work activities within the project limits, as shown on the plans, until such time as the temporary groundwater treatment system design has been reviewed and accepted by the Engineer, installed and is operational. **No claim for delay in the progress of the work will be honored for failure by the Contractor to design a system to meet this performance specification.**

Materials:

Specific to system design. At a minimum the system shall consist of:

- 3-20,000 gallon fractionation tanks;
- Piping, valves, connections, union(s), wiring;
- Meters, sampling ports;
- 2 Submersible Flow Pumps;
- 4 Micron Particulate Filter Bags;
- 2-5,000 lb. Activated Carbon Filters;
- 1 heating system and other appurtenances which comprise the complete functioning system.

Construction Methods:

The groundwater treatment system shall be capable of treating groundwater contaminated with volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), RCRA metals and Total Petroleum Hydrocarbons (TPH) to meet the discharge requirements specified in the Connecticut Department of Environmental Protection (CTDEP), "General Permit for the Discharge of Groundwater Remediation Wastewater to a Sanitary Sewer". All equipment and materials used in the installation shall be resistant to these contaminants and surrounding site conditions. The system shall be capable of treating a maximum of two hundred and fifty (250) gallons per minute (gpm). Discharge from the system shall be connected to the effluent line from the existing groundwater treatment system at the project site.

The Contractor is responsible for the installation of all equipment and connection of the treatment system to the existing effluent line. The Contractor shall submit working drawings showing the connection to the existing effluent line. The Contractor is also responsible for ensuring that the discharge from the installed system for this project does not influence, interfere, or backflow the effluent line to the existing treatment system. The connection structure to the existing effluent line shall be designed and installed in a manner to minimize disruption and impacts to the existing system. **No claim for delay will be considered based upon the Contractor's failure to accommodate the permitting process or discharge requirements identified herein.**

The Contractor shall be responsible for securing all necessary permits, including fees, for treatment and discharge of contaminated groundwater to sanitary sewer.

The Engineer will sample the groundwater treatment system discharge as required by the Discharge Authorization Permit and furnish copies of the analytical results to the Contractor for submittal to the appropriate agencies. The Contractor shall submit copies of the analytical results and monitoring forms to the appropriate agencies and shall be responsible for any modifications to the system to meet the Discharge Authorization requirements.

Known groundwater contaminant concentrations from previous environmental investigations are provided in the attached tables.

The Contractor shall ensure that all personnel involved in the groundwater treatment operations understand the terms of the Discharge Authorization received from the CTDEP. In the event of a conflict between the requirements of this item and the Discharge Authorization, the terms of the Discharge Authorization shall have priority.

Prior to initial effluent discharge into the existing effluent discharge system from any level of treatment within the project limits, the Engineer will sample the treatment system discharge to verify conformance with requirements of the Discharge Authorization.

The Engineer will notify the Contractor as soon as practicable upon knowledge of an exceedance of the pollutant levels established in the Discharge Authorization upon such notification. The Contractor shall be responsible for ceasing the discharge immediately.

If required, the Contractor shall (re) start the discharge in accordance with all necessary approvals from the CTDEP and in full compliance with the Discharge Authorization and any amendments imposed thereto.

Upon completion of operations involving the use of the settling tanks/fractionation tanks or when the tanks reach 90 percent of their sediment capacity, the Engineer will sample silt and sediment collected in the settling tanks or fractionation tanks for waste characterization determination. Disposal of the materials shall be in accordance with Item Number 202315A Disposal of Controlled Materials. The Contractor is hereby notified that laboratory turnaround time is expected to be

fourteen (14) calendar days. **No claim for delay will be considered based upon the Contractor's failure to accommodate the laboratory turnaround time as identified above.**

No claim for delay will be considered based upon the environmental specialty contractor failing to operate, maintain and clean the system to meet the Contractor's production schedule.

During the periods between October 15 to April 15, the Contractor shall take precautions to ensure that the dewatering system is adequately protected against freezing. Freeze protection methods and equipment shall be approved by the Engineer.

The Contractor is responsible for all piping, valves, connections, unions, structures, etc., required to connect the temporary groundwater treatment system to the existing effluent line. The Contractor is also responsible for the closure and maintenance of the valve at the effluent line junction to prevent backflow of discharge waters to this system or to other existing system(s) utilizing the main effluent discharge pipe.

Method of Measurement:

Handling Contaminated Groundwater shall be paid for in accordance with Article 1.04.05 - Extra Work for the specialty contractor to design, procure, install, operate, maintain, clean and dismantle the contaminated groundwater treatment system, including obtaining all necessary permits and fees and electrical service for the system. This shall include all equipment, materials, appurtenances, tools, labor, and work incidental to completion of this item.

Furnishing and utilizing pumps and incidental conveyances of dewatering fluids to the treatment system will not be measured for payment under this item, as this equipment and labor associated with it are incidental to excavation items: earth excavation (Item No. 0202003A); trench excavation (Item Nos. 0205001, 0205003 & 0205005); rock in trench excavation (Item No. 0205004); structure excavation (Item No. xxxxxx); and structure excavation - earth [complete] (Item No. 203).

The collection and disposal of materials and liquids generated during maintenance of contractor owned equipment, including decontamination activities, will not be measured for separate payment.

Basis of Payment:

The Basis of Payment for "Handling Contaminated Groundwater" will include the services of a specialty contractor to design, procure, install, operate, maintain, clean and dismantle the contaminated groundwater treatment system, including obtaining all required permits and approvals, including fees for permitting and discharging. "Handling Contaminated Groundwater" shall be paid for in accordance with Article 1.04.05 - Extra Work.

ITEM

Handling Contaminated Groundwater

PAY UNIT

Estimate

Table 6
Results of Groundwater Sample Analyses

Analyte	Sample Location:	WPB7	WPB12	CTDEP Regulatory Criteria		
				SWPC	Residential Vol. Criteria	I/C Vol. Criteria
Total Petroleum Hydrocarbons (mg/l)		74.6	0.99	NE	NE	NE
Polychlorinated Biphenyls (PCBs) (µg/l)		ND (<0.10)	ND (<0.10)	0.5	NE	NE
Pesticides/Herbicides		ND	ND	Varies		
Volatile Organic Compounds (VOCs) (µg/l)	n-Butylbenzene	2.1	ND (<0.7)	NE	NE	NE
	sec-Butylbenzene	2.2	ND (<0.6)	NE	NE	NE
	tert-Butylbenzene	1.0	ND (<0.8)	NE	NE	NE
	Isopropylbenzene	5.6	ND (<0.6)	NE	NE	NE
	n-Propylbenzene	7.9	ND (<0.8)	NE	NE	NE
	1,1-Dichloroethane	ND (<0.7)	2.2	2,970	34,600	50,000
	cis-1,2-Dichloroethylene	ND (<0.5)	2.2	NE	NE	NE
	Vinyl Chloride	ND (<0.3)	2.8	15,750	2	2
	o & p-Xylene	0.7	ND (<0.5)	NE	21,300	50,000
Semivolatile Organic Compounds (µg/l)	2-Methylnaphthalene	BDL (<50.0)	ND (<10.0)	NE	NE	NE
Total RCRA Metals (mg/l)	Arsenic	0.67	3.72	0.004	---	---
	Barium	6.07	30.0	NE	---	---
	Cadmium	0.0352	0.0612	0.006	---	---
	Chromium	2.00	3.50	1.31 ⁽¹⁾	---	---
	Lead	9.06	162	0.013	---	---
	Mercury	0.13	1.3	0.0004	---	---
	Selenium	ND (<0.25)	ND (<1.25)	0.05	---	---
	Silver	ND (<0.025)	ND (<0.125)	0.012	---	---
Dissolved RCRA Metals (mg/l)	Arsenic	ND (<0.02)	ND (<0.02)	0.004	---	---
	Barium	0.0462	0.272	NE	---	---
	Cadmium	ND (<0.0002)	ND (<0.0002)	0.006	---	---
	Chromium	ND (<0.002)	ND (<0.002)	1.31 ⁽¹⁾	---	---
	Lead	ND (<0.01)	ND (<0.01)	0.013	---	---
	Mercury	ND (<0.00004)	ND (<0.00004)	0.0004	---	---
	Selenium	ND (<0.02)	ND (<0.02)	0.05	---	---
	Silver	ND (<0.0025)	ND (<0.0025)	0.012	---	---

Notes: ND = Not detected
BDL = Below detection limits
NE = Not established

⁽¹⁾ = Combined trivalent and hexavalent chromium

ITEM 0204210A

Table 8				
MU Storage Yard Task 210 Results of Groundwater Sample Analyses				
<i>Sample Location:</i>	GP-10	CTDEP Criteria		
<i>Sample Type:</i>	Grab	SWP	RES Vol.	I/C Vol.
Total Petroleum Hydrocarbons (TPH) EPA Method 418.1 - mg/L				
Total Petroleum Hydrocarbons	0.77	NE	NE	NE
RCRA 8 Metals - mg/L				
Arsenic	ND (0.02)	4	NE	NE
Barium	0.209	NE	NE	NE
Cadmium	ND (0.0002)	6	NE	NE
Chromium	0.006	1,200	NE	NE
Lead	0.004	13	NE	NE
Mercury	ND (0.00004)	0.4	NE	NE
Selenium	ND (0.02)	50	NE	NE
Silver	ND (0.002)	12	NE	NE
Dissolved RCRA 8 Metals - mg/L				
Arsenic	ND (0.02)	4	NE	NE
Barium	0.0892	NE	NE	NE
Cadmium	ND (0.0002)	6	NE	NE
Chromium	ND (0.002)	1,200	NE	NE
Lead	0.0006	13	NE	NE
Mercury	ND (0.00004)	0.4	NE	NE
Selenium	ND (0.02)	50	NE	NE
Silver	ND (0.002)	12	NE	NE
Volatile Organic Compounds (VOCs) EPA Method 8260 - ug/L				
MTBE	2.3	NE	50,000	50,000
Remaining Parameters	ND (0.5/50)	Varies	Varies	Varies
Polychlorinated Biphenyls (PCBs) EPA Method 8080 - ug/L				
PCBs	ND (0.05)	0.5	NE	NE
Polynuclear Aromatic Hydrocarbons (PAHs) EPA Method 8270 - mg/kg				
All Parameters	ND (0.03/30)	Varies	NE	NE

Notes: ND = Not detected
 BDL = Below detection limit
 NE = None Established by DEP

ITEM #205001A - TRENCH EXCAVATION - 0-4' DEEP
ITEM #205003A - TRENCH EXCAVATION - 0-10' DEEP
ITEM #205005A - TRENCH EXCAVATION - 0-15' DEEP

Article 2.05.01 Description:

Add the following:

Included in this item is the dewatering and handling contaminated water from the excavation and conveyance to the temporary groundwater treatment system.

All excavated material within the limits of environmental concern shall be considered a Controlled Material and transported to the waste stockpile area. See "Contaminated Material Excavation", "Disposal of Controlled Materials", and "Management of Re-Usable Controlled Materials" Specifications.

The Contractor shall be aware that there are designated archaeological sites within the yard. Excavations shall follow the requirements of Article 1.10.06 of the Standard Specification Form 814A.

Article 2.05.04 Method of Measurements:

Add the following:

Excavations beyond the payment limits will be considered "Unauthorized Excavation" and will not be paid for. Any soil generated by unauthorized excavations will be stockpiled separately. And the contractor shall assume the additional costs of environmental testing, stockpiling, off-site disposal of controlled and/or clean soils, and placement and compaction of suitable backfill.

Article 2.05.05 Basis of Payment:

Add the following:

The disposal of materials excavated under this item determined to be non-contaminated shall be included in the Structure Excavation-Earth (Complete) item.

The cost for handling and disposal of contaminated excavated material will not be paid for under this Section, but will be paid for under the items, "Contaminated Material Excavation", "Disposal of Controlled Materials". The transport and placement of suitable reusable controlled material will not be paid under this Section, but will be paid for under the item "Management of Re-Usable Controlled Material".

ITEM #207150A - LIGHTWEIGHT FILL

Description:

Work under this item shall consist of the furnishing and placement of lightweight fill in the formation of embankments. This work shall be performed as hereinafter specified, to the dimensions indicated on the plans, or as directed by the engineer.

Materials:

Lightweight fill shall be a rotary kiln expanded shale aggregate meeting the requirements of ASTM C 330. The aggregate shall consist of tough, durable, non-corrosive particles with the following gradation:

<u>Square Mesh Sieves</u>	<u>Percent Passing By Weight</u>
1 inch	100
¾ inch	80-100
3/8 inch	10-50
No. 4	0-15

The dry loose unit weight shall be less than 50 pcf. The lightweight aggregate supplier shall submit verification of a compacted density (AASHTO T99) of less than 60 pcf.

The maximum soundness loss when tested with 5 cycles of magnesium sulfate shall be 10 percent (ASTM C 88).

The maximum Los Angeles Abrasion loss when tested in accordance with ASTM C 131 (B grading) shall be 40 percent.

Construction Methods:

When applicable and except where noted below, lightweight fill placement shall conform to the requirements of Section 2.02.03 of the Standard Specifications, Form 814A.

Lightweight fill shall be placed in layers of a maximum thickness of 1 ft. Each layer shall be compacted by the use of vibratory compaction equipment weighing not more than 10 tons static weight. The minimum of passes shall be two (2) and the maximum four (4). The actual number of passes shall be determined by the engineer depending on the type of compactor used.

Method of Measurement:

Lightweight fill will be measured in place after compaction including allowance for settlement.

Basis of Payment:

This work will be paid for at the contract unit price per cubic yard for "Lightweight Fill", complete in place, which price shall include all materials, transportation, tools, and equipment and labor incidental thereto.

ITEM #406999A - ASPHALT ADJUSTMENT COST

The sum of money shown on the proposal form for Item #406999A Asphalt Adjustment Cost is for the Engineers' use.

The estimated cost figure shall be added to the contract bid and 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 cost figure will be used to determine the amount bid for the contract.

- ITEM #507026A – TYPE “C” CATCH BASIN (4’ SUMP)**
- ITEM #507027A – TYPE “C” CATCH BASIN OVER 10’ DEEP (4’ SUMP)**
- ITEM #507048A – TYPE “C” CATCH BASIN (WITHOUT SUMP)**
- ITEM #507070A – TYPE “C” C.B. DBL GRATE – TYPE I OVER 10’ DEEP (4’ SUMP)**
- ITEM #507079A – TYPE “C” CATCH BASIN DBL GRATE – TYPE I (4’ SUMP)**
- ITEM #507649A – MANHOLE RISER**
- ITEM #507656A – STANDARD STORM MANHOLE**
- ITEM #507686A – MANHOLE – 6’ DIAMETER OVER 10’ DEEP**
- ITEM #507688A – MANHOLE – 5’ DIAMETER OVER 10’ DEEP**
- ITEM #507697A – MANHOLE – 10’ DIAMETER**
- ITEM #507707A – TYPE “C” C.B. DBL GRATE – TYPE II OVER 10’ DEEP (4’ SUMP)**

Materials:

Materials shall conform to the applicable requirements of Article M.08.02 and the following:

Cast iron catch basin frame & manhole frames & covers – Cast iron shall conform to American Society of Testing Materials (ASTM) Standard Specification for grey iron castings, ASTM Designation A 48 Class 25 B for frames & 30 B for covers.

Castings shall be boldly filleted at angles and the arrises shall be sharp and perfect. They shall be true to pattern in form and dimensions, free from pouring faults, spongness, cracks blowholes and other defects in positions affecting their strength and value for the service intended.

Castings shall be sand blasted or otherwise effectively cleaned of sand and scale, so as to present a smooth, clean and uniform surface before inspection.

The following portions of the covers and frames shall be machined:

Frame - Horizontal surface to receive the cover:

Cover - Under surface which rests on frame.

After machining, it shall not be possible to rock any cover when it is sealed in any position in its associated frame.

Manufacturer’s name and catalog number must be cast on each frame and cover.

No frame and cover shall weigh less than 90% of weight indicated below.

Catch basin frames shall be cast in substantial permanent steel forms, so constructed that no overall dimension of a casting shall vary more than one-quarter inch over or under the specified dimension, and so that the frame for the inlet grate is in the desired position in the completed unit. Suitable provision shall be made in precasting the units for convenient handling of the completed unit and additional reinforcement steel shall be provided to allow for such handling.

Precast units shall be cured in accordance with AASHTO M-170. Steel grates shall be galvanized in accordance with Connecticut Department of Transportation Specification 814A, Section M.06.03.

Weight:

Frame	360 lbs.
Cover	<u>160 lbs.</u>
Total (Min.)	520 lbs.

Catch basin and manhole frames, grates and covers shall be as manufactured by Campbell Foundry Co., or approved equal.

ITEM #507602A – SPECIAL MANHOLE

Description:

This item shall consist of furnishing and installing a manhole with 8' by 8' base and a Type "C-L" Inlet where shown of the plans.

Materials:

Materials shall conform to the applicable requirements of Article M.08.02.

Provide manhole steps of the type detailed on the plans.

Provide rectangular opening in roof for Type "C-L" inlet.

Construction Methods:

Confirmation of Existing Conditions: Prior to the start of construction, the Contractor shall excavate test pits to locate the existing drainage pipe and verify the invert. The Contractor shall prepare sketches of the existing structure at 1/4 inch = 1 foot scale and submit them to the Engineer. The sketch shall show the relationship of the proposed manhole to Pier #7. The Contractor shall note and differences between what was found in the field and what is shown on the plans.

General: Construct manhole in accordance with the requirements of Section 5.07 and the following:

Construct manhole so as not to interfere with the construction of Pier #7.

Install Type "C-L" inlet including frame and grating on the top of a rectangular riser section. The rectangular riser section shall conform to the horizontal dimensions of a standard Type "C-L" catch basin.

Install manhole steps from the inlet to the invert of the manhole as shown on the plans.

Pipe connections: Utilize flexible sleeve or compression gasket.

Method of Measurement:

The manhole will be measured for payment per each, completed and accepted.

Basis of Payment:

The manhole will be paid for at the contract unit price per each, complete in place, including all materials, equipment, tools and labor incidental thereto.

ITEM #507640A – MANHOLE MODIFICATIONS

Description:

This item shall consist of furnishing and installing modifications to existing manhole No. 126 as shown on the plans. Modifications will include removal of existing twin 60-inch CMP outlet pipes, patching and plugging existing pipe penetration locations, making new penetrations for the proposed drainage connections, and connecting the proposed drainage to the existing manhole.

Materials:

Concrete shall conform to the requirements of Article M.03.01.

Reinforcing steel shall conform to the requirements of Article M.06.01.

Non-shrink grout: Non-shrink, non-metallic grout: Provide non-metallic cement based grout requiring only the addition of water, with minimum 28-day compressive strength of 8,000 psi, with shrinkage compensation characteristics in both the plastic and hardened states, conforming with ASTM C1107, "Grade C." Provide one of the following products:

- 1) Five Star Grout 100 by Five Star Products, Inc.
- 2) SikaGrout 212 as manufactured by Sika Corporation.
- 3) Masterflow 928 by Master Builders, Inc.
- 4) Or equal.

Construction Methods:

Confirmation of Existing Conditions: Prior to the start of construction, the Contractor shall excavate test pits to locate the existing outlet pipes and to verify the size of the structure. The Contractor shall prepare sketches of the existing structure at 1/4 inch = 1 footscale and submit them to the Engineer. The Contractor shall note and differences between what was found in the field and what is shown on the plans.

General Construction: Reinforced concrete shall be installed in accordance with Sections 6.01 and 6.02. Dowels shall be drilled into the existing structure and grouted with a non-shrink grout.

The Contractor shall reset the existing manhole frame and cover to the finish grade.

Removal of Existing Pipes: The Contractor shall remove the existing twin 60-inch outlet pipes as shown on the plans. The Contractor shall patch the existing penetrations to the manhole utilizing reinforced concrete with dowels into the existing structure.

Connection of Box Culvert: The Contractor shall modify the wall of the existing manhole to connect the proposed box culvert to the existing manhole. The Contractor shall chip out and remove the existing wall to match the configuration of the proposed box. The Contractor shall connect the proposed box culvert to the existing manhole with reinforced concrete encasement as shown on the plans.

Invert: The Contractor shall reconstruct the invert of the existing manhole to provide a smooth drainage channel connecting the inlet pipes with the proposed box culvert outlet.

Method of Measurement:

Manhole Modifications, being paid for on a lump sum basis, will not be measured for payment.

Basis of Payment:

Manhole Modifications will be paid for at the contract lump sum price per each, complete in place, including all materials, equipment, tools and labor incidental thereto.

ITEM #507706A - GUTTER INLET

Description:

This item shall consist of furnishing and installing manhole gutter inlet where shown of the plans.

Materials:

Materials shall conform to the applicable requirements of Article M.08.02 and the following:

Concrete shall conform to the requirements of Article M.03.01.

Reinforcing steel shall conform to the requirements of Article M.06.01.

Cast iron catch basin frame & manhole frames & covers – Cast iron shall conform to American Society of Testing Materials (ASTM) Standard Specification for grey iron castings, ASTM Designation A 48 Class 25 B for frames & 30 B for covers.

Castings shall be boldly filleted at angles and the arrises shall be sharp and perfect. They shall be true to pattern in form and dimensions, free from pouring faults, spongness, cracks blowholes and other defects in positions affecting their strength and value for the service intended.

Castings shall be sand blasted or otherwise effectively cleaned of sand and scale, so as to present a smooth, clean and uniform surface before inspection.

The following portions of the covers and frames shall be machined:

Frame - Horizontal surface to receive the cover:

Cover - Under surface which rests on frame.

After machining, it shall not be possible to rock any cover when it is sealed in any position in its associated frame.

Manufacturer's name and catalog number must be cast on each frame and cover.

No frame and cover shall weigh less than 90% of weight indicated below.

Catch basin frames shall be cast in substantial permanent steel forms, so constructed that no overall dimension of a casting shall vary more than one-quarter inch over or under the specified dimension, and so that the frame for the inlet grate is in the desired position in the completed unit. Suitable provision shall be made in precasting the units for convenient handling of the completed unit and additional reinforcement steel shall be provided to allow for such handling.

Precast units shall be cured in accordance with AASHO M-170. Steel grates shall be galvanized in accordance with Connecticut Department of Transportation Specification 814A, Section M.06.03.

Weight:

Frame	360 lbs.
Cover	160 lbs.
<u>Total (Min.)</u>	<u>520 lbs.</u>

Catch basin and manhole frames, grates and covers shall be as manufactured by Campbell Foundry Co., or approved equal.

Construction Methods:

Confirmation of Existing Conditions: Prior to the start of construction, the Contractor shall excavate test pits to locate the existing gas mains and electric duct in the vicinity of the proposed gutter inlet. The Contractor shall prepare sketches of the existing utilities at 1/4 inch = 1 foot scale and submit them to the Engineer. The Contractor shall note and differences between what was found in the field and what is shown on the plans.

General: Construct gutter inlet in accordance with the requirements of Section 5.07 and the following:

Reinforced concrete shall be installed in accordance with Sections 6.01 and 6.02.

Carefully excavate and install the gutter inlet so as not to disturb or damage the existing utilities. Notify the utilities affected at least 72 hours prior to start of excavation and request that a representative of each affected utility be present at the site.

Method of Measurement:

Gutter Inlets will be measured for payment per each completed and accepted.

Basis of Payment:

Gutter Inlets will be paid for at the contract unit price per each, complete in place, including all materials, equipment, tools and labor incidental thereto.

ITEM #507989A - JUNCTION CHAMBER NO. 1
ITEM #507990A - JUNCTION CHAMBER NO. 2
ITEM #507991A - JUNCTION CHAMBER NO. 3

Description:

These items shall consist of furnishing and installing junction chambers where shown of the plans.

Materials:

General: Junction Chambers may be constructed utilizing precast concrete, poured-in-place concrete, or a combination. The Contractor shall submit detailed shop drawings illustrating the construction of each chamber, including details of reinforcing steel. For precast elements, the Contractor shall submit detailed structural calculations stamped by a structural engineer registered in the State of Connecticut.

Precast elements shall be designed to withstand all dead loads including, but not limited to, lateral earth pressure, dead weight of cover materials, AASHTO HS20-44 vehicle loading (including impact), and hydrostatic pressure due to groundwater.

Materials shall conform to the applicable requirements of Article M.08.02 and the following:

Concrete shall conform to the requirements of Article M.03.01.

Reinforcing steel shall conform to the requirements of Article M.06.01.

Manhole Steps: Provide manhole steps of the type detailed on the plans.

Non-shrink grout: Non-shrink, non-metallic grout: Provide non-metallic cement based grout requiring only the addition of water, with minimum 28-day compressive strength of 8,000 psi, with shrinkage compensation characteristics in both the plastic and hardened states, conforming with ASTM C1107, "Grade C." Provide one of the following products:

- 1) Five Star Grout 100 by Five Star Products, Inc.
- 2) SikaGrout 212 as manufactured by Sika Corporation.
- 3) Masterflow 928 by Master Builders, Inc.
- 4) Or equal.

Construction Methods:

Confirmation of Existing Conditions: Prior to the start of construction, the Contractor shall excavate test pits at Junction Chambers No. 1 and 3 to locate the existing drainage pipes and verify the inverts. At Junction Chamber No. 3, locate the twin 72-inch pipes and the 24-inch inlet pipe. Verify the distance between the 72-inch pipes. At Junction Chamber No. 3, locate the CMP arch pipe. Also verify locations of pipes and inverts for all pipes at existing structures No. 126 and 127. The Contractor shall prepare sketches of the existing structure at 1/4 inch = 1 foot scale and submit them to the Engineer. The sketch at Junction Chamber No.1 shall show the relationship of the proposed manhole to Pier #7. The Contractor shall note and differences between what was found in the field and what is shown on the plans.

General: Construct manhole in accordance with the requirements of Section 5.07 and the following:

Reinforced concrete shall be installed in accordance with Sections 6.01 and 6.02.

Install manhole steps from the inlet to the invert of the manhole as shown on the plans.

Junction Chamber No. 3: Construct Junction Chamber No. 3 around the existing 72-inch RCPs. Saw cut or use other means to cleanly cut the existing RCPs. Remove sections of the existing RCPs and CMPs within the footprint of the proposed chamber. The Contractor's attention is drawn to the detail of how the existing 72-inch RCPs are joined to the 60-inch CMPs by use of concrete collars. The Contractor shall completely remove all of the existing concrete that interferes with the construction of Junction Chamber No. 3.

Pipe connections: Utilize flexible sleeve or compression gasket for connection pipes up to 36-inch in diameter to precast concrete. For larger pipes, utilize non-shrink grout where the interstitial space is 3 inches or less. Where the space between the pipe and the precast concrete is greater than 3 inches, utilize reinforced concrete as detailed on the plans.

Method of Measurement:

Junction Chambers, being paid for on a lump sum basis, will not be measured for payment.

Basis of Payment:

Junction Chambers will be paid for at the contract lump sum price for each chamber, complete in place, including all materials, labor, equipment, tools and work incidental thereto.

ITEM #511031A - BRIDGE SCUPPER (TYPE A)
ITEM #511032A - BRIDGE SCUPPER (TYPE B)

Description:

Work under this item shall consist of furnishing and installing scuppers and grates where shown on the plans or where directed by the Engineer. All work to be done shall conform to the pertinent provisions of Sections 6.03, M.06 and M.07.

Materials:

Materials for the frames and grates of the scuppers shall be structural steel conforming to the provisions of ASTM A709 Grade 50 and shall be manufactured in accordance with the plans. The bolts, nuts and locking device shall be stainless steel conforming to the provisions of ASTM A276 Type 304.

The caulking shall be silicone sealant conforming to ASTM C-920 Type S, Grade NS, Class 40 or Federal Specifications TT-S-001543A (COM-NBS) Class A and TT-S-00230C (COM-NBS) Class A.

The hoppers shall be custom molded, reinforced polyester chemical resistant fiberglass, as shown on the plans.

The resin shall be corrosion resistant and shall be evaluated as a laminate by test or previous service to be acceptable for the environment. The resins used shall not contain fillers except as required for viscosity control or fire retardance. Up to 5% by weight of the isotropic agent which will not interfere with visual inspection, may be added to the resin for viscosity control. Resins may contain pigments and dyes if authorization for their use is obtained from the Department. Antimony compounds or other fire retardant agents shall be added as required for improved fire resistance. The resin shall be protected by an ultra violet system concurrent with good practice.

The contractor shall furnish Certified Test Reports for each batch in conformance with the requirements set forth in the Specifications.

The reinforcing material shall be of commercial grade of glass fiber having a coupling agent which will provide a suitable bond between the glass reinforcement and the resin. The glass and resin shall be applied in proper quantities to achieve maximum strength. However, the glass fiber shall be not less than 25% by mass. The laminate shall have a minimum ultimate tensile strength of 12,000 psi, a minimum flexural strength of 19,000 psi, and minimum tangent flexural modulus of elasticity of 800,000 psi. The material used as reinforcing on the surface exposed to chemical attack shall be a commercial grade chemical resistant glass having a coupling agent.

The laminate shall consist of an inner surface, an interior layer, and no exterior layer of laminate body. The composition of the inner surface and interior layer are intended to achieve optimum chemical resistance. The inner surface shall be free of cracks and crazing with a smooth finish and with an average of not over 2 pits per square foot, providing the pits are less than 1/8 inch. in diameter and not over 1/32 inch. deep and are covered with sufficient resin to avoid exposure of inner surface fabric. Some waviness is permissible as long as the surface is smooth and free

of pits. Between 0.010 and 0.020 inches of reinforced resin rich surface shall be provided. This surface shall be reinforced with 1 ply glass reinforcing mat.

The laminate shall be built to finished thickness in stages to prohibit warping.

The laminate shall come to room temperature before successive plies are built-up.

All manufacturing practices shall conform to S.P.I. Standards.

Each hopper shall be shipped to the job site paper wrapped in a cardboard carton or box of other suitable material.

Steel frames and grates shall be galvanized by the hot-dip process in accordance with the requirements of ASTM A 153.

Construction Methods:

Shop Drawings: Before fabricating any materials, the Contractor shall submit shop drawings to the Engineer for approval in accordance with Article 1.05.02-3. These drawings shall include; but not be limited to the following information:

- a. A plan and elevation with details showing all lengths, fittings, supports and material designation needed to fabricate the scupper.
- b. Commercial items shall be identified by manufacturer, trade name and catalog number and shall indicate sufficient details.

The installation of welded studs shall be in accordance with the requirements of Article 5.08.03.

The scuppers shall be located and set to grade as shown on the plans or as directed by the Engineer. All connections shall be secure and watertight, including the connections to adjacent concrete.

Method of Measurement:

The scuppers will be measured for payment by the number of units installed, completed and accepted.

Scuppers and grates with necessary welded studs, bolts, nuts and washers and pipe extension will constitute one unit.

Basis of Payment:

This work will be paid for at the contract unit price each for "Bridge Scupper (Type A & B)", complete in place, which price shall include all materials including, caulking, welded studs and all equipment, tools and labor incidental thereto.

ITEM #512024A - 12" PIPE FOR BRIDGE DRAINAGE (FIBERGLASS)

Description:

This item shall consist of furnishing and installing the fiberglass pipe, fittings including reducers, expansion joints, cleanouts, hangers, hoppers, supports and appurtenances, at the locations and to the lines and grades designated on the plans, or as directed by the Engineer.

Materials:

All fiberglass components of the bridge drainage piping system shall be supplied by a single manufacturer.

The fiberglass pipe shall be Reinforced Thermosetting Resin Pipe (RTRP) which shall satisfy the requirements of ASTM Specification D 2996 RTRP-11AA-1111. The pipe shall qualify for a 900 psi minimum short term rupture strength hoop tensile stress.

Pipe joints shall be bell-and-spigot or flanged as shown on the plans.

Fittings including wyes, cleanouts, reducers, and other types of manufactured elbows shall have a smooth interior with a minimum centerline radius of one and one half (1-1/2) times the pipe diameter. Cleanout end caps shall be fiberglass and shall attach to the cleanout pipe fitting using a flanged connection with a minimum of 4 bolts and a sealing gasket.

All fittings shall be static rated at 900 psi with a safety factor of three (3) times the static rating, in accordance with ASTM D1599.

The adhesive to be used for joining pipe segments shall consist of epoxy resin and a hardener curing agent having a minimum pot life of 15 minutes at 106° F which when fully cured develops the strength capacity of the pipe, in accordance with the manufacturer's recommendations.

The color of all fiberglass piping components shall be "concrete-grey". The Contractor shall submit a color sample to the Engineer for approval. A U.V. inhibitor shall be incorporated in the epoxy resin.

Pipe supports, clamps and hangers shall be steel conforming to ASTM A709 Grade 50 and shall be galvanized after fabrication in accordance with ASTM A123.

Neoprene pads, 1/8 inch., thick shall be bonded to all surfaces of steel pipe supports or hangers in direct contact with the fiberglass pipe. The neoprene shall conform to the requirements of ASTM D4637, Type II, Class SR. The adhesive bonding agent for attaching the neoprene to the pipe support clamp surface shall be "Quick Gel Instant Adhesive" manufactured by Loctite Corporation, Newington, Connecticut, or an approved equal recommended by the manufacturer of the neoprene.

Threaded rods and associated nuts and washers shall be Type 316 Stainless Steel.

High strength bolts shall conform to requirements of ASTM A325.

Hex nuts shall conform to ASTM A563, Grade DH or ASTM A194, Grade 2H. Washers shall conform to ASTM F436.

High strength bolts including hex nuts and washers shall be mechanically galvanized in conformance with ASTM B695, Class 50.

The Contractor shall furnish a Certified Test Report and a Materials Certificate for the pipe joining adhesive, all fiberglass components of the piping system, in conformance with the requirements set forth in 1.06.07.

Construction Methods:

- 1) Shop Drawings: Before fabricating any materials, the Contractor shall take all field measurements necessary to assure proper fit of the finished work, and shall submit shop drawings to the Engineer for approval in accordance with Article 1.05.02-3. These drawings shall include, but not be limited to the following information:
 - a) A layout plan and elevation showing all lengths, elevations, fittings, supports, cleanouts, expansion devices if required, appurtenances and material designations.
 - b) Commercial items shall be identified by manufacturer, trade name and catalog number and shall indicate sufficient details.
 - c) Pipe supports and hangers and all other support devices shall be fully detailed.
 - d) All field measurements shall be submitted for reference.
- 2) Installation: The pipe shall be installed to the lines and grades shown on the plans and shall be securely attached to the structure.

The adhesive for joining the pipes shall be mixed and applied in strict accordance with directions included in the adhesive kit, or as directed by the representatives of the manufacturer. The surfaces of the joint shall be coated with the adhesive immediately before joining adjacent lengths of pipe. After properly joining two adjacent sections, the pipe supports and clamps shall be properly tightened to hold the pipe in place.

Method of Measurement:

This work will be measured for payment by the actual number of linear feet of pipe for bridge drainage of the size specified, completed and accepted, measured in place along the axis of the pipe through all fittings.

Basis of Payment:

This work will be paid for at the contract unit price per linear feet of "12" Pipe for Bridge Drainage (Fiberglass)", complete in place, which price shall include all materials including fiberglass pipe, cleanouts, hoppers hangers, supports including hardware, all equipment, tools and labor incidental thereto.

Structural steel members and appurtenances detailed to support the pipe shall be paid for under the Item "Structural Steel."

ITEM #520020A - ELASTOMERIC CONCRETE EXPANSION JOINT SYSTEM

Description:

Work under this item shall consist of furnishing and installing the elastomeric concrete expansion joint system as shown on the plans, as directed by the Engineer, and in accordance with these specifications.

Materials:

The following elastomeric concrete expansion joint system manufacturers and their associated component materials have been approved for use:

Elastomer Seals, Inc.
5 DiThomas Court
Copiague, NY 11726
Phone: (516) 842-1501

Steel extrusion -Shape A or E
Strip seal gland - ES series
Elastomeric concrete - Bond-Tech

Watson Bowman & Acme Corp.
95 Pineview Dr.
Amherst, NY 14120
Phone: (716) 691-7566

Steel extrusion - Type A or E
Strip seal gland - S or EF series
Elastomeric concrete - Wabocrete

Epoxy Industries, Inc.
14 West Shore Rd.
Ravena, NY 12143
and
Structural Accessories, Inc.
South Main Street
PO Box 10
Terryville, CT 06786

Steel extrusion - Type SA or AM 2
Strip seal gland - 40SS,40SD or 40SEQ
Elastomeric concrete - CevaHarris 90

Additionally, the elastomeric concrete expansion joint system components shall conform to the following:

- **Steel Extrusions:** The extrusions shall be 1-1/2" high and conform to the requirements of ASTM A588.
- **Extrusion Anchorage:** The steel extrusions shall be anchored in both the deck and curb areas. The anchorage shall be a minimum 1/2" diameter and conform to the requirements of ASTM A709, Grade 36 or ASTM A706.
- **Strip Seal Gland:** The gland shall be extruded polychloroprene.

A Materials Certificate will be required in accordance with article 1.06.07 certifying the conformance of the elastomeric concrete expansion joint system components to the requirements set forth in this specification.

Construction Methods:

Before fabricating any section of the expansion joint, 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. The name of the manufacturer.
- b. Strip seal, steel extrusion, and designations and model numbers.
- c. Details of a typical expansion joint section including the anchorage and method of temporary support.
- d. Plan of the joint showing the location and details of shop and field splices in the steel extrusions.
- e. The complete details of the methods, materials and equipment proposed to be used in the installation.
- f. Details at the curbs and sidewalks.
- g. The maximum and minimum joint installation widths including an ambient temperature table for joint widths between 40 °F and 90 °F in 10 °F increments.

The steel extrusions shall be fabricated in sections and be made continuous by welding during placement. The strip seal shall be fabricated and installed in one piece. No shop or field splicing of the seal will be permitted.

A competent technical representative of the elastomeric concrete manufacturer shall be present during the installation of the elastomeric concrete and steel extrusions to provide the Contractor such aid and instruction as required to obtain a satisfactory installation, to the approval of the Engineer.

The elastomeric concrete expansion joint system shall be installed at the locations shown on the plans and in stages in accordance with the traffic requirements in the special provisions "Maintenance and Protection of Traffic" and "Prosecution and Progress".

The Contractor shall sawcut the overlay to full depth in order to delineate the location of the elastomeric concrete headers. Within these limits, the overlay and membrane shall be removed. The exposed bituminous concrete and steel header surfaces shall be sandblasted (steel to SSPC-SP-10) and air-blast cleaned to clean and dry the surfaces, and remove all dust, dirt, laitance, loose particles and foreign matters to insure proper bonding of the elastomeric concrete.

The steel extrusions and anchorage shall be sandblasted in accordance with SSPC-SP-10, Near-White Blast Cleaning, prior to placement. The extrusions shall be aligned with the deck cross slope and breaks in the cross slope. The trailing side of the extrusion shall be recessed below the leading edge as shown on the plans. The extrusions shall be firmly and accurately held in position prior to and during the placement of the elastomeric concrete by temporary supports. Adjacent sections of extrusion shall be butt welded together.

Forms shall be used to keep the elastomeric concrete from entering the open joint between the concrete deck slabs.

The elastomeric concrete shall be mixed and placed in accordance with the manufacturer's instructions. A primer, if required, shall be applied prior to placing the concrete. The concrete shall be placed, with a trowel if necessary, to insure that it completely fills the header below the extrusion and to prevent honeycombing and voids. The headers shall be finished flush with the adjacent overlay.

The elastomeric concrete shall be heat cured with the use of external heat sources, as required by the manufacturer. Curing may require that vulcanizing heat be applied for approximately 2 to 3 hours. Traffic shall not be permitted over the joint until proper cooling of the joint has occurred and the elastomeric concrete has developed adequate strength in accordance with the manufacturer's recommendations.

After the extrusions and headers have been placed, the strip seal shall be installed in a continuous length along the deck and up the curbs. An adhesive lubricant shall be used to install the strip seal in the steel extrusions as required by the manufacturer.

Any section of the elastomeric concrete expansion joint system that is punctured, ruptured, cracked, bent or damaged in any other way shall be removed and replaced by the Contractor at no additional cost to the State.

All work shall be done in accordance with the special provisions for "Maintenance and Protection of Traffic" and "Prosecution and Progress" contained elsewhere within.

Method of Measurement:

This work will be measured for payment by the number of linear feet of strip seal, installed and accepted, measured from gutterline to gutterline along the centerline of the joint.

Basis of Payment:

This work will be paid for at the contract unit price per linear foot for "Elastomeric Concrete Expansion Joint System", complete in place, which price shall include all materials, equipment, tools, and labor incidental thereto.

ITEM #521001A - ELASTOMERIC BEARING PADS

Description:

Work under this item shall consist of furnishing and installing elastomeric bearing pads and all other necessary materials and equipment to complete the work as shown on the plans.

Materials:

Elastomeric Bearing Pads: The elastomer shall be virgin neoprene (polychloroprene) Grade 3 and shall be of the Durometer (hardness) indicated on the plans and shall conform to the requirements of Section 18, Table 18.4.5.1-1A of Division II of the AASHTO Standard Specifications for Highway Bridges, Sixteenth Edition.

The internal steel laminae shall conform to ASTM A709 Grade 36 or approved equal. The laminae shall be sandblasted and cleaned of all surface coatings, rust and mill scale before bonding and shall be free of sharp edges and burrs.

The bearing shall be cast as a unit in a mold and shall be bonded and vulcanized under heat and pressure. The mold finish shall conform to standard shop practice.

Flash tolerance, finish and appearance shall meet the requirements of the latest edition of the Rubber Handbook, published by the Rubber Manufacturer's Association, Inc., RMA F3 and T.063.

Fabrication tolerances shall conform to Article 18.5.1.5-1 – Fabrication Tolerances of Division II of the AASHTO Standard Specifications for Highway Bridges, Sixteenth Edition.

The tests on the elastomer specified in Table 18.4.5.1-1A of AASHTO shall be conducted on each lot of bearings. A shear modulus test shall be performed on each batch of material. (A lot consists of a single type of bearing of the same size, manufactured from the same batch of elastomer, submitted for inspection at the same time. A batch of elastomer is the quantity of elastomer prepared and compounded at one time).

In lieu of the low temperature crystallization test for each lot of bearings and a shear modulus test for each batch of material, the manufacturer may provide certificates from tests performed on identical formulations within the preceding year.

Every bearing shall be visually inspected for compliance with dimensional tolerance and for overall quality of manufacture. Buffing, cutting, or any other attempt to alter the size of the bearings, for the purpose of meeting the tolerances stated herein will not be permitted.

The elastomer shall meet the minimum requirements specified in Table 18.4.5.1-1A for durometer hardness, tensile strength, ultimate elongation, heat resistance, compression set, ozone resistance, low temperature brittleness, low temperatures stiffness and low temperature crystallization. The shear modulus of the material shall be tested at 73° F using the apparatus and procedure described in Annex A of ASTM D4014. The steel laminae shall develop a minimum peel strength of 473 lbs./ft. when tested in accordance with ASTM D429 Method B.

Every bearing shall be tested as follows for a Short-Duration Compression Test:

1. The bearing shall be loaded in compression to 1.5 times the design load shown on the plans. The load shall be held constant for 5 minutes, removed and reapplied for another 5 minutes.
2. The bearing shall be carefully examined while under the second loading.
3. If the bulging pattern indicates laminate parallelism or layer thickness outside of specified tolerance, or poor laminate bond, the bearing shall be rejected. If there are three or more separate surface cracks, greater than 1/16 inch wide and 1/16 inch deep, the bearing shall be rejected.

A Certified Test Report in accordance with Section 1.06.07 shall be required for the specified tests on the elastomer and for the specified short duration compression tests.

Each elastomeric bearing pad shall have embossed on it the following: the work "CONN", project number, manufacturer's identification code or symbol, and the month and year of manufacture. The bearing shall also have stenciled on it, with indelible ink, the lot number, bridge number, and the bearing number. The marking shall be placed on a side of the bearing that is visible after installation.

For structures requiring less than fifty pads, one test pad shall be furnished. For structures requiring more than fifty pads, one extra test pad shall be furnished for each additional fifty pads or part thereof. If there are two or more types of pads in one structure, and only one test pad is required, the test pad will be furnished for the type of which there are the greater number. All test pads shall be furnished without charge.

All of the pads on one structure shall be manufactured by the same firm.

The manufacturer shall furnish facilities for the test and inspection for the completed bearing in his plant or at the independent test facility and the inspectors shall be allowed free access to the manufacturer's plant and test facility.

Load Plates: Load plates conforming to ASTM A709 Grade 50 w steel shall be vulcanized to the top of each elastomeric bearing pad. The size of the plate shall be as indicated on the plans. Holes in the load plates shall be made prior to vulcanizing the elastomeric pad to the load plate. The load plate contact surface to be vulcanized to the elastomeric pad shall not be painted or galvanized.

5.21.03 - Construction Methods:

Before fabricating any materials, the Contractor shall submit shop drawings to the Engineer for approval in accordance with Subarticle 1.05.02-3. These drawings shall include but not be limited to the following information. The name of the manufacturer, complete details of the pads and pertinent material designations.

The bearing areas of the masonry upon which the elastomeric bearing pads are to be placed shall be carefully finished, by grinding if necessary, to a smooth, even surface of the required elevation, and shall show no variations from a true plane greater than 1/16 of an inch over the entire area upon which the elastomeric bearing pads are to rest.

After delivery of the bearings to the job site, the bearings shall be stored such that they are kept clean and dry at all times.

There shall be uniform bearing between the elastomeric bearing pad and the concrete seat after application of full dead load. Also after application of full dead load, there shall be uniform deflection of the elastomeric bearing pad.

Welding of the structural steel adjacent to elastomeric bearing pads shall be controlled such that no portion of the bearing pad will be subjected to temperatures in excess of 400° F.

The elastomeric bearing pads shall be installed when the ambient air temperature has been within the range of 32° – 80° F for a period of at least two hours.

Method of Measurement:

This work will be measured for payment by the number of cubic inches of elastomeric bearing pads, installed and accepted.

Basis of Payment:

This work will be paid for at the contract unit price per cubic inch of "Elastomeric Bearing Pads", complete-in-place, which price shall include all materials including the internal steel laminae, testing equipment, tools and labor incidental thereto, including the cost of furnishing test pads.

ITEM #522280A – ISOLATION BEARING ASSEMBLY

Description:

This work shall consist of furnishing and installing isolation bearings assemblies at the locations shown on the plans in accordance with these Special Provisions and the AASHTO Guide Specifications for Seismic Isolation Design, 2nd edition. Isolation bearing assemblies shall consist of one of the following isolation systems:

Elastomeric Isolation System:

This system shall consist of an elastomeric bearing with lead core type consisting of alternate layers of natural rubber and steel plates with a preformed hole at the center of the unit filled tight with a pure lead plug. This system shall include base isolation bearings (isolators), sole plates, base plates, masonry plates, load plates, prefabricated pads and connection hardware.

Sliding Isolation System:

This system shall be composed of sliding bearings consisting of TFE stainless steel surfaces used in conjunction with enclosed energy control devices. This system shall include base isolation bearings (isolators), distribution plates, distribution pads and connection hardware.

Isolation bearings shall be self-contained and shall not be susceptible to detrimental environmental conditions. All isolation bearings shall be designed to be easily removable in the future, if necessary.

All isolators shall be of the same isolation system and shall be provided by one supplier.

The following suppliers have been approved by the State and have displayed the capability of supplying isolation bearing assemblies with characteristics that conform to the general requirements of this Special Provision.

Elastomeric Isolation System:

DIS, Inc.
3470 Mt. Diablo Blvd.
Suite A200
Lafayette, CA 94549
Telephone: 925-283-1166
Fax: 925-283-4307

Seismic Energy Products, L.P.
518 Progress Way
Athens, TX 75751
Telephone: 903-675-8571
Fax: 903-677-4980

Sliding Isolation System:

R.J. Watson, Inc.
P.O. Box 85
East Amherst, New York 14051
Telephone: 716-741-2166
Fax: 716-741-2580

Materials:

All materials shall be new and unused, with no reclaimed material incorporated in the finished bearing.

Elastomeric Isolation System:

The elastomers of the isolators shall be natural rubber. Type NR Grade 3 per ASTM D4014.89 meeting or exceeding the following requirements.

A. Heat Resistance

- ASTM D573 (158° for 7 days)
- Maximum permissible change in tensile strength – 25%
- Maximum permissible change in ultimate elongation – 25%
- Maximum permissible change in durometer hardness – 10 points

B. Compression Set

- ASTM D395 Method B (158° F for 22 hours)
- Maximum permissible set: 25%

C. Low Temperature Properties

- ASTM D1229 (Compression set at 14° F for 7 days at 25% compression)
- Maximum permissible set: 65%
- ASTM D2240 (Low Temperature Stiffness; conditioned for 22 hours at -13° F)
- Maximum permissible change in durometer hardness: +15 Shore A points

D. Ozone Resistance of Elastomer: Ozone resistance will be determined by tests on strips of representative material mounted as per Method A of ASTM D518. The tests will be performed by ASTM D1149 at an ozone concentration of 50 +5 parts per hundred million at 20% stain at 100° F for 100 hours. The ozone resistance will be regarded as satisfactory, if on conclusion of a test, no cracks are visible using 7X magnification.

E. Bond of Elastomer to Steel Laminate: The average of the peak values of force during separation to determine the minimum peel strength will be at least 40 lbs./in. The failure type shall be 100% rubber test. Peel strength tests will be performed by ASTM D429 Method B.

F. Tensile Strength and Ultimate Elongation of Elastomer: Minimum tensile strength and ultimate elongation tests will be performed by ASTM D412. The minimum tensile strength will be 2250 psi and the minimum ultimate elongation will be 550%.

G. Hardness of Elastomer: The durometer hardness will be determined by ASTM D2240.

H. Shear Modulus at 50% Shear Strain of Elastomer: The shear modulus of the elastomer at 50% shear strain will be determined by ASTM D4014. The tangent modulus will be the design value \pm 10%.

Lead:

The purity of lead will be established by chemical analysis from a sample of the lead in the isolators. This test will confirm a minimum of 99% purity of the lead.

Sliding Isolation System:

Polyether Urethane Structural Element:

The physical properties of the polyether urethane shall conform to one of the following requirements:

<u>Physical Property</u>	<u>ASTM Test Method</u>	<u>Compound A</u>		<u>Compound B</u>	
		<u>Min</u>	<u>Max</u>	<u>Min</u>	<u>Max</u>
Hardness, Shore D	D2240	46	50	60	64
Tensile Stress	D412				
At 100% elongation		1500		2000	
At 200% elongation		2800		3700	
Tensile Strength, psi	D412	4000		5000	
Ultimate Elongation, %	D412	350		220	
Compression Set	D395		40		40
22 hrs. at 158 F, &					

Steel:

All steel except stainless steel components of the bearing shall conform to the requirements of the type of steel designated in the Contract Plans.

Stainless Steel:

Stainless Steel shall conform to the requirements of ASTM A240, Type 304 or ASTM A240, Type 316. Stainless steel in contact with TFE Sheet shall be polished to a bright mirror finish, less than 20 micro-inches root mean square. The minimum thickness of the stainless steel shall be 0.050 inches.

Polytetrafluorethylene Sheet:

Polytetrafluorethylene (TFE) sheet shall be manufactured from pure virgin (not processed) unfilled TFE resin. TFE sheet shall meet the applicable material requirements of AASHTO standard Specifications for Highway Bridges; Section 18, Div. II.

Construction Methods:

The Contractor shall submit name of the isolator supplier to be used with the bid.

Isolation Bearings Shown on the Contract Plans:

The dimensions of the isolation bearings detailed on the Contract Plans are of a conceptual nature; however, the beam seat elevations, as detailed, are computed based

on the dimensions given. Any change in height of the isolation bearings shall be made up in adjustments first to masonry and sole plates (minor changes), and second to the beam seat elevations, if absolutely necessary. Changes in the plan dimensions (i.e. width and length) shall take into consideration the physical limits of the beam seats which may be sized for future jacking clearance; and all bearings shall be centered directly beneath stiffeners and girder webs, as detailed on the plans.

Since adjustments to the beam seats may be necessary, the Contractor shall submit Shop Drawings to the Engineer for approval and shall have received said approval prior to construction of the beam seats and fabrication of bearings. These drawings shall include, but not be limited to the following information:

- Plans and elevation of each bearing size.
- Complete details and sections showing all materials (with ASTM or other designations) incorporated in the bearings.
- Vertical and horizontal load capacity (the minimum bearing capacities are given on the Contract Plans).
- Details of the connections of the isolators to the adjacent sole, base, masonry or distribution plates. Separate plates are required to allow for easy removal of bearings, if necessary.
- Any required revisions or additions to concrete reinforcement or other facilities.

System Description:

The "Bearing Data" tables given on the Contract Plans contain the design requirements for this bridge. These are supplied as a means of specifying the required performance characteristics for the isolation system. Analytical results showing the maximum seismic forces and displacements at all locations shall be submitted and approved by the Design Engineer. Also, calculations showing system compliance with all relevant provisions of the AASHTO Guide Specifications for Seismic Isolation Design, including the seismic isolation modifications to Section 14 of Division I and Section 18 of Division II of the AASHTO Standard Specifications, shall be submitted and approved by the Design Engineer.

Elastomeric Isolation System:

Fabrication Details:

The tolerance on isolator dimensions shall be as follows:

<u>Dimensions</u>	<u>Tolerance</u>
External Plan Dimensions	±1/4 inch
Flatness of Exterior Top and Bottom Surfaces of Completed Bearings	±1/16 inch from the main surface
Variation from Plane Parallel to the Theoretical Surface	
Top	Slopes relative to the bottom no more than 0.005 radians
Sides	±1/4 inch
Overall Bearing Height	±1/4 inch

Exposed steel surfaces, if any, will be prepared for weathering or painting in accordance with the requirements of Article 6.03.03.

Each isolator will be permanently marked. The markings will consist of an isolator number specified by the manufacturer, date of fabrication (month and year), isolator type and manufacturer (name and address)

Testing:

Test results for combined compression and shear (as specified in Section 15 of the AASHTO Guide Specifications for Seismic Isolation Design) will be provided to the Engineer. The test load for each isolator type will be determined from the maximum design dead plus live load to be applied to that particular isolator type. All test results will identify the isolators by identification number.

During the combined compression and shear tests on all completed isolators, each isolator will be closely inspected for lack of rubber to steel bonds, laminate placement faults, or three (3) surface cracks wider and deeper than 0.08 inches. Any isolator showing such signs will be rejected.

The results of each isolator test shall be evaluated for the following performance requirements:

Product Delivery, Storage and Handling:

The isolators shall be shipped in protective packing. They shall be stored under cover above the ground in the original packaging until installation.

Installation:

The Contractor shall certify to the Engineer that a skilled representative of the bearing manufacturer will be available to the Contractor to give such aid and instruction in the installation of bearings as is required to obtain satisfactory results.

The isolators shall be installed level and normal to the gravity loads. Superstructure gradients shall be accommodated with beveled sole plates.

There shall be no obstructions, including bolt extension, which prevent the isolators from deforming horizontally in any direction. The area around the isolator shall be cleaned of all debris and construction materials at the completion of the Contract.

No welding will be performed on steel in contact with an isolator.

Sliding Isolation System:

Seismic analysis shall include non-linear time history analyses, non-linear modeling shall include a varying pressure and velocity dependent friction element as well as any nonlinearities present in the restoring force.

Non-linear time history analysis shall include simultaneous orthogonal excitations to check for excessive torsional displacements.

The supplier shall show previous history in the design and fabrication of sliding bearings with restoring force elements to mitigate dynamic effects.

Sliding bearings shall be still in shear, i.e. negligible shear displacement shall occur with the load bearing element.

Isolation system shall be fully test verified utilizing shake table testing. Documentation of the testing shall be provided as well as verification from a member of the test team. In addition to shake table testing prototype bearing tests in accordance with the AASHTO Guide Specifications of Seismic Isolation Bearings will be required.

A copy of the manufacturing specification to be used in the project shall be supplied to the Engineer.

Energy dissipation shall not be achieved via the material degradation of a structural element in the bearing system. If such a structural element is to provide resistance to service load conditions (wind, braking forces, etc.) it shall not also be used in a manner that would lead to reduced capacity after material yielding.

Isolation bearing shall not contain elements known to be toxic, nor shall energy dissipation devices contain fluids.

Dynamic testing for both production testing, and prototype testing (if required) shall be performed at the undamped natural frequency of the isolation system, or, at a minimum of 0.5 Hz.

Fabrication Details:

The Contractor shall provide the Engineer with written notification thirty (30) days prior to the start of bearing fabrication. This notification shall include all of the information shown on the shop drawings which are required by Section of these specifications dealing with "Contract Document and Shop Drawings".

Contract Document and Shop Drawings:

The contract documents shall contain information necessary for proper design and detailing of the bearings. This information is listed in AASHTO Standard Specifications for Highway Bridges.

The Contractor shall submit detailed shop drawings in conformance with the applicable requirements of the Engineer for approval prior to the start of fabrication. Information to be noted on the plans shall be as required by AASHTO Standard Specifications for Highway Bridges.

All steel surfaces exposed to the atmosphere, except stainless steel surfaces and metal surfaces to be welded, shall be shop painted to match weathering steel or galvanized color in accordance with the Contract Plans. Prior to painting, the exposed steel surfaces shall be cleaned in accordance with the recommendations of the coating's manufacturer. Metal surfaces to be welded shall be given a coat of clear lacquer, or other protective coating approved by the Engineer, if the time of exposure before welding takes place is to exceed three months. The coating shall be removed at the time of welding. No painting will be done to these surfaces prior to the completion of welding.

Stainless steel sheet shall be attached with a continuous seal weld. Weldment shall remain below the level of the stainless steel sheet.

All welding shall conform to, and all welders shall be qualified in accordance with the requirements of the ANSI/AASHTO/AWS D1.5 (Bridge Welding Code) including interims as modified by AASHTO Standard Specifications for Welding of Structural Steel Highway Bridges.

Except as noted, all bearing surfaces of steel plates shall be finished or machined flat within 0.010 inches per foot. Out-of flatness greater than 0.010 inches per foot on my plate shall be cause for rejection. The bottom surfaces of lower bearing plates (masonry plates) designed to rest on bearing pads shall not exceed and out-of-flatness value of 0.0625 inches per foot (1/16 inch per foot). Oxygen cut surfaces shall not exceed a surface roughness value of 1000 micro-inches, as defined by ANSI B46.1.

Gross bearing dimensions shall have a tolerance of $-0, +1/8"$.

Every bearing shall have the Project Identification Number, Lot Number, and individual bearing number indelibly marked with ink on a side that will be visible after erection.

After assembly including sole plates and masonry plates, bearing components shall be held together with steel strapping, or other means, to prevent disassembly until the time or installation. Packing shall be adequate to prevent damage from impact as well as from dust and moisture contamination during shipping and storage.

Sampling and Testing:

Requirements for lot size shall be in accordance with AASHTO Standard Specifications for Highway Bridges.

Sampling and testing requirements shall be in accordance with AASHTO Standard Specifications for Highway Bridges with modifications as noted:

<u>Test</u>	<u>Samples Required</u>
Physical properties of polyether urethane (except compression set)	One 10" x 15" sheet of polyether urethane material (thickness of 0.063" to 0.120") per lot
Compression set of polyether urethane	One 4" x 4" sheet of polyether urethane per lot, molded or cut to the thickness requirements of ASTM D395, Method B.

Production Bearing Testing:

The sliding coefficients of friction shall be measured at the bearing's design capacity in accordance with AASHTO Standard Specifications for Highway Bridges and on the fifth and fiftieth cycles, at a sliding speed of 1 inch per minute. The sliding of one bearing,

divided by the bearing's vertical design capacity. The test results will be evaluated as follows:

- a. The measured sliding coefficients of friction shall not exceed 3%.
- b. The bearing will be visually examined both during and after the proof load test. Any resultant defects, such as bond failure, physical destruction, cold flow of TFE to the point of debonding, or damaged components shall be cause for rejection.

Seismic tests on EQS bearings shall be tested in accordance with Section 13 of AASHTO Guide Specifications for Seismic Isolation Design. Results shall be within +/- 10% of the predicted values. Bearings which test outside this range may only be acceptable on the specific approval of the Engineer.

Proof load testing shall be performed in accordance with AASHTO Standard Specifications for Highway Bridges; Section 18.3.5.3.1, Div. II.

A test bearing shall be loaded to 150% of the bearings' rated design capacity and simultaneously subjected to design rotation for a period of one (1) hour.

Any visual defects, such as extruded or deformed polyether urethane or TFE, or cracked steel, shall be cause for rejection.

Installation:

Bearings delivered to the bridge site shall be stored under cover on a platform above the ground surface. Bearings shall be protected at all times from injury. When placed, bearings shall be dry, clean, and free from dirt, oil, grease, or other foreign substances.

Bearing devices shall not be disassembled unless otherwise permitted by the Engineer or Manufacturer.

Bearings shall be installed in accordance with the alignment plan and installation scheme as shown in the Contract Plans. Upon final installation of the bearings, the Engineer, in the presence of the Manufacturer's representative, shall inspect the bearing components to assure that they are level and parallel to centerline of girder with +/- 1/32" per foot. Any deviations in excess of the allowed tolerances shall be corrected.

Certificate of Compliance:

In addition to records of test results, the Contractor's isolator supplier shall submit Certificates of Compliance for the isolators indicating the materials, fabrication, testing, and installation are as specified herein.

Method of Measurement:

Isolation bearing assemblies will be measured for payment for each complete and accepted installation.

Basis of Payment:

This work will be paid for at the contract unit price each for "Isolation Bearing Assembly," which price shall include all materials, tools, furnishing and installing isolation bearing assemblies where shown on plans.

ITEM #601057A - HIGH PERFORMANCE CONCRETE

Work under this item shall conform to the pertinent requirements of Section 6.01 supplemented and amended as follows:

Description:

Work under this item shall consist of furnishing and placing high performance concrete for the various components of the superstructure deck, parapets and sidewalks within the limits shown on the plans, including all necessary materials and equipment to complete the work and the design of the concrete mix. Special care as specified below, must be taken in the finishing of high performance concrete. The inclusion of microsilica and low water/cement ratio decreases bleeding rates and may cause faster set times. As such, high performance concrete must be finished as soon as possible after placement and during finishing particular measures must be taken to prevent water loss from the surface of the concrete: these include (1) strict adherence to specifications regarding evaporation rates and cessation of concrete placement if relative humidity is low and temperature and wind speed are high (2) expediting finishing of concrete and use of fog sprays during finishing (3) use of evaporation retarding agents during and immediately after finishing, and (4) initiation of wet curing as soon as possible after finishing. The Contractor is encouraged to work closely with the microsilica manufacturer or his technical representative in developing his finishing techniques.

Materials:

Materials for this work shall conform to the requirements of Article M.03.01 amended as follows:

Concrete: The concrete shall be air-entrained and composed of portland cement, fly ash, microsilica admixture, fine and coarse aggregate, admixtures and water. The air-entraining feature shall be obtained by the use of an approved air-entraining admixture. The entrained air content of the concrete immediately before placement shall be not less than 5 percent nor more than 7 percent. The testing of air content shall be performed in accordance with the requirements of AASHTO T152.

The consistency shall be determined by the AASHTO Method T119. A uniform consistency shall be continuously maintained. The slump shall be 125 to 200 mm. Slumps greater than indicated above may be used only when directed by the Engineer.

The Contractor shall design and submit for the approval by the Engineer, a concrete mix that shall attain a minimum 28 day cylinder strength (f'c) as shown on the plans.

The maximum water – cementitious material ratio shall be 0.40.

The minimum weight of cementitious materials per cubic yard of concrete shall be 860 lbs.

Fly ash shall be used to replace 20% by mass of cementitious material and microsilica shall be used to replace 6% by mass of cementitious material.

Portland Cement:

The portland cement shall be Type II cement conforming to the requirements of Article M.03.01-3.

Fly Ash: The fly ash shall conform to the requirements of Article M.03.01-13.

Coarse Aggregate: The coarse aggregate shall conform to the requirements of Article M.03.01-1 and the mix shall be designed utilizing a nominal maximum size of No. 6 aggregate.

Water-Reducing Admixture: The Contractor may submit, for the approval of the Engineer, a water-reducing admixture for the purpose of increasing workability and reducing the water requirements for the concrete.

Calcium Chloride: The addition of calcium chloride to the mix will not be permitted.

Microsilica Admixture: The microsilica admixture shall be in accordance with ASTM C1240 and approved by the Department. Only one brand shall be allowed for any structural element. The manufacturer shall provide written certification that the supplied material meets the requirements of the specifications.

If the microsilica admixture is supplied in the slurry form, the slurry shall be maintained in storage above the temperature of 32°F. Slurries exposed to temperatures of 32°F or less shall be removed and replaced at no cost to the Department. The slurry shall be homogeneous and agitated as necessary to prevent separation. The slurry shall be added using proportioning equipment approved by the Engineer. The microsilica slurry admixture shall be added through an existing automation system or a two stop off-line automated batching system. The automated batching system shall meet the following requirements:

- Delivery accuracy of $\pm 1\%$ (by volume)
- Program quantity (liters, nearest tenth)
- Batching tolerance $\pm 2.0\%$ (by volume)
- System interlocks
- Print requirements:
 - a. Date and time
 - b. Truck number (or alternate method relating microsilica to batch ticket)
 - c. Delivered quantity (liters, nearest tenth)

The control box/printer for a two stop off-line batching system shall be located at the batch plant operator's work station unless otherwise approved by the Engineer.

If the microsilica admixture is supplied in the densified powder form, the mass of the densified powder shall be measured cumulatively with the cement and fly ash. The densified powder shall be last in the measuring sequence and the tolerance for each material draw mass shall be based upon the total mass of cement plus fly ash plus densified powder. The batching tolerance for the cement plus fly ash plus densified powder shall be $\pm 1\frac{1}{2}\%$ by mass.

Special Mixing Requirements for Densified Microsilica:

Densified microsilica requires enhanced mixing to ensure full dispersion. Mix requirements shall conform to the recommendations of the microsilica manufacturer.

Construction Methods:

The construction methods for this work shall conform to the requirements of Section 6.01.03, supplemented and amended as follows:

When falsework is required to support the forms and before the erection of such falsework, the Contractor shall submit working drawings of falsework and forms to the Engineer for approval in

accordance with Article 1.05.02-2. These working drawings shall be submitted at least thirty (30) days before the erection of such and shall include but not be limited to the following information:

1. Complete details and erection plan of falsework and forms.
2. The computed settlements and deflections of falsework and forms.
3. Required camber of the forms to correct falsework settlement and form deflections.
4. Sequence of concrete placement.
5. Screed erection plan.

Any work done or material ordered prior to approval of these drawings shall be at the Contractor's risk. Approval of the working drawings shall not serve to relieve the Contractor of any of his responsibility for the successful completion of the project.

At least thirty (30) days before the erection of falsework and forms, the Contractor shall submit the required information in accordance with Article 1.05.02 for review by the Engineer. This information shall include details of equipment to be used in placing and finishing of the concrete, including the number and type of personnel who will be engaged in placing the concrete. The personnel shall consist exclusively of persons with skill and experience appropriate to their working assignments.

Concrete shall not be placed until the Engineer has inspected the forms, form ties, the placing of the reinforcing steel, and has given his approval thereof.

When falsework is required to support the forms, the Contractor shall make proper allowances for the deflection and settlement of forms and form supports and for the deflection and camber of the superstructure due to all operations.

Cylinders for Compressive Strength Testing: The concrete necessary to cast cylinders for compressive-strength determinations shall be furnished by the Contractor from each pour. The necessary personnel and forms for casting these specimens will be furnished by the Department and the number of specimens required will be specified by the Engineer.

Construction joints shall be made only where shown on the plans. Approval will not be given to place concrete in more than one operation where construction joints are not shown on the plans.

The concrete shall be vibrated. Both internal and external vibration shall be used when ordered by the Engineer. The vibrating shall be done with care in such a manner as to avoid displacement of reinforcing steel or other components. Concrete shall be carefully placed in the forms and vibrated sufficiently to produce a surface free from imperfections such as honeycomb, segregation, cracking or checking.

Any deficiency such as honeycomb or segregation may be cause for rejection.

Contractor shall submit procedures to demonstrate compliance with ACI 301 "Guide for Concrete Floor and Slab Construction", ACI 308 "Standard Practice for Curing Concrete", ACI 306 "Standard Practice for Cold Weather Concreting", and ACI 305 "Hot Weather Concreting."

During finishing the evaporation rate shall not exceed 0.1 pound per square foot per hour of exposed concrete. Possible procedures may include cooling ingredients prior to mixing, use of temporary windbreaks, sun shades, and fog nozzles.

The concrete for each pour sequence shall be kept constantly moist and protected against any drying action and cured for no less than seven (7) days after the placing of the concrete. Curing shall be accomplished in the following manner:

Fog Spray:

Curing of the concrete shall begin by the application of a water fog spray immediately after the initial set. Fog spray shall continue until such time as the moist cotton mats are placed. The amount of fog spray shall be strictly controlled so that accumulations of standing or flowing water on the surface of the concrete shall not occur. There shall be a sufficient amount of spray to keep up with the placing operations.

Should atmospheric conditions render the use of fog spray impractical, the Contractor shall use plastic covers of suitable thickness and securely fastened down, but not directly in contact with the deck concrete. The covers shall be used only until the initial set has taken place, whereupon moist cotton mats shall be placed immediately thereafter and kept wet for the duration of the curing period.

On the windward side of the panel being cured, the Contractor shall erect barriers of suitable height, when necessary, to protect the curing concrete from the direct force of the wind.

Moist Curing:

When the concrete has set sufficiently, moist curing shall be substituted for the fog spray.

Cotton mats shall be prewetted and ready to place on the newly finished concrete surface as soon as placement, consolidation, and finishing of concrete are complete. The time between initial exposure of the finished concrete to the environment and the application of soaked mats shall not exceed 10 minutes. The mats should then be covered with plastic sheeting to prevent evaporation of the curing water. Additional curing water should be applied through soaker hoses running under the protective plastic sheeting so that the mats are kept continuously wet throughout the period of cure.

To compensate for shrinkage, fresh concrete shall not be placed against a construction joint until the existing concrete has cured for 24 hours, except as noted on contract plans or otherwise authorized or ordered by the Engineer.

No load shall be imposed on the superstructure for at least seven days after the concrete has been placed.

Test Panels:

At least two weeks prior to the test panel placement, a preplacement meeting shall be held to review the specification, proposed procedures including concrete and admixture handling, placing, finishing and curing and to facilitate coordination between all the parties involved. Individuals attending this meeting should include the Engineer, Contractor, Concrete Supplier, representatives from the Department and a technical representative from the microsilica manufacturer.

At least 45 days prior to placing high performance concrete on the bridge, the Contractor shall construct a test panel utilizing the proposed mix. The test panel shall be a minimum of 15 feet x 15 feet and 8" thick and shall be located on site. The test panel shall be utilized to demonstrate that the Contractor's method of placing, finishing and curing the concrete shall meet the requirements of this specification. Finishing of the concrete surface shall be that required for an exposed concrete slab. The test panel shall include a 7 day wet cure as described above.

A technical representative of the microsilica manufacturer shall be present to advise the Contractor regarding finishing the test panel. Additional test panels shall be cast until all aspects, including materials, placement and curing are approved by the Engineer.

Method of Measurement:

This work will be measured for payment by the actual volume in cubic yards of High Performance Concrete, completed and accepted in place in accordance with the plans or as ordered by the Engineer. No deductions will be made for the volume of reinforcing bars.

Basis of Payment:

Payment for this work will be made at the contract unit price per cubic yard for "High Performance Concrete" complete in place, which price shall include all materials, equipment, tools, labor and work incidental thereto, including test panels, heating and cooling, curing and all admixtures.

ITEM #601082A - 5' x 4' PRECAST CONCRETE BOX CULVERT
ITEM #601154A - 12' x 4' PRECAST CONCRETE BOX CULVERT

Description:

This item shall consist of furnishing and installing precast concrete box culverts of the sizes indicated for gravity storm drains where shown of the plans.

Materials:

General: Precast concrete box culverts shall be manufactured in accordance with ASTM C789 and C850. Steel reinforcing bars shall conform to ASTM A615 and welded wire fabric shall conform to ASTM A185. Concrete compressive strength shall be a minimum of 5,000 psi.

The box shall be designed to withstand all dead loads including, but not limited to, lateral earth pressure, dead weight of cover materials, AASHTO HS20-44 vehicle loading (including impact), and hydrostatic pressure due to groundwater.

Provided gasketed joints between precast sections.

Pipe Connections: Provide openings for pipe penetrations in walls where indicated on the plans.

Manhole Risers: Provide openings in roof for manhole risers where indicated on the plans. Provide key to join precast manhole riser sections to box culvert. Provide steps in box culvert wall at manhole locations, as shown on the plans.

Sections Adjacent to Cast-in-Place Chambers: At the section end adjacent to the cast-in-place chamber, provide keyway and PVC waterstop continuous around perimeter. Provide two rows of threaded steel inserts as shown on the plans. Sections adjacent to cast-in-place chambers shall be a maximum of 4 feet in length.

Non-shrink grout: Non-shrink, non-metallic grout: Provide non-metallic cement based grout requiring only the addition of water, with minimum 28-day compressive strength of 8,000 psi, with shrinkage compensation characteristics in both the plastic and hardened states, conforming with ASTM C1107, "Grade C." Provide one of the following products:

- 1) Five Star Grout 100 by Five Star Products, Inc.
- 2) SikaGrout 212 as manufactured by Sika Corporation.
- 3) Masterflow 928 by Master Builders, Inc.
- 4) Or equal.

Construction Methods:

Box culvert shall be installed in accordance with Section 6.51 and the following:

Precast sections shall be set on a bedding of crushed stone as indicted on the plans.

Connection of Pipes to Box Culvert: Connect pipes to box culvert by use of flexible sleeve, compression gasket, or non-shrink grout.

Manhole Risers: For installation of Manhole Risers on box culvert, see Item 0507649A.

Sections Adjacent to Cast-in-Place Chambers: Install precast sections with special ends as specified above. Cast chambers after precast units are installed. Insert dowels into threaded inserts. Cast chamber as shown on the plans and as specified under the respective specifications for the chambers or manhole modifications.

Plugging Openings for Temporary Pipes: Where temporary pipes are connected to the box culverts, the openings shall be plugged after the temporary pipe is abandoned. Remove the portion of pipe within the wall of the box culvert. Plug the opening with a reinforced cast-in-place concrete patch as detailed on the plans.

Method of Measurement:

Box culvert will be measured for payment by the actual linear feet of pipe completed and accepted and measured in place along the invert.

Basis of Payment:

Box culvert will be paid for at the contract unit price per linear foot of the respective size of box culvert, complete in place, including all materials, equipment, tools and labor incidental thereto.

Resiliency @ 77 °F, (ASTM D3407)	60% Min.
Asphalt Compatibility, (ASTM D3407)	Pass
Recommended Pouring Temp.	390 °F
Safe Heating Temperature	410 °F

5. Aggregate - Shall be crushed, double-washed and dried granite, basalt or gabbro. It shall be supplied in 3/4", 1/2", and 3/8" sizes as recommended by the joint manufacturer.

Materials for the asphaltic plug expansion joint shall be supplied by one of the following companies and all materials must be approved by the Engineer before use:

Thorma-Joint, manufactured by:	Linear Dynamics, Inc. 400 Lannidex Plaza Parsippany, NJ 07054
Koch BJS, manufactured by:	Koch Materials Company P.O. Box 510 Stroud, OK 74079
Polyjoint, manufactured by:	A.H. Harris 321 Ellis Street New Britain, Ct. 06050

Certification: A Certified Test Report shall be required for the closed cell foam backer rod and the binder material in accordance with Article 1.06.07, certifying the conformance of these materials to the testing requirements stated herein.

A Materials Certificate shall be required for the backing plates, locating pins, and aggregate in accordance with Article 1.06.07, certifying the conformance of these materials to the requirements stated herein.

The materials for the sealing of the joints in the parapets shall be comprised of the following:

1. The joint sealant shall be Dow Corning 888 or approved equal.

Other single component, non-sagging silicone joint sealants expressly manufactured for use with concrete will be considered for this item provided they are submitted in advance for approval to the Engineer. Other joint sealants will be considered for use only if a complete product description is submitted, as well as documentation describing at least five installations of the product. These documented installations must demonstrate that the product has performed successfully for at least five years under traffic conditions. The joint sealant shall be gray in color.

2. The closed cell polyethylene foam backer rod shall be cylindrical, with a diameter 1" wider than the joint opening, and shall conform to the following:

Density, ASTM D1622:	2.0 lb/cubic ft (min.)
Tensile strength, ASTM D1623:	25 psi (min.)
Water absorption, ASTM C509:	1.0% of weight (max.)

Certification: A Certified Test Report shall be required for the closed cell foam backer rod in accordance with Article 1.06.07, certifying the conformance of this material to the testing requirements stated herein.

A Materials Certificate shall be required for the joint sealant in accordance with Article 1.06.07, certifying the conformance of this material to the requirements stated herein.

Construction Methods:

A technically competent representative of the manufacturer shall be present during installation of the expansion joint to give such aid and instruction in the installation of the joint as is required to obtain satisfactory results.

Saw cut and remove the bituminous concrete overlay and membrane waterproofing to the required dimensions of the joint. Existing concrete headers, defective joint sealant, and reinforcement within the required dimensions of the joint shall also be removed. All concrete joint surfaces shall then be cleaned by the use of a hot compressed air lance until a clean, dry surface is produced. The cut asphalt surfaces shall be cleaned in a similar manner taking care to remove all water and cutting dust.

The backer rod shall be installed in the joint opening at a minimum depth of 1" through the roadway and curbs. At curbs, the backer rod shall be placed as indicated on the plans.

Binder material shall be heated to a temperature greater than 350 °F, but not to exceed the manufacturer's recommended safe heating temperature. The heating kettle shall have a continuous agitation system, temperature controls, calibrated thermometers and be double steel jacketed with an oil layer in between, to prevent scorching of the binder. During application, the binder material temperature shall be maintained at a minimum of 350 °F. The binder shall be poured into the expansion joint opening until it runs over the edges.

A backing plate shall be placed from curb to curb on the roadway portion of the expansion joint. The plate shall be centered over the joint opening. The plate section shall be butted up to each section and not overlapped. Locating pins shall be placed in the pre-drilled holes and hammered in to secure the plates.

Binder material shall be applied over the plate and in the blockout to seal this area.

The aggregate shall be heated in a rotating drum mixer to a minimum of 350 °F. The temperature shall be monitored with a calibrated digital temperature sensor. Binder material shall be added to the mixer to precoat the aggregate.

The coated aggregate shall be placed into the blockout in layers as recommended by the joint material manufacturer. The blockouts shall be overfilled with coated aggregate as required to compensate for compaction. Equipment for compaction shall be as recommended by the joint manufacturer. Additional binder material shall be screeded over the compacted joint to fill any surface voids.

Vehicular traffic may pass over the installed joint 2 hours after compaction of the joint material.

The parapet joints shall be thoroughly cleaned of all scale, loose concrete, dirt, dust or other foreign matter by abrasive blast cleaning. Residual dust shall then be removed by blasting with oil free compressed air. Projections of concrete into the joint space shall also be removed. Closed cell elastomer shall be placed in the joint as shown on the plans and as directed by the Engineer. The joint shall be clean and dry before the silicone joint sealant is applied.

The silicone joint sealant shall applied as outlined in the accordance with the manufacturer's printed instructions and as directed by the manufacturer's representative, and with the equipment prescribed by the manufacturer.

The Contractor shall arrange for, and have present at the time the first joint-sealing operation is to be performed, a manufacturer's representative knowledgeable in the methods of installation of the sealant. The Contractor shall also arrange to have the representative present at such other times as the Engineer may request.

Method of Measurement:

This work will be measured for payment by the number of linear feet of joint measured from gutterline to gutterline (final condition) on a horizontal line along the centerline of the joint.

Basis of Payment:

This work will be paid for at the contract unit price per linear foot for "Asphaltic Plug Expansion Joint System", complete in place, which price shall include all materials, equipment, tools and labor incidental thereto.

ITEM #601700A - STAIN PROTECTION

Description:

Work under this item shall consist of furnishing, installing and maintaining temporary coverings required to protect surfaces of abutments, piers and other areas as shown on the plans from rust stain; and the removal of rust stain as directed by the Engineer.

Materials:

Temporary coverings of reinforced polyethylene film shall be used in areas requiring temporary protection from staining. The film shall have a minimum thickness of 6 mils.

Rust Stain Remover shall effectively remove rust stains and shall not harm or discolor concrete, steel, or other materials with which it may come in contact.

Construction Methods:

Temporary coverings shall be installed over abutments and piers or as directed by the Engineer and shall be securely fastened into place at all times. Damaged coverings shall be repaired immediately. The installation of the temporary coverings shall be approved by the Engineer prior to erection of any structural steel and shall not be removed until after all deck joints in the superstructure have been completed or sealed as shown on the plans. Any staining which takes place due to ineffective coverings shall be removed by methods approved by the Engineer, at no additional cost to the State.

Method of Measurement:

Payment under this item shall be at the contract lump sum price and will not be measured for payment.

Basis of Payment:

This work will be paid for at the contract lump sum price for "Stain Protection". The price shall include all materials, equipment, tools, labor and work incidental thereto.

ITEM #602034A – DEFORMED STEEL BARS (CLADDED STAINLESS STEEL)

Description:

Work under this item shall consist of furnishing, placing stainless steel cladded rebar in the deck slab, sidewalks and parapets of the size designated on the plans as directed by the Engineer in accordance with these specifications.

Materials:

The stainless steel cladded bar shall meet the requirements of ASTM A615 Grade 75. The outer stainless steel layer shall meet the requirements of ASTM A276 and the bond strength of the clad to the core shall meet ASTM A263. Intergranular corrosion resistance of the stainless steel layer shall meet the requirements of ASTM A262, Practice 'E'.

Construction Methods:

Fabrication shall conform to the requirements of Section 6.02.03 of Form 814A with the following addition:

The exposed carbon steel ends of all rebar shall have end caps. Adhesive recommended by the supplier shall be used to press fit end caps to all rebar ends so all core ends are completed sealed.

Method of Measurement:

This work will be measured by the number of pounds of bar reinforcement installed and accepted.

Basis of Payment:

This work will be paid for at the contract unit price per pound for "Deformed Steel Bars (Cladded Stainless Steel)" complete in-place and accepted, including shop drawings, furnishing, fabricating and placing reinforcing steel, and all materials, equipment, tools, labor and work incidental thereto.

ITEM #602936A - DRILLING AND GROUTING REINFORCING BARS

Description: Work under this item shall consist of drilling holes in concrete and grouting reinforcing bars at the locations shown on the plans, in accordance with the plans, the manufacturer's recommendations, and as directed by the Engineer.

Materials: The adhesive bonding material shall be a resin compound specially formulated to anchor steel bars in holes drilled into concrete for the purpose of resisting tension pull-out. The adhesive bonding materials shall be selected from the Connecticut Department of Transportation Approved Product List.

Certification: A Materials Certificate shall be required for the adhesive bonding material in accordance with Article 1.06.07, certifying the conformance of this material to the requirements stated herein.

Construction Methods: The Contractor shall drill holes into the concrete to the depth and at the locations shown on the plans.

The Contractor shall submit the following to the Engineer for approval: type of drill, diameter of bit, method of cleaning holes and method of placement of the adhesive bonding material. Specifications and recommendations for the aforementioned may be obtained from the manufacturer of the adhesive bonding material. The weight of the drill shall not exceed 20 pounds.

The reinforcing dowels shall be able to develop a pull-out resistance of 90 percent of their nominal yield strength when bonded at the embedment depths provided.

The Contractor shall provide the minimum cover for the dowels as shown on the plans.

If the existing reinforcing steel is encountered during drilling, the holes may be relocated only if approved by the Engineer.

Drilling methods shall not cause spalling, cracking, or other damage to the concrete. Those areas damaged by the Contractor shall be repaired by him in a manner suitable to the Engineer and at no expense to the State.

The Contractor shall take necessary precautions to prevent any materials from falling onto the area below.

For the adhesive bonding material, a Certificate of Compliance and a Materials Certificate will be required in accordance with Article 1.06.07, confirming the conformance of the adhesive bonding material to the requirements set forth in these specifications.

Method of Measurement: This work will be measured for payment by the actual number reinforcing bars grouted into drilled holes each, completed and accepted.

Basis of Payment: This work will be paid for at the contract unit price each for "Drilling and Grouting Reinforcing Bars", which price shall include drilling and preparing holes, and applying adhesive bonding material in the hole. It shall also include all material, except dowels, and all equipment, tools and labor incidental thereto. Dowels will be paid for under item "Deformed Steel Bars".

ITEM #603272A - DECONTAMINATION FACILITY

Description:

Under this item, the Contractor shall provide for the duration of the work where employees will be exposed to lead a climate controlled decontamination facility. The decontamination facility shall consist of a "clean" area where workers can remove and store clean street clothing when they arrive on site for work, shower room with hot and cold running water, soap and towels and a "dirty" area where work clothing and personal protective equipment may be stored. The showers shall be located between the two areas. The facility shall be used by all employees as defined in Item "Lead Health Protection Program" who are exposed to lead above the action level of 30 mg/m³ or have blood levels above 20 mg/dl or who are directed by the CIH. The facility shall have adequate clean storage for all employees who are required to use the facility to store their non-work clothing. The facility shall be located as close to the work site as is physically possible. If the Contractor is unable to locate the decontamination facility close to specific work areas, a designated shuttle vehicle shall be provided. This vehicle shall be classified as contaminated and shall remain at the job site in the decontamination zone. This vehicle shall be operated and maintained to eliminate any possibility of cross contamination with the support zone. The vehicle shall be cleaned as defined in the current CRISP protocol. Ownership of and liability for the facility and shuttle vehicle shall remain with the Contractor throughout. The facility shall comply with 29 CFR Part 1926.51.

Materials:

Materials shall be of satisfactory quality for the purpose intended and shall be approved by the Engineer. The walls, ceiling, and floors shall be constructed of impervious material to aid in the cleaning of the facility such as, but not limited to, fiberglass and plastic.

Requirements:

The decontamination facility shall have adequate floor space to accommodate the work force and a minimum ceiling height of seven feet. Windows shall be of a type that will open and close conveniently shall be sufficient in number and size to provide adequate light and ventilation and shall be fitted with locking devices and screens. The entrance shall be secure, screened and fitted with a lock.

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

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

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

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

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

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

Method of Measurement:

The furnishing of the decontamination facility and shuttle vehicle specified will be measured for payment by the number of calendar months that the facility and shuttle vehicle are in place, operational, and being used by employees who are exposed to lead above the action level of 30 mg/m³ or have blood levels above 20 mg/dl or who have been directed by the CIH. A decontamination facility and shuttle vehicle that is in operation for only a portion of a month will be measured for payment for the entire month.

Basis of Payment:

The furnishing of the decontamination facility and shuttle vehicle will be paid for at the contract unit price per month for "Decontamination Facility" as specified, which price shall include all material, equipment, labor, cleaning, sampling, testing, treatment and disposal of wastewater, utilities, maintenance, services, cost of CIH to perform wipe sampling, and work incidental thereto.

The cost of providing external illumination, trash removal and snow and ice removal shall also be included in the monthly unit price bid for the item "Decontamination Facility" as specified.

<u>Pay Item</u>	<u>Pay Unit</u>
Decontamination Facility	Month

ITEM #603273A - PORTABLE HANDWASH FACILITY

Description:

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

Materials:

Materials shall be of satisfactory quality for the purpose intended and shall be approved by the Engineer.

Requirements:

The portable handwash facility shall be trailer, skid or cart-mounted and have a minimum of one (1) sink with a fresh water tank, and a holding tank. Hand soap or similar cleansing agents shall be provided and individual hand towels or sections made of cloth or paper, warm air blowers or clean individual sections of continuous cloth toweling. The facility will also be equipped with hot water heater, eye wash station, storage cabinets, lights for night use, an electric or pneumatic water pump, and lead filtration system. Containers for the collection and disposal of refuse generated at the facility shall also be provided.

The facility shall be kept in a sanitary condition and clean as defined in the current CRISP protocol. As a minimum, the facility shall be cleaned after every shift.

Method of Measurement:

The furnishing of the portable handwash facility(ies) that are approved will be measured for payment by the number of calendar months that each facility is in place, operational, and being used by employees who are exposed to lead above the action level of 30 mg/rn³ or have blood levels above 20 mg/dl or who have been directed by the CIH. A portable handwash facility that is in operation for only a portion of a month will be measured for payment for the entire month.

Basis of Payment:

The furnishing of the portable handwash facility will be paid for at the contract unit price per month for each "Portable Handwash Facility" as specified, which price shall include all material, equipment, labor, sampling, testing, treatment and disposal of wastewater, cleaning, maintenance, disposal, cost of the CIH for monitoring the cleanliness of the facility and work incidental thereto.

<u>Pay Item</u>	<u>Pay Unit</u>
Portable Handwash Facility	Month

ITEM #603345A - INSPECTION WALKWAY (TYPE I)
ITEM #603346A - INSPECTION WALKWAY (TYPE II)
ITEM #603347A - INSPECTION WALKWAY (TYPE III)

Description:

This item shall consist of furnishing, fabricating and erecting all components of the inspection walkways conforming to the details as shown on the plans and in accordance with these specifications.

Materials:

The details of the inspection walkways shall be as shown on the plans and shall consist of the following materials as required.

All structural members shall be fiber reinforced plastic (FRP) unless noted otherwise. The FRP members shall be a fire-resistant polyester meeting the requirements of ASTM test method E-84 with a maximum flame spread value of 25. The FRP members shall be dark gray in color and contain ultra-violet inhibitors. In addition, the FRP members shall have the following physical properties:

Property	ASTM Designation	Value
Ultimate Tensile Strength	D-638	30,000 PSI
Ultimate Flexural Strength	D-790	30,000 PSI
Ultimate Short Beam Shear Strength	D-2344	4,500 PSI
Modulus of Elasticity	Full Section	2,800,000 PSI

All fasteners shall be stainless steel 316 bolts, condition A, per ASTM F593-98.

Inspection walkway gratings shall be one of the following or an equivalent to be approved by the engineer:

- a) IKG Industries Corgrate WT 2" fiber reinforced pultruded grating
- b) Strongwell Duragrid T-3300 2" fiberglass pultruded grating
- c) Seasafe Safe-T-Grate T-3320 2" fiber reinforced pultruded grating

FRP grating shall be secured with type 316 stainless steel hold down clamps fastened at each structural member. The quantity of grating hold down clamps shall meet the recommendations of manufacturers and but shall not be less than 4 clamps per grating panel and the on center spacing between clamps shall not exceed 24 inches.

Inspection walkways will be designed to support a live load of 100 psf. Allowable deflection of the FRP grating under live load shall not exceed 0.25 inches at the center of grating span. All

structural members shall be designed to sustain all applied loads. Deflection in any direction shall not be more than L/360 of the span for structural members.

Structural steel shapes shall conform to ASTM A709, Grade 36.

Structural steel plates and shapes shall be hot dipped galvanized after fabrication in conformance with ASTM A123.

Touch-up for galvanizing shall be Zinc Rich Paint conforming to the requirements of Federal Specification TT-P-6416 or Military Specification MIL-P-21035.

A Certified Test Report will be required in accordance with Article 1.06.07, certifying the conformance of the materials to the requirements set forth in this specification. Should the consignee noted on a Certified Test Report be other than the Prime Contractor, the Materials Certificates shall be required to identify the shipment.

Submittals:

Shop Drawings:

Prior to beginning work and fabrication of any materials, the Contractor shall take all field measurements necessary to assure the proper fit of the finished inspection walkways, including all supports, brackets and hangers, railings, ladders and cages, gratings, fasteners, anchor bolts and other appurtenances and shall submit shop drawings to the Engineer for approval in accordance with Article 1.05.02-3. These drawings shall include complete fabrication details erection plans, material lists and designations for the work under this item.

Method of Measurement:

Payment under this item will be at the contract price per each type for the completed inspection walkways and will not be measured for payment.

Basis of Payment:

This work will be paid for at the contract unit price per each for "Inspection Walkway" of each type, complete in place, which price shall include furnishing, fabricating, transporting, erection, surface preparation, galvanizing and all materials, tools, equipment and labor incidental thereto.

Steel hanger clip supports, attached to floor system stringers to support inspection walkway hangers and bracing, shall be included in the item "Structural Steel (Segment 2)".

ITEM #603353A - STRUCTURAL STEEL (SEGMENT 1 & 3)

This special provision provides additional requirements for the surface preparation, coating and field touch-up of structural steel.

Work under this item shall conform to the requirements of Section 6.03, supplemented and amended as follows:

It is anticipated that the placement and removal of the concrete forms for the cantilever deck slab will be completed after the structural steel truss of Segment 2 is lifted and moved into its final position. Metro-North Railroad and Amtrak requires that the placement and removal of the concrete forms for the cantilever deck slab work be completed above temporary work platforms/protective shielding.

The installation of the work platforms/protective shielding over the railroad right of way for the purposes of deck forming and any of the other Contractor's operations as required by the railroad(s) will be included under this item.

The Contractor's attention is directed to the fact that specific "Suggested Erection Sequence", as shown on the plans, have been developed for the erection of the structural steel of Segments 1 & 3 within the New Haven Rail Yard. The Contractor shall determine and be responsible for the actual erection methods and sequencing with the approval of the Engineer. The suggested erection methods and sequencing shown on the plans shall be considered only as a guide.

The Contractor shall determine and be responsible for the actual sequence of construction with the approval of the Engineer. Prepare and submit to the Engineer working drawings and computations in accordance with Article 1.05.02-2 of Form 814. The drawing shall be prepared and stamped by a professional Engineer licensed in the State of Connecticut fully depicting his proposed methods and sequencing. These drawings shall include, but not be limited to complete details of the methods, materials and equipment he proposes to use for this purpose.

Article 6.03.02 - Materials:

Delete the entire article and replace with the following: The materials for this work shall conform to the requirements of Section M.06, M.07.02 and the following.

The coating system shall be a three-coat system. All materials for the complete coating system shall be furnished by the same coating material manufacturer. Intermixing of materials within and between coating systems will not be permitted. Thinning of paint shall conform to the manufacturer's recommendations.

The Contractor shall select a NEPCOAT system from the Product Reference List of the latest Product Use Status Lists, maintained at the Material Testing Lab in Rocky Hill. The system chosen shall have a prime coat which has achieved a Class B slip coefficient.

Fasteners: All high strength ASTM A325 Type 1 bolts, nuts and washers for use in painted steel structures shall be mechanically galvanized in accordance with ASTM B695, Class 50.

Article 6.03.03 - Construction Methods:

Delete the following Subarticles:

- Subarticle 23 - Surface Preparation
- Subarticle 24 - Blast Cleaning
- Subarticle 25 - Pickling for Painting
- Subarticle 26 - Other Methods of Surface Cleaning
- Subarticle 29 - Paint
- Subarticle 31 - Mixing of Paint
- Subarticle 37 - Shop Painting
- Subarticle 38 - Field Painting

Add the following general requirements:

All shop painting of structural steel fabricated for projects advertised on or after July 1, 1997, must be done by companies that are certified by the Steel Structures Painting Council (SSPC) Painting Contractor Certification Program QP-3, entitled "Standard Procedure for Evaluating Qualifications of Shop Painting Contractors". The companies shall be fully certified for the duration of the time they are doing surface preparation and coating application.

The complete coating system shall be shop applied except for field touch-up which shall be applied after all bolts are fully tensioned and deck formwork removed.

Shop Inspection Requirements: The firm performing shop painting of the structural steel shall have a written quality control (QC) program. A copy of the QC program and record keeping procedures shall be provided to the Engineer prior to commencing any surface preparation or coating application. The program shall contain, but not be limited to, the following:

1. Qualifications of QC staff.
2. Authority of QC staff. QC staff must have the authority to stop non-conforming work.
3. Procedure for QC staff to advise operation supervisor, in writing, of non-conforming work.
4. Sample copy of QC inspection reports that will document compliance with specification.
5. Procedure for calibrating inspection equipment and recording calibration.

The Contractor shall retain at least one National Association of Corrosion Engineers (NACE) Coating Inspector, who has successfully completed all three training sessions and the peer review, for the duration of the project. The Contractor's shop inspector shall verbally inform the Engineer on a daily basis, of the progress and any corrective actions performed on the coating work. The NACE inspector shall be present during all cleaning and coating operations.

Daily coating activity shall be recorded in the latest version of the NACE Coating Inspector Log Book and shall commence prior to structural steel shop drawing preparation. The Contractor shall be responsible for purchasing and providing the inspection log book(s) prior to shop drawing preparation. At the time of steel shipment from the fabricator's plant, the Contractor's inspector shall stamp the front page of each inspector's log book used during painting operations. The stamped book(s) shall indicate the inspector's NACE certification number, expiration date and shall also be signed. The log book(s) shall then be furnished to the Department's shop representative who shall in turn send it to the Engineer responsible for overseeing field topcoating of fascia beams.

Technical Advisor: The Contractor shall obtain the services of a technical advisor who is

employed by the coating manufacturer to assist the Engineer and shop painting firm during this work. The technical advisor shall be a qualified representative, approved by the Engineer, and shall be at the work site prior to the opening of the material containers. The technical advisor shall provide instruction in the proper mixing of components and application of the material. He shall remain at the site until the Engineer is satisfied that the shop painting firm's personnel have mastered the proper handling, mixing and application of the material. The Engineer may call the technical advisor back to the site if the shop painting firm is not applying the material in accordance with the material data sheet or application instructions.

Surface Preparation: Before being abrasive blast cleaned, all square edges, sharp discontinuities and flame cut edges shall be ground in accordance with the ANSI/AASHTO/AWS Bridge Welding Code D1.5 Section 3.2.9. All steel surfaces shall then be solvent cleaned in accordance with SSPC-SP 1 - "Solvent Cleaning" before being blast cleaned.

Abrasive blast cleaning shall be performed in accordance with SSPC-SP 10 - "Near White Blast Cleaning" using a production line shot and grit blast machine or by air blast. The abrasive working mix shall be maintained such that the final surface profile is within the range specified elsewhere in this specification.

The abrasive shall also be checked for oil, grease or dirt contamination with the vial test. This test consists of a sealable vial or jar filled with distilled water, in which a sample of abrasive taken from the inside of the blast machine is added to the vial. The vial is shaken for one minute and left to settle for five minutes. Observe the vial. If any oil or grease is floating on top of the water, then the abrasive is contaminated with oil or grease. If the water has become cloudy, then the abrasive is contaminated with dirt. Contaminated abrasive shall not be used to blast clean steel surfaces. The blast machine shall be cleared of all contaminated abrasive and then solvent cleaned thoroughly in accordance with SSPC-SP 1 "Solvent Cleaning". New uncontaminated abrasive shall be added after a vial test and blast cleaning may resume.

All compressed air sources shall have properly sized and designed oil and moisture separators, attached and functional, to allow air at the nozzle, either for blast cleaning, blow-off, painting or breathing, to be oil-free, and moisture-free. They shall have sufficient pressure to accomplish the associated work efficiently and effectively.

The blotter test shall be performed at the start of each blasting shift by the Contractor to ensure that the compressed air be free of oil and moisture. The blotter test shall be performed in accordance with the procedure outlined in ASTM D4285. For contaminated air sources, the oil and moisture separators shall be drained and the air retested.

No surface preparation or coating shall be done when the relative humidity is at or above eighty percent or when the surface temperature of the steel is less than five degrees Fahrenheit above the dewpoint temperature as determined by a surface thermometer and an electric or sling psychrometer.

Surface Profile: The steel surface profile shall be 1 to 3 mils. Each girder, beam or diaphragm shall have the surface profile measured at three locations. This measurement shall be performed with both coarse (0.8-2.0) and extra coarse (1.5-4.5) Testex Replica Tape. During this measurement, special attention shall be given to areas that may have been shielded from the blast wheels, such as the corners of stiffeners and connection plates. The impressed tapes shall be filed in the NACE Coating Inspector's Log Book. Note: When measuring the profile on the tape, 2 mils shall be subtracted (non-compressible mylar thickness) from the micrometer reading as indicated on each piece of tape.

A surface profile correction factor shall be measured in accordance with SSPC-PA2 section 2.2.4. with a "type 2" magnetic film thickness gage.

Application Methods: The coating system shall be applied by spray equipment of a type and size capable of applying each coat within the required thickness range in one application as approved by the Engineer. The applicator shall adhere strictly to the manufacturer's recommendations about cure times, temperature and humidity conditions and recoat times as the individual coats of the specified system are applied. Brushes may be used in those restrictive areas where spray application would not achieve acceptable results. Brushing technique shall be performed in a manner that will provide a uniform, blended finish.

For prime coat application, conventional spray equipment with mechanical agitators shall be used.

All storage, mixing, thinning, application and curing efforts, techniques and methods shall be accomplished in strict accordance with the printed material data sheets and application instructions published by the respective coating material manufacturer.

Surfaces shall be painted with the specified prime coat material before the end of the same work shift that they were blast cleaned and before any visible rust back occurs, unless otherwise approved by the Engineer.

Applied coatings shall not have runs, sags, holidays, pinholes or discontinuities.

The dry film thickness shall be within the range specified in the manufacturer's printed literature for the coating system used. Dry film thickness shall be measured in accordance with SSPC-PA2.

The intermediate coat shall be of a contrasting color to the prime and top coat colors.

There shall be no color variation in the topcoat as determined by comparison with Federal Standard 595 nor any gloss variation in the top coat as tested in accordance to ASTM D523.

Areas Requiring Special Treatment: All steel surfaces shall receive the three-coat shop applied system as specified except the following particular area types which shall be masked off and treated as follows:

- 1.) Faying surfaces of slip-critical bolted connections shall receive only a single application of primer. The dry film thickness shall be the same as the tested thickness on the coating manufacturer's Certified Test Report for slip coefficient.
- 2.) All steel surfaces within four (4) inches of field welds shall receive only a single mist coating of primer at 0.5 - 1.5 mils dry film thickness.

- 3.) Steel surfaces, within a length equal to 1.5 web depths from the end of members, including end diaphragms, shall receive an additional application of the intermediate coating material at 3 mils minimum dry film thickness before application of the full intermediate coat.
- 4.) Steel surfaces to be in contact with concrete shall receive only a single application of the primer.
- 5.) Previously ground edges and shop welds shall be locally hand-stripped with a brush in the longitudinal direction with an additional intermediate coat material prior to application of the full intermediate coat.
- 6.) If weathering steel members are used, all steel surfaces within a length equal to 1.5 web depths from the centerline of deck joints, including end diaphragms, shall receive the full three coat system. The color of the top coat shall be weathering steel brown (Federal Standard 595 Color Number 20062) to match the future weathered surface.
- 7.) The interior surfaces of box girders, including bracing, shall be prepared in accordance with this specification then coated with the first two coats of the three coat system. The intermediate coat shall be white and match Federal Standard 595 Color Number 27925.

Protection of Coated Structural Steel: All fully coated and cured assemblies shall be protected from handling and shipping damage with the prudent use of padded slings, dunnage, separators and tie downs. Loading procedures and sequences shall be designed to protect all coated surfaces.

Erection marks for field identification of members and weight marks shall be affixed in such a manner as to facilitate removal upon final assembly without damage to the coating system.

Qualification of Field Painting Contractors: All painting contractors and painting subcontractors used for field touch-up must be certified by the Steel Structures Painting Council (SSPC) Painting Contractor Certification Program (PCCP), QP-1, entitled "Standard Procedure for Evaluating Qualifications of Painting Contractors: Field Application to Complex Structures" at the time of field coating application. This certification must be full and not interim. The painting contractors or subcontractors must remain so certified for the duration of the field coating application. If a contractor's or subcontractor's certification expires, the painting firm will not be allowed to perform any work until the certification is reissued. Requests for extension of time for any delay to the completion of the project due to an inactive certification will not be considered and liquidated damages will apply. At the option of the Engineer, if such a delay continues for more than 60 calendar days, the Department may engage another SSPC certified contractor to perform the painting work at the prime contractor's expense.

Field Touch-Up: After the slab is poured and forms removed, all adhering rust, scale, dirt, grease, concrete splatter and other foreign material on connections, bolts, nuts and around field welds shall be completely removed by solvent cleaning in accordance with SSPC-SP1, hand tool cleaning SSPC-SP 2, or power tool cleaning SSPC-SP3. Cleaning shall be performed prior to field touch-up painting.

Bolts, nuts and washers shall receive brush applications of intermediate and top coat after final

tensioning. Careful attention shall be given to bolted connections to insure that all bolts, nuts and washers are fully coated and that no gaps are left unfilled and uncoated.

Field welded areas shall be treated in the same manner as shop welded areas, including special treatment requirements.

At damaged areas that extend back to the steel surface (such as scratches, gouges or nicks), the entire three coat system shall be locally reapplied after power tool cleaning to bare metal in accordance with SSPC-SP 11. The coating system adjacent to the damage shall be feathered back to increase the surface area for touch up painting. Field touch-up in these areas shall use the same sequence and thickness of coatings as originally applied in the shop.

At damaged areas that extend back only to the prime or intermediate coat, the area shall have the top coat applied. Application of the touch-up materials in these damaged areas shall be performed by brush only.

ITEM #603354A - STRUCTURAL STEEL (SEGMENT 2)

Work under this item shall conform to the requirements of Section 6.03 amended as follows:

Article 6.03.01 – Description:

Add the following to the end of the article:

This item shall include the assembly of the structural steel truss of Segment 2 supported on the proposed welded girders of Segment 3, as shown on the “Suggested Erection Sequence – Truss Assembly” plans. The Contractor is completely responsible for the erection of the truss and shall completely design and detail the erection sequencing and methods. Also included under this item is the use of temporary transfer beams and hold-down devices, as shown on the “Suggested Erection Sequence – Truss Assembly” plans. It shall include the design of, and the furnishing, fabricating, transporting, erecting, installing, and the removal and disposal of, the transfer beams and hold-down devices, as required.

This item will also include supporting and jacking the fully assembled truss segment at the four reaction posts for the purpose of determining the correct installation of remain-in-place forms, and to allow for the installation of the proposed inspection platforms. The remain-in-place forms and the inspection platforms shall be installed when the truss is in the temporary location. This jacking will require the use of temporary support structures, including bracing and foundations, and hydraulic jacks, as required, and as determined by the Contractor. It shall include the design of, and the furnishing, fabricating, transporting, erecting, installing, jacking, and the removal and disposal of, the temporary supports, bracing, foundations and jacks, as required.

Included under this item is the preparation of working drawings and computations, as required, and as noted herein and elsewhere in these specifications, for the methods and temporary work the Contractor proposes to complete the work included under this item. All working drawings and computations shall be signed and sealed by a Professional Engineer licensed in the State of Connecticut and experienced in this type of work. The Department reserves the right to approve the use of any and all Professional Engineers performing the work.

It is anticipated that the placement and removal of the concrete forms for the cantilever deck slab will be completed after the structural steel truss of Segment 2 is lifted and moved into its final position. Metro-North Railroad and Amtrak requires that this work be completed above temporary work platforms/protective shielding.

The installation of the work platforms/protective shielding over the railroad right of way for the purposes of deck forming and any of the other Contractor’s operations as required by the railroad(s) will be included under this item.

Article 6.03.02 - Materials:

The materials for this work shall conform to the requirements of Section M.06 amended as follows:

Subarticle M.06.02-1 – Structural Steel: Delete the entire subarticle and replace with the following:

The structural steel shall be low alloy conforming to the requirements of AASHTO M270, Grade 50 or ASTM 709 HPS Grade 70W as shown on the plans.

Fasteners: All high strength ASTM A325 Type 1 bolts, nuts and washers for use in the galvanized steel truss shall be mechanically galvanized in accordance with ASTM B695, Class 50.

The structural steel for the main load carrying components of the structure shall meet the Zone 2 Charpy V-notch Impact Testing requirements, for fracture critical and non-fracture critical members, in accordance with AASHTO M270 (ASTM A709).

Subarticle M.06.03 – Galvanizing: add the following:

Before hot dip galvanizing, the tanks shall be cleaned to remove surface and bottom contamination, i.e. dross, sludge, ash and flux.

The steel members shall be hot-dip galvanized by completely submerging them in the galvanizing tank.

The hot-dip galvanizing shall conform to the requirements of ASTM A123 as amended as follows:

Subarticles 5.2, 5.3 and 7.3 shall be replaced with the following:

- 5.2 Finish – The coating shall be continuous, smooth and uniform in thickness and shall be inspected by visual means with the aid of straight edge and dry film thickness instruments. The overall dry film thickness shall be 3.4 – 8.0 mils. Joint faying surfaces shall have a dry film thickness of 3.4 – 4.5 mils.
- 5.3 Appearance – Galvanized articles shall be free from uncoated areas, blisters, flux deposits, acid and black spots, and dross inclusions. Lumps, projections, globules, or heavy deposits of zinc will not be permitted. All holes shall be clean and free of excess zinc. The pieces shall be handled so that after galvanizing they will not freeze together on cooling.
- 7.3 Finish and Appearance – Inspection shall be visual with the aid of straight edge instruments to determine compliance with the requirements of 5.2 and 5.3. Articles that have a nonuniform, rough coating shall be ground smooth with power tools such as disc grinders. If grinding has been performed, the resultant surface shall comply with 5.2 and 5.3.

All damage, (i.e., scratches, nicks, cracks), on the hot dip galvanized steel shall be repaired in accordance with ASTM A780 Annex A2 "Repair using Zinc-Rich Paints". The Zinc-Rich paint shall conform to Federal Specification TT-P-641 Type 1 and shall be brush applied with a dry film thickness range of 3 to 6 mils.

Add the following Subarticle.

Subarticle M06.05 – Certified Tests Reports, Material Certificates and Certificates of Compliance:

The Contractor shall furnish Certified Test Report in conformance with Article 1.06.07 confirming that the structural steel meets the chemical and strength requirements stated herein. The Contractor shall furnish Materials Certificate in conformance with Article 1.06.07 confirming that the structural steel galvanizing meets the requirements stated herein.

Temporary Supports: All steel for the temporary support of the structural steel shall conform to the requirements of ASTM A709 Grade 36 or Grade 50, as proposed by the Contractor and approved by the Engineer. All material shall be in conformance with the Connecticut Department of Transportation Standard Specifications Form 814A. The structural steel for the temporary supports need not be painted. All bolts shall be high strength bolts conforming to ASTM A325. Anchor bolts shall be fully threaded rods conforming to ASTM A449. Threaded rods for the hold-down devices shall conform to ASTM A354 Grade BD. All materials required for the temporary support of the proposed structural steel, which are not required in the completed structure, shall remain the property of the Contractor and shall be removed from the site when it is no longer needed.

Article 6.03.03 - Construction Methods:

Add the following to Subarticle 1 – Shop Drawings:

The Contractor shall prepare and submit to the Engineer, Working Drawings and Computations for approval in accordance with Article 1.05.02(2), for the work required under this item. The working drawings and computations shall be stamped by a Professional Engineer Licensed in the State of Connecticut and experienced in this type of work. The drawings and computations shall fully depict the erection methods, sequences, details and materials and equipment the Contractor proposes to use.

The working drawings shall include, but not be limited to, the following information:

Truss Assembly:

- A sequencing plan for the complete assembly of the proposed truss, including bracing members and floor beams and stringers.
- A layout plan for the temporary supports required, including bracing and guying to be used during the assembly of the proposed truss.
- Complete member sizes, material specifications, dimensions, connection details, temporary support systems, working loads and design methods, field measurements and grades as required, and an estimated time schedule for the truss assembly operation.

Truss Jacking:

- A sequencing plan for supporting and jacking the fully assembly truss for the purpose of determining the correct installation of remain-in-place forms, and to allow for the installation of the proposed inspection platforms.
- A layout plan for the temporary support structures, including bracing and foundations, and hydraulic jacks, as required. It shall include the design of, and the furnishing, fabricating, transporting, erecting, installing, jacking, and the removal and disposal of, the temporary supports, bracing, foundations and jacks, as required.

The Contractor's attention is directed to the fact that specific "Erection Sequencing" as shown on the plans and elsewhere in these specifications, have been developed for the erection of the Structural Steel Truss (Segment 2) over the Metro-North Railroad. The Contractor shall determine the specifics of and be responsible for the actual erection methods and sequencing with the approval of the Engineer. Prepare and submit to the Engineer working drawings and computations in accordance with Article 1.05.02-2 of Form 814A. The drawing shall be prepared

and stamped by a professional Engineer licensed in the State of Connecticut fully depicting his proposed methods and sequencing. These drawings shall include, but not be limited to complete details of the methods, materials and equipment he proposes to use for this purpose.

ITEM #0603801A - STRUCTURAL STEEL
ITEM #0603431A - STEEL (MISCELLANEOUS)

Description

Work under this item consists of furnishing, fabrication and erection of structural steel and steel (miscellaneous) for support of feeders.

Materials

Structural shapes, plates and rods shall conform to Form 814A, Section M.06.02. The material for rolled sections, plates and rods shall be ASTM A36 and ASTM A500 Grade B for structural tubes.

Size of bolt holes shall be 1/16" larger than bolt diameter unless specified otherwise.

All field connections shall be bolted.

All connection bolts shall be 7/8" diameter except as noted.

All bolts to have hex. heads and nuts and washers.

High strength bolts, nuts and washers shall conform to Form 814A, Section M.06.02.5 and shall meet ASTM A325 Type 1. Other connectors, where noted, shall be ASTM A307.

All material provided under this Section shall be galvanized after fabrication in conformance with Form 814A, Section M.06.03.

Filler material for welding shall conform to form 814A, Section M.06.04.

Steel used in fabrication shall conform to the requirements of the following material specifications: poles, cross-arms ladders and miscellaneous plates; rods, bars, tubes and rolled shaped used in the fabrication of the tubular structures shall conform to ASTM A36, or A572.

Field welding is not permitted.

Submittals

Shop drawings.

Mill certificates for structural steel and proof of U.S. origin.

Charpy V-notch test certificates.

Certificate for high strength bolts (See Section M.06 in the Special Conditions).

Proposed erection procedure to demonstrate compliance with "Requirements for Erection, Demolition, or other Rigging operations over or Adjacent to Railroad Right-of-Way" See Special Conditions.

Construction Methods

All applicable portions of Form 814A, Section 6.03.03 shall apply.

All shop connections shall be welded All splices shall be full strength bolted splices as defined in AISC Manual of Steel Construction.

Field welding of galvanized members will not be permitted.

Before erecting a post extension or stringing a ground or feeder wire the Contractor shall ascertain that no energized wires will come into contact with or within 3 ft. of a new post extension, feeder or ground wire. Should energized feeders or catenaries of the existing system be 3 ft. of a structure or ground wire, then the Contractor shall consult the Engineer about protective measures before proceeding with erection.

Methods of Measurement

Structural Steel and Steel (Miscellaneous) will be measured for payment based on its weight to be calculated in accordance with Form 814A, Section 6.03.04-1.

No direct payment will be made for galvanizing, but the cost thereof shall be included in the unit prices of Structural Steel or Steel (Miscellaneous).

No direct payment will be made for temporary grounds but the cost thereof shall be included in the unit price of Structural Steel.

Structural Steel shall include, for payment purposes, pole extensions.

Steel (Miscellaneous) shall include, for payment purposes, cross arms for feeders, termination assemblies.

Basis for Payment

This work will be paid for at the contract unit price for the following pay items which prices shall include all transportation, materials, equipment, tools and labor incidental thereto:

<u>Pay Item</u>	<u>Pay Unit</u>
STRUCTURAL STEEL	CWT
STEEL (MISCELLANEOUS)	CWT

ITEM #651970A - FILL EXISTING PIPE

Description:

Work under this item shall consist of furnishing and placement of flowable fill used in filling existing pipes.

Materials:

Concrete used for backfilling the abandoned corrugated metal pipes along Church Street Extension shall be classified as "Flowable Fill" and be a mixture of Portland Cement, aggregates, water and mineral admixtures. Chemical admixtures shall be incorporated into Flowable Fill to modify performance properties of strength, flow, set and permeability.

Materials shall include the following:

Portland Cement: ASTM C150

Stable Air Generator Admixture: Designed for controlled low strength material to lower unit weights, reduce shrinkage and subsidence, and control compressive strength. Admixture shall be Darafill as manufactured by Grace Construction products or engineer approved substitute.

Aggregate: Provide material meeting the requirements of ASTM C33.

Other Admixtures: Chemical admixtures shall be liquid or powder form used in standard ready-mix concrete production unless specifically designed for Flowable Fill. Provide materials meeting requirements of ASTM C94.

Pozzolanic Materials: Fly ash meeting requirements of ASTM C618.

The Flowable Fill shall have characteristics as follows:

Compressive Strength $f'c$ not to exceed 100 psi at 28 days

Weight between 90 and 120 lbs density per cubic foot

Air contents 25% or greater

Mixing, placement, finishing and curing of Flowable Fill shall be done in compliance with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete", and as herein specified.

Construction Methods:

Flowable Fill shall be used to fill the entire void space within the abandoned corrugated metal pipes that are indicated as remaining in-place.

Flowable Fill shall be pumped or placed into the pipe in such a manner as to completely fill the void space within the pipe, along the entire length of pipe. No voids will be permitted.

Method of Measurement:

This work shall be paid for at the contract unit price per cubic yard for "Fill Existing Pipes" complete in place, which price shall include all materials, equipment, tools, and labor incidental thereto.

ITEM #702896A – REMOVAL OF EXISTING TIMBER PILES

Description:

Work under this item will include removal and satisfactory disposal of the existing timber piles as shown on the plans or as shown on the plans or as directed by the Engineer.

Materials:

Sand shall conform to the requirements of Article M.08.03, paragraph 2, Sand.

Construction Methods:

The Contractor shall submit plans and procedures for the removal of the piles to the Engineer for approval prior to starting any work. The plans shall show the location of all equipment in relation to the centerline of roadway. Manufacturer's capacity charts for this equipment shall also be submitted to the Engineer.

Open holes vacated by withdrawal of piles shall be immediately filled with sand or sandy material to the satisfaction of the Engineer.

All work shall proceed in accordance with the provisions for "Maintenance and Protection of Traffic".

Method of Measurement:

The number of piles actually removed and disposed.

Basis of Payment:

Payment for the removal of piles will be made at the contract unit price per each for "Removal of Existing Timber Piles", complete, which price shall include all materials, equipment, tools and labor incidental thereto, filling of holes and disposal of the removed piles.

ITEM #707001A - MEMBRANE WATERPROOFING (WOVEN GLASS FABRIC)

Section 7.07 - Membrane Waterproofing (Woven Glass Fabric) shall be amended as follows:

7.07.03 - Construction Methods:

1- Primer: Delete the entire paragraph and replace with the following:

Beginning at the low point of the structure to be waterproofed, the primer shall be applied in one coat at a minimum rate of 1/10 gallon per square yard. The cure time of the primer shall be as recommended by the manufacturer.

ITEM #714020A – TEMPORARY SHEET PILING

Work under these items shall conform to the requirements of Section 7.14 supplemented and amended as follows:

Article 7.14.01 – Description:

Add the following:

Culvert Excavation: The Contractor shall perform all culvert excavation below the ground water table within a continuous steel sheet pile enclosure with a maximum length of 100 feet and with the bottom of all the sheets extending to a minimum of El – 12 ft. When removing sheeting from around the dewatered excavation, the downgradient (easterly) side of the sheet pile enclosure shall be pulled first.

ITEM #714026A – TEMPORARY SHEET PILING (RAILROAD)

Description:

Work under this item shall consist of furnishing and driving sheet piling to the limits shown on the plans for the purpose of protecting railroad facilities during construction. Unless this sheeting or portions thereof are ordered to be left in place by the Railroad, this item shall also include the removal of the sheet piling after completion of the permanent work.

Materials:

Sheet piling shall be an interlocking steel type conforming to the requirements of ASTM A 328.

Construction Methods:

Sheet piling, including bracing if shown, shall be installed at the locations and to the horizontal and vertical limits indicated on the plans. The size and structural shape of sheets shall be as elected by the Contractor but shall not be less than the sizes indicated on the plans.

All sheet piling shall be driven to the depth shown on the plans. Movements of steel sheet piling or bracing which prevent the proper completion of the piers shall be corrected at the sole expense of the Contractor. No part of the temporary steel sheet piling or bracing shall be allowed to extend into the substructure without written permission of the Engineer.

If the required penetration of any portion of the sheet piling system is not obtained, the Contractor shall employ such other driving or setting methods as may be necessary to obtain the required penetration; or he may elect to install such types of bracing or shoring as may be needed to properly retain the railroad facilities during excavation for, and placement of the permanent work. If such work becomes necessary and is authorized by the Engineer, it will be paid for as "extra work" in accordance with Articles 1.04.05 and 1.09.04 of the Standard Specifications.

Where sheet piling is driven on the neat lines of the footing, provision shall be made for breaking the bond between the sheet piling and the footing concrete. Unless otherwise ordered by the Railroad, all parts of the temporary sheet piling shall be removed upon completion of the work for which it was provided. The excavation shall be backfilled and properly compacted prior to removal of piling unless otherwise permitted by the Engineer. Any cavities created by removing sheeting shall be filled with sand and any disturbed ballast must be restored and tamped immediately. Sheet piling may be left in place at the option of the Contractor if so permitted by the Railroad provided that it is cut off at an elevation as directed by the Railroad and the cutoffs removed from the site.

Method of Measurement:

Work under this item will be measured for payment by the number square feet of sheet piling, measured horizontally and vertically, completed and accepted within the limits shown on the plans. Any increases in horizontal and vertical dimension, including additional bracing, which the Contractor elects to use for his own construction convenience, will not be measured for payment.

Basis of Payment:

This work will be paid for at the Contract unit price per square foot for "Temporary Sheet Piling (Railroad)," which price shall include furnishing, driving and the later removal of the sheeting, unless otherwise ordered, and all materials, equipment and labor incidental thereto.

Underground Obstructions: If the required pile penetration is not reached due to the presence of underground obstructions which are not the result of the Contractor's operations but are due to the presence of earlier construction at the site, then the cost of removing these obstructions and backfilling the area will be paid for as extra work unless otherwise specified in the contract documents.

ITEM #821163A – CONCRETE CAP

Description:

Work under this item shall consist of the construction of a reinforced cast-in-place concrete cap or a reinforced precast concrete cap to be placed between the concrete median barrier curbs and a detailed on the plans. The reinforcement shall be welded steel wire fabric.

Materials:

Concrete shall be Class "A" concrete conforming to the requirements of Article M.03.01.

Reinforcement shall be welded steel wire fabric conforming to the requirements of ASTM A185 and shall be epoxy coated conforming to the requirements of ASTM A884. The size and configuration of the wire fabric shall be as shown on the plans.

Joint sealant for joints between cap sections and between the concrete median curbing and cap sections shall conform to Article M.04.02.

Preformed expansion joint filler shall conform to the requirements of AASHTO 153, Type II.

Construction Methods:

The Contractor has the option to construct either a precast concrete cap or a cast-in-place concrete cap. Whichever option is chosen shall be used throughout. Closure sections as required shall be cast-in-place concrete. The concrete cap shall be constructed to the configuration shown on the plans.

Lap splices in the welded wire fabric shall be a minimum of 8 inches.

Prior to placement of the joint sealant in the joints, the concrete surface shall be thoroughly cleaned of all dirt, loose concrete, or other foreign matter by brushing and/or blasting with oil free air.

The joint seal material shall be installed in accordance with the manufacturer's printed instructions. Primer, if required, shall be supplied by the sealer manufacturer and shall be applied in accordance with the manufacturer's instructions.

Method of Measurement:

This work will be measured for payment by the actual number of cubic yards of concrete cap installed and accepted.

Basis of Payment:

The work will be paid for at the contract unit price per cubic yard for "Concrete Cap", complete in place, which price shall include Class "A" Concrete, welded steel wire fabric (epoxy coated), joint fillers, joint sealants, transportation, materials, equipment, tools, labor and work incidental thereto.

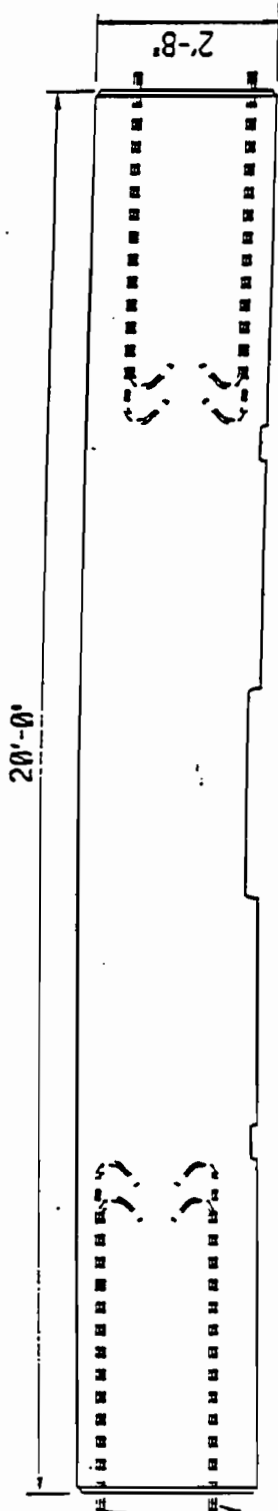
ITEM #822001A - TEMPORARY PRECAST CONCRETE BARRIER CURB
ITEM #822002A - RELOCATED TEMPORARY PRECAST CONCRETE BARRIER CURB

Work under these items shall conform to the requirements of Section 8.22 supplemented and amended as follows:

Article 8.22.01 – Description:

Add the following:

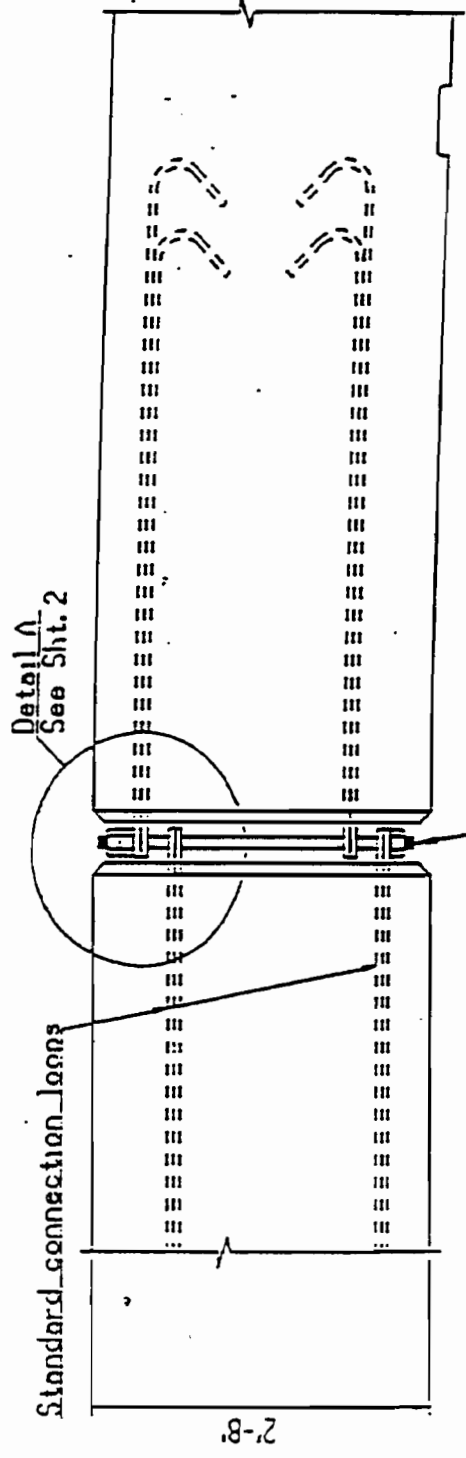
Standard Sheet 822A detailing temporary precast concrete barrier curb are hereby modified in accordance with the attached details showing a revised connection rod between barrier sections.



ELEVATION
TYPICAL PRECAST UNIT

Scale: $\frac{3}{4}'' = 1'-0''$

Standard connection loops (typ.)



ELEVATION
(THREADED CONNECTION ROD ASSEMBLY)

Scale: $\frac{3}{4}'' = 1'-0''$

Detail A
See Sht. 2

Connection Rod Assembly

Standard connection loops

THREADED CONNECTION ROD ASSEMBLY FOR
TEMPORARY PRECAST CONCRETE BARRIER CURB

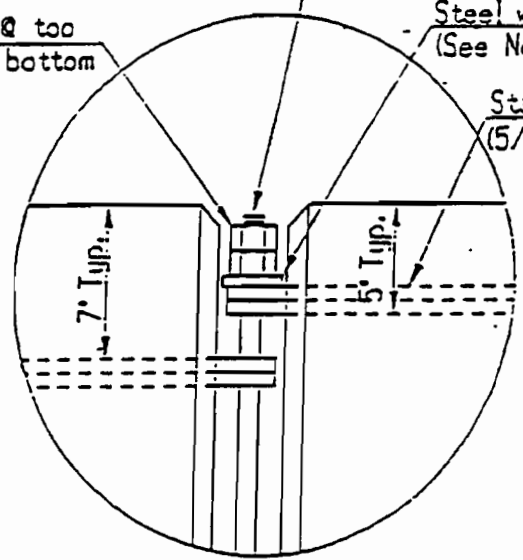
ENGINEER : BRIDGE DESIGN	
DESIGNER : JRH	DRAFTER : SWC
CHECKER : VJD	DATE : 11-21-95

1" Dia. threaded connection rod x 2'-6" long
(See Note 1)

2 Heavy hex nuts @ top
1 Heavy hex nut @ bottom
(See Note 3)

Steel washer (Typ. top & bottom)
(See Note 2)

Standard connection loops
(5/8" Dia. bar typ.)



DETAIL 'A'

Scale: 1 1/2" = 1'-0"

Notes:

1. Threaded steel connection rods shall conform to the requirements of AASHTO M314 Grade 55. Threads shall be Unified National Coarse Series as specified in ANSI B1.1 and shall have Class 2A thread tolerances before galvanizing (the rod shall be threaded for a minimum of four inches at each end).
2. Hardened steel washers shall be manufactured in accordance with AASHTO M293.
3. Heavy hex nuts shall be Grade A, manufactured in accordance with AASHTO M291 and tapped over-size for galvanizing.
4. The threaded rod, washers and nuts shall be hot-dip galvanized after fabrication in accordance with the requirements of Class C of AASHTO M232.
5. Nuts shall be turned until the washer is drawn up against the connection loop. The connection loops shall not be bent due to the tightening process.
6. For ease of removal of nuts, the threads may be waxed.
7. Details for the threaded connection rod assembly modify those shown on Standard Sheet 822A and on the applicable structure sheet if any.

CONNECTION ROD ASSEMBLY DETAILS FOR
TEMPORARY PRECAST CONCRETE BARRIER CURB

ENGINEER : BRIDGE DESIGN	
DESIGNER : JRH	DRAFTER : SVC
CHECKER : WJD	DATE : 11-21-95

ITEM #904042A - METAL BRIDGE RAIL (COMBINATION) (EXTRUDED ALUMINUM)

Description:

Work under this item shall consist of fabricating and installing a metal bridge railing, consisting of aluminum posts and rails as shown on the plans, as directed by the Engineer and in accordance with this specifications.

Materials:

Materials for this work shall conform to the following requirements:

1. Metal Bridge Rail:

The railing posts, rails, plates angles, splice bars and connections shall be extruded aluminum and conform to the requirements of ASTM B221, aluminum alloy 6061-T6.

All bolts and socket head cap screws shall be stainless steel and conform to the requirements of ASTM A193, Class 2 Grade B8 (AISI Type 316). Washers shall be stainless steel and conform to the requirements of ASTM A167, Type 316.

2. Preset Anchorage:

The preset anchorage shall be fabricated as detailed on the contract plans. Preset anchorages configured differently from those detailed on the plans may be used provided they utilize the same materials described below and are approved by the Engineer prior to fabrication.

The wire struts shall be cold-drawn and conform to ASTM A510, Grade 1030 with minimum tensile strength of 100,000 psi. These wire struts shall be securely welded to the ferrules with the welds capable of developing the tensile strength of the struts and the ferrules.

The ferrules, either open end or closed end, shall conform to ASTM A108, Grade 12 L 14. A plastic cap shall be provided for sealing the bottom of each open end ferrule before placing concrete. Closed end ferrules shall provide a minimum full thread length of 2". Removable plastic washers of the same diameter as the ferrules and approximately 3/32" in thickness shall be provided for the top of each ferrule and shall be left in place until the temporary supporting bolts are removed. Removable plastic caps shall be provided for sealing the top of each ferrule until the erection of railing posts.

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

A sample anchorage system shall be submitted to the Engineer for approval prior to incorporation into the project.

3. Molded Pads:

Molded pads shall be manufactured from new unvulcanized elastomer and unused synthetic fibers, with a weight proportion of fiber content equal to approximately one-half of the total weight of the pad. The pads shall be formed into single sheets of 1/8" minimum thickness, with a tolerance of plus or minus 10 percent. Pads shall have a Shore A Durometer hardness within the range of 70 to 90, and shall have a minimum compressive breakdown of 7,000 psi.

4. Color:

Metal Bridge Rail shall be anodized to a grey color. The aluminum Assoc. designated number for the finish shall be AA-M12-C22-A42. The anodic coating shall be Architectural Class I with a minimum thickness of 0.7 mils and a minimum weight of 35 mg/in².

Samples from production costs of finished material as selected by the Engineer, shall be tested in accordance with the following ASTM Specifications available from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA.

1. ASTM B137 - Coating Weight
2. ASTM B244 - Coating Thickness
3. ASTM B136 - Sealing

Color range samples shall be submitted by the selected finisher for the Engineer's approval before proceeding with production. All the color should be obtained from one source. These samples shall be used for comparison purposes during production finishing, and shall consist of actual sections large enough so that good comparisons can be made to establish the limits of the allowable color shade range. Material outside the allowable color shade range, as determined by the Engineer, will be rejected.

Stainless steel hardware shall be colored grey by a thermo-chemical conversion process, to simulate the color of the hardcoat and anodizing processes for aluminum.

The Contractor shall furnish a Materials Certificate and a Certificate of Compliance in conformance with the requirements of Article 1.06.07 for the following materials: rail posts, rails, rail splices, preset anchorages, bolts, washers and molded pads. Samples of the bolts and washers, of all sizes used in the metal bridge rail, shall be submitted to the Engineer.

Construction Methods:

Before fabricating any materials, the Contractor shall submit shop drawings to the Engineer for approval in accordance with Article 1.05.02(b). These drawings shall include but not be limited to the following information: The layout plan showing all railing post spacings, rail splice locations, details for the rails, posts and anchorage system and material designations.

Aluminum welding shall be in accordance with the American Welding Society "Structural Welding Code-Aluminum", ANSI/AWS D1.2.

The preset anchorages shall be fabricated for installation perpendicular to the grade of the parapet. The anchorages shall be firmly and accurately held in position prior to and during the placing of concrete.

The railings shall be accurately fabricated and installed as shown on the plans. Lengths of rail elements shall be continuous over a minimum of four rail posts wherever possible and in no case less than two. Rail splices shall be located in rail panels over open joints in parapets and at other locations determined by the Contractor. Splice bars shall have a sliding fit in the rail sections.

Aluminum railings shall be carefully adjusted prior to fixing in place to insure proper matching at abutting joints and correct alignment and curvature throughout their length. After installation, all rails and posts shall be free of burrs, sharp edges and irregularities.

Method of Measurement:

This work will be measured for payment by the actual number of linear feet of metal bridge rail completed and accepted, measured along the centerline of the rail.

Basis of Payment:

This work will be paid for at the contract unit price per foot for "Metal Bridge Rail (Combination) (Extruded Aluminum)", complete and accepted in place, which price shall include all materials, equipment, tools and labor incidental thereto.

ITEM #904885A – METAL BRIDGE RAIL PROTECTIVE FENCE (5' HIGH)(CHAIN LINK)

Description:

Work under this item shall consist of furnishing and installing chain link fencing in accordance with the details shown on the plans or as ordered and in conformance with these specifications.

Materials:

The Contractor shall provide Materials Certificates and Certificates of Compliance in accordance with Article 1.06.07 for all materials conforming to ASTM A53 (E or S Grade B) and AASHTO M181.

Materials for this work shall conform to the following:

1. Fabric: The fabric shall be aluminum coated steel woven wire of the chain link type. It shall be No. 9 gage wire woven to form a two-inch mesh. The chain link fabric shall conform to the requirements of AASHTO M181 for Type II Aluminum Coated Steel Fabric except that the fabric selvage shall be knuckled at the top and bottom.
2. Posts and Rails: Metal posts and rails shall be standard steel pipe conforming to the requirements of ASTM A53 (E or S Grade B) or with AASHTO M181, Grade 2, all to be galvanized in conformance with Subarticle M.10.05-2.
3. Fittings: Fittings shall conform to AASHTO M181 Sections 29-36 and shall be of the fabricator's standard design. All except the stretcher bars shall be galvanized in accordance with ASTM A153. The stretcher bars shall be galvanized in conformance with ASTM A123.
4. Wire Clamps and Wire Ties: All clamps and wire ties shall conform to the requirements of Subarticle M.10.05-4.
5. Galvanizing Compound: Galvanizing compound shall be in conformance with the requirements of Federal Specification TT-P-641b or Military Specification MIL-P- 21035.
6. Preset Anchorage:

The preset anchorage shall be fabricated as detailed on the contract plans. Preset anchorages configured differently from those detailed on the plans may be used provided they utilize the same materials described below and are approved by the Engineer prior to fabrication.

The wire struts shall be cold-drawn and conform to ASTM A510, Grade 1030 with minimum tensile strength of 100,000 psi. These wire struts shall be securely welded to the ferrules with the welds capable of developing the tensile strength of the struts and the ferrules.

The ferrules, either open end or closed end, shall conform to ASTM A108, Grade 12 L 14. A plastic cap shall be provided for sealing the bottom of each open end ferrule before placing concrete. Closed end ferrules shall provide a minimum full thread length

of 2". Removable plastic washers of the same diameter as the ferrules and approximately 3/32" in thickness shall be provided for the top of each ferrule and shall be left in place until the temporary supporting bolts are removed. Removable plastic caps shall be provided for sealing the top of each ferrule until the erection of railing posts.

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

A sample anchorage system shall be submitted to the Engineer for approval prior to incorporation into the project.

Bolts for the preset anchorage system shall be stainless steel and conform to the requirements of ASTM A193, Class 2 : Grade B8 (AISI Type 316). All washers shall be standard size and conform to ASTM A167, Type 316.

7. Molded Pads:

Molded pads shall be manufactured from new unvulcanized elastomer and unused synthetic fibers, with a weight proportion of fiber content equal to approximately one-half of the total weight of the pad. The pads shall be formed into single sheets of 1/8 " minimum thickness, with a tolerance of plus or minus 10 percent. Pads shall have a Shore A Durometer hardness within the range of 70 to 90, and shall have a minimum compressive breakdown of 7,000 psi.

Construction Methods:

The protective fence shall be accurately fabricated in accordance with the plans.

The preset anchorage assembly shall be set perpendicular to grade in concrete. Each unit shall be completely furnished with plastic end caps, throw away bolts, and templates. The Contractor shall place molded pads as herein specified under each base plate. Each pad shall be the same size and shape as the base plate it is to support, and the holes to accommodate the anchorage bolts shall be clearly and accurately punched before setting the pads in place.

The protective fence shall be installed in accordance with the details shown on the plans. The posts shall be placed plumb with the top and bottom rails set parallel to the top 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.

Galvanized areas damaged during shipment, storage and installation shall be given two coats of galvanizing compound.

Shop Drawings: Before fabricating any materials, the Contractor shall submit shop drawings to the Engineer for approval in accordance with Article 1.05.02(b). These drawings shall include but not be limited to the following information: the layout plan showing all rail post locations, fence details materials lists and material designations.

Method of Measurement:

This work will be measured for payment by the number of linear feet of completed and accepted Metal Bridge Rail Protective Fence (5' High)(Chain Link) measured horizontally as shown on the plans.

Basis of Payment:

This work will be paid for at the contract unit price per linear foot for "Metal Bridge Rail Protective Fence (5' High)(Chain Link)" complete in place, which price shall include all materials, equipment, tools and labor incidental thereto.

ITEM #904908A – METAL BRIDGE RAIL - PROTECTIVE FENCE (Type C)

Description:

This item shall consist of furnishing and installing aluminum railing, ornamental grill, stainless steel hardware, aluminum extrusions, plates, and steel anchorages fabricated in accordance with the dimensions and details shown on the plans or as ordered by the Engineer in accordance with these specifications.

Materials:

Materials for this work shall conform to the following requirements:

Materials for posts, rails, plates, angles and straps shall be extruded aluminum alloy conforming to the requirements of ASTM B221, Alloy 6060 – T6.

The aluminum ornamental grill shall be of the dimensions and pattern as designated on the plans and conform to ASTM B211 Alloy 6061-T6 or approved equal.

Welding of aluminum components shall be accomplished in the shop; no field welding will be permitted. Following shop welding, all aluminum components shall be anodized to match solid barrier panels.

All hardware shall be stainless steel and conform to the requirements of ASTM A193, Class 2 Grade B8 (AISI Type 316). Washers shall be stainless steel and conform to the requirements of ASTM A167, Type 316.

The stainless steel hardware shall be made a grey color by a thermo-chemical conversion process, to simulate the color of the hardcoat and anodizing processes for aluminum such as Kaiser Aluminum Company's Kalcolor. Aluminum Company of America's Duranodic, and Reynolds Metals Company's Reynocolor. The finish shall be such that it does not peel, chip or crack. It must also be abrasion, fade and corrosion resistant.

2. Preset Anchorage:

The preset anchorage shall be fabricated as detailed on the contract plans. Preset anchorages configured differently from those detailed on the plans may be used provided they utilize the same materials described below and are approved by the Engineer prior to fabrication.

The wire struts shall be cold-drawn and conform to ASTM A510, Grade 1030 with minimum tensile strength of 100,000 psi. These wire struts shall be securely welded to the ferrules with the welds capable of developing the tensile strength of the struts and the ferrules.

The ferrules, either open end or closed end, shall conform to ASTM A108, Grade 12 L 14. A plastic cap shall be provided for sealing the bottom of each open end ferrule before placing concrete. Closed end ferrules shall provide a minimum full thread length

of 2". Removable plastic washers of the same diameter as the ferrules and approximately 3/32" in thickness shall be provided for the top of each ferrule and shall be left in place until the temporary supporting bolts are removed. Removable plastic caps shall be provided for sealing the top of each ferrule until the erection of railing posts.

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

A sample anchorage system shall be submitted to the Engineer for approval prior to incorporation into the project.

Bolts for the preset anchorage system shall be stainless steel and conform to the requirements of ASTM A193, Class 2 : Grade B8 (AISI Type 316). All washers shall be standard size and conform to ASTM A167, Type 316.

3. Molded Pads:

Molded pads shall be manufactured from new unvulcanized elastomer and unused synthetic fibers, with a weight proportion of fiber content equal to approximately one-half of the total weight of the pad. The pads shall be formed into single sheets of 1/8 " minimum thickness, with a tolerance of plus or minus 10 percent. Pads shall have a Shore A Durometer hardness within the range of 70 to 90, and shall have a minimum compressive breakdown of 7,000 psi.

4. Color:

Metal Bridge Rail shall be anodized to grey color. The aluminum Assoc. designated number for the finish shall be AA-M12-C22-A42. The anodic coating shall be Architectural Class I with a minimum thickness of 0.7 mils and a minimum weight of 35 mg/in².

Samples from production costs of finished material as selected by the Engineer, shall be tested in accordance with the following ASTM Specifications available from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA.

1. ASTM B137 - Coating Weight
2. ASTM B244 - Coating Thickness
3. ASTM B136 - Sealing

Color range samples shall be submitted by the selected finisher for the Engineer's approval before proceeding with production. All the color should be obtained from one source. These samples shall be used for comparison purposes during production finishing, and shall consist of actual sections large enough so that good comparisons can be made to establish the limits of the allowable color shade range. Material outside the allowable color shade range, as determined by the Engineer, will be rejected.

The Contractor shall furnish a Materials Certificate and a Certificate of Compliance in conformance with the requirements of Article 1.06.07 for the following materials: rail posts, rails,

rail splices, preset anchorages, bolts, washers and molded pads. Samples of the bolts and washers, of all sizes used in the metal bridge rail, shall be submitted to the Engineer.

Construction Methods:

Before fabricating any materials, the Contractor shall submit shop drawings to the Engineer for approval in accordance with Article 1.05.02(b). These drawings shall include but not be limited to the following information: The layout plan showing all railing post spacings, railing post grades, expansion joint locations, details for the rails, posts and anchorage system and material designations.

The metal bridge rail shall be accurately fabricated and erected in accordance with the plans and as directed by the Engineer. All rails shall be erected to produce a smooth continuous appearance with posts vertical and the rail components paralleling the line of the tops of the parapets.

The preset anchorage assembly shall be set perpendicular to grade in concrete. Each unit shall be completely furnished with plastic end caps, throw away bolts, and templates. The Contractor shall place molded pads as herein specified under each base plate. Each pad shall be the same size and shape as the base plate it is to support, and the holes to accommodate the anchorage bolts shall be clearly and accurately punched before setting the pads in place.

Aluminum welding shall be in accordance with the American Welding Society "Structural Welding Code-Aluminum", ANSI/AWS D1.2.

Method of Measurement:

This work will be measured for payment by the actual number of linear feet of the type of metal bridge rail completed and accepted, measured along the centerline of the rail.

Basis of Payment:

This work will be paid for at the contract unit price per foot for "Metal Bridge Rail - Protective Fence (Type C)", complete and accepted in place, which price shall include all materials, equipment, tools and labor incidental thereto.

ITEM #904950A - METAL BRIDGE RAIL (SOLID PANEL) (Type A)
ITEM #904951A - METAL BRIDGE RAIL (SOLID PANEL) (Type B)

Description:

This work of this item shall include posts, rails, solid barrier panels, woven fabric and related materials fabricated of aluminum alloy. Erection shall be as shown on the plans and in accordance with these specifications.

Materials:

Materials for this work shall conform to the following requirements:

1. Metal Bridge Rail:

Material for solid barrier panels shall be extruded aluminum alloy conforming to the requirements of ASTM B221, Alloy 6063, Temper T6. Extruded barrier panel detail sections shall be joined with panel nuts, bolts and washers to achieve the desired barrier panel height as shown on the plans. Vertical dimensions of the extruded sections shall be as shown on the plans. Mass and section properties of the extruded sections shall be as indicated on the plans. The extruded sections shall be anodized: Duranodic 311E-M32-C22-A42 grey.

Materials for barrier panel nuts, bolts and washers shall be aluminum alloy alclad conforming to the requirements of ASTM B211, alloys and tempers as follows:

- (a) Lock-Nuts: 6262-T9
- (b) Bolts: 2025-T4
- (c) Washers: 2024-T4

Nuts, bolts and washers shall be anodized to match panels.

Materials for posts, rails, plates, angles and straps shall be extruded aluminum alloy conforming to the requirements of ASTM B221, Alloy 6060 – T6.

Material for fabric shall be aluminum coated steel woven wire of the chain link type. It shall be No. 9 gage wire woven to form a 3/8" mesh. The chain link fabric shall conform to the requirements of AASHTO M181 for Type II Aluminum Coated Steel Fabric except that the fabric selvage shall be knuckled at the top and bottom.

Welding of aluminum components shall be accomplished in the shop; no field welding will be permitted. Following shop welding, all aluminum components shall be anodized to match solid barrier panels.

All hardware shall be stainless steel and conform to the requirements of ASTM A193, Class 2 Grade B8 (AISI Type 316). Washers shall be stainless steel and conform to the requirements of ASTM A167, Type 316.

The stainless steel hardware shall be made a grey color by a thermo-chemical conversion process, to simulate the color of the hardcoat and anodizing processes for aluminum such as Kaiser Aluminum Company's Kalcolor. Aluminum Company of America's Duranodic, and Reynolds Metals Company's Reynocolor. The finish shall be such that it does not peel, chip or crack. It must also be abrasion, fade and corrosion resistant.

2. Preset Anchorage:

The preset anchorage shall be fabricated as detailed on the contract plans. Preset anchorages configured differently from those detailed on the plans may be used provided they utilize the same materials described below and are approved by the Engineer prior to fabrication.

The wire struts shall be cold-drawn and conform to ASTM A510, Grade 1030 with minimum tensile strength of 100,000 psi. These wire struts shall be securely welded to the ferrules with the welds capable of developing the tensile strength of the struts and the ferrules.

The ferrules, either open end or closed end, shall conform to ASTM A108, Grade 12 L 14. A plastic cap shall be provided for sealing the bottom of each open end ferrule before placing concrete. Closed end ferrules shall provide a minimum full thread length of 2". Removable plastic washers of the same diameter as the ferrules and approximately 3/32" in thickness shall be provided for the top of each ferrule and shall be left in place until the temporary supporting bolts are removed. Removable plastic caps shall be provided for sealing the top of each ferrule until the erection of railing posts.

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

A sample anchorage system shall be submitted to the Engineer for approval prior to incorporation into the project.

Bolts for the preset anchorage system shall be stainless steel and conform to the requirements of ASTM A193, Class 2 : Grade B8 (AISI Type 316). All washers shall be standard size and conform to ASTM A167, Type 316.

3. Molded Pads:

Molded pads shall be manufactured from new unvulcanized elastomer and unused synthetic fibers, with a weight proportion of fiber content equal to approximately one-half of the total weight of the pad. The pads shall be formed into single sheets of 1/8 " minimum thickness, with a tolerance of plus or minus 10 percent. Pads shall have a Shore A Durometer hardness within the range of 70 to 90, and shall have a minimum compressive breakdown of 7,000 psi.

4. Color:

Metal Bridge Rail (Solid Panel) shall be anodized to grey color. The aluminum Assoc. designated number for the finish shall be AA-M12-C22-A42. The anodic coating shall be Architectural Class I with a minimum thickness of 0.7 mils and a minimum weight of 35 mg/in².

Samples from production costs of finished material as selected by the Engineer, shall be tested in accordance with the following ASTM Specifications available from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA.

1. ASTM B137 - Coating Weight
2. ASTM B244 - Coating Thickness
3. ASTM B136 - Sealing

Color range samples shall be submitted by the selected finisher for the Engineer's approval before proceeding with production. All the color should be obtained from one source. These samples shall be used for comparison purposes during production finishing, and shall consist of actual sections large enough so that good comparisons can be made to establish the limits of the allowable color shade range. Material outside the allowable color shade range, as determined by the Engineer, will be rejected.

The Contractor shall furnish a Materials Certificate and a Certificate of Compliance in conformance with the requirements of Article 1.06.07 for the following materials: rail posts, rails, rail splices, preset anchorages, bolts, washers and molded pads. Samples of the bolts and washers, of all sizes used in the metal bridge rail, shall be submitted to the Engineer.

Construction Methods:

Before fabricating any materials, the Contractor shall submit shop drawings to the Engineer for approval in accordance with Article 1.05.02(b). These drawings shall include but not be limited to the following information: The layout plan showing all railing post spacings, rail splice locations, details for the rails, posts and anchorage system and material designations.

The metal bridge rail shall be accurately fabricated and erected in accordance with the plans and as directed by the Engineer. All rails shall be erected to produce a smooth continuous appearance with posts vertical and the rail components paralleling the line of the tops of the parapets.

The preset anchorage assembly shall be set perpendicular to grade in concrete. Each unit shall be completely furnished with plastic end caps, throw away bolts, and templates. The Contractor shall place molded pads as herein specified under each base plate. Each pad shall be the same size and shape as the base plate it is to support, and the holes to accommodate the anchorage bolts shall be clearly and accurately punched before setting the pads in place.

Aluminum welding shall be in accordance with the American Welding Society "Structural Welding Code-Aluminum", ANSI/AWS D1.2.

Method of Measurement:

This work will be measured for payment by the actual number of linear feet of the type of metal bridge rail completed and accepted, measured along the centerline of the rail.

Basis of Payment:

This work will be paid for at the contract unit price per foot for "Metal Bridge Rail (Solid Panel)(Type A & B)", complete and accepted in place, which price shall include all materials, equipment, tools and labor incidental thereto.

ITEM #913045A – 8 FT. CHAIN LINK FENCE WITH BARBED WIRE
ITEM #913853A – 8 FT. CHAIN LINK CANTILEVERED GATE (45')

Work under this item shall conform to the requirements of Section 9.13 supplemented and amended as follows:

Description:

Work under this item shall consist of furnishing, installing, and removing 8 foot high woven wire fencing, supplemented with a 45'-wide cantilever slide gate and supported by metal posts topped with three strand barbed wire, where indicated on the plans or as ordered. Chain link fence and gate including accessories, fittings and fastenings shall be obtained from a single, approved manufacturer.

Materials:

1. **Fabric:** The fabric shall be aluminum coated steel woven wire of the chain link type conforming to Subarticle M.10.05-1(a).
2. **Framing:** Metal posts and rails for chain link fence proper shall be standard steel pipe, hot-dip galvanized conforming to Subarticle M.10.05-2. Frames and internal uprights for the slide gate shall be 2" X 2" square aluminum members conforming to Subarticle M.06.02-11b. Top track/rail of slide gate shall withstand 2,000 lb. reaction load. Gate support posts shall be schedule 40 pipe weighing 9.1 lb./ft. or equivalent.
3. **Fittings:** Fittings shall be pressed steel conforming to Subarticle M.10.05-3(a).
4. **Tension and Tie Wire:** Coil spring steel less than 7 gage conforming to Subarticle M.10.05-4(a). Aluminized steel hog rings shall not be less than 11 gage.
5. **Bracing:** Bracing shall apply to both the fence and gate and shall be 3/8" galvanized steel diagonal truss rods.
6. **Gate Leaves:** Gate leaves shall be a minimum of 41' in width. Gate leaves shall be manufactured to allow the attachment of a standard size (30") stop sign on outside face of gate.
7. **Security Accessories:**
 - (a) Barbed wire supporting arms shall be pressed steel, complete with provisions for anchorage to end, corner, and pull posts and for attaching 3 rows of barbed wire to each arm.
 1. Single 45 outward projecting and vertical arms on gates shall be integral with a post top weather cap.
 2. Intermediate arms shall have hole for passage of top rail. Arms shall be capable of withstanding, without failure, 1.112KN downward force at outermost end of arm.

(b) Aluminized Barbed Wire shall be ASTM A585 double-strand, 12-1/2 ga. Wire with 14 Ga. 4-point barbs. Standard barbs shall be space approximately 127 mm. on center. Barbwire shall be installed on both the fence and gate.

Construction Methods:

Barbed wire shall be firmly attached to the braces and stretched taut.

Barbwire shall be installed on both the fence and gate.

Gate frame members shall be welded together forming rigid, one-piece frame integral with top track.

Steel plate shall be welded between tops of support posts to maintain proper alignment of truck assemblies with tracks.

Gates shall be installed plumb, level, and secure for full opening without interference.

Hardware shall be attached accordingly to prevent unauthorized removal and to ensure smooth operation of slide gate.

METHOD OF MEASUREMENT:

8 Ft. Chain Link Fence with Barbed Wire: This work shall be measured for payment by the actual linear feet of fencing including accessories, fittings and fastenings installed and approved by the Engineer.

8 Ft. Chain Link Cantilevered Gate (45'): This work shall be measured for payment by the actual number of gates installed including accessories, fittings and fastenings and approved by the Engineer.

BASIS OF PAYMENT:

8 Ft. Chain Link Fence with Barbed Wire: This work shall be paid for at the contract unit price per linear foot of "8 Ft. Chain Link Fence with Barbed Wire" successfully installed. This payment shall include all accessories, fittings and fastenings, and all equipment and labor.

8 Ft. Chain Link Cantilevered Gate (45'): This work shall be paid for at the contract unit price per each for "8 Ft. Chain Link Cantilevered Gate (45')" successfully installed. Payment shall include all accessories, fittings and fastenings, and all equipment and labor.

<u>Pay Item</u>	<u>Pay Unit</u>
8 Ft. Chain Link Fence with Barbed Wire	Linear Foot
8 Ft. Chain Link Cantilevered Gate (45')	Each

ITEM # 913827A – REMOVE AND RELOCATE FENCE AND GATE

Section 9.13 is supplemented as follows:

Description:

Under this item the Contractor shall remove and relocate fence and gate where shown on the plans, or as directed by the Engineer.

Materials:

The Contractor shall be responsible for damage to all equipment and material incurred during removal and hauling to the specified area. All repairs or replacements due to damage or loss by the Contractor shall be made at the Contractor's expense.

Any components designed for one-time use, including corner and line posts, shall be the responsibility of the Contractor to replace. All items replaced shall be an approved equal.

Method of Measurement:

The work will be measured for payment by the number of Linear Feet of reinstalled fence completed and accepted measured from outside to outside of terminal posts.

Basis of Payment:

This work will be paid for at the contract unit price per meter for "Remove and Relocate Fence and Gate", complete in place which price shall include removal, storage and reinstallation of the fence and gate and all material, equipment, tools, excavation, backfill labor incidental thereto.

ITEM #969000A - PROJECT COORDINATOR

Description:

Under this item the Contractor shall furnish the services of one of his administrative employees, entitled the Project Coordinator for this project and to coordinate and expedite all phases of the work required for the project to ensure that the construction schedule is maintained.

The Project Coordinator shall be designated by name, in writing with a resume of his qualifications, within ten (10) calendar days of the award of the Contract and shall not be changed without prior written notice to the Department.

If in the judgement of the Engineer, the Project Coordinator is not sufficiently experienced and versatile in the preparation, interpretation and modification of the construction schedules, the Contractor shall engage the services of a Consultant, subject to the approval of the Engineer, for the scheduling work required. If a Consultant is engaged, he shall be present at the first meeting, along with the Project Coordinator, prepared to discuss, in detail, the methods and techniques he proposes to use. Thereafter, the Project Coordinator or the Consultant responsible for updating the Critical Path Schedule shall attend all meetings between the Contractor, his Subcontractors, and any other meetings which will affect the CPM schedule.

The Contractor shall prepare Critical Path Schedules utilizing the latest version of Primavera Project Planner software as described more fully hereinafter. The Contractor shall provide the Engineer with a licensed copy of the latest version of the Primavera Project Planner scheduling software and maintain the Primavera customer support service contract over the duration of the project. The Contractor shall deliver to the Engineer all supporting documentation for the software including any instructions or manuals.

Computer Hardware and Software:

The software listed below shall be installed on the computer systems specified and is to be stationed in the Department's project field office. The contractor shall provide the computer system with all the required maintenance and repairs (to include labor and parts) throughout the contract life. The computer system furnished shall have all software and hardware necessary for the complete installation of the latest versions of the software listed, and therefore supplements the minimum specifications below. The Engineer reserves the right to expand or relax the specification to adapt to the software and hardware limitations and availability to provide the Department with an operating system that can handle the needs of the project. This requirement is to insure that the rapid changing environment that computer systems have experienced do not leave the needs of the project orphan to what has been specified.

The contractor shall provide the Engineer with a licensed copy registered in the Departments name of the latest versions of the software listed and maintain customer support services offered by each software producer for the duration of the project.

The Contractor shall deliver to the Engineer all supporting documentation for the software and hardware including any instructions or manuals. Original backup diskettes for the software shall be provided by the Contractor.

A. Computer Specification (MINIMUM)Processor:

- Intel 400MHz Pentium II Processor w/ 512K Cache
- Memory: 123MB 100Mhz SDRAM expandable to 384
- Monitor: 17inch color monitor (16.0 inch viewable)
- Graphics Accelerator: AGP 8MB Video Card
- Hard Drive: 6.4GB Ultra ATA hard drive
- Floppy Drive: 3.5inch 1.44MB diskette drive
- CD-ROM: 13X min./32X max. CD-ROM drive
- Multimedia Package: Wavetable sound card
- Fax/Modem: 56k w/ x2TM Technology
- Case: Mid Tower
- Network Adapter: 3COM PCI 10/100 twisted pair Ethernet
- Back-up Drive: Iomega™ Zip Drive
- Keyboard: 104 + Keyboard
- Mouse: MS compatible 3-button Mouse
- Additional Software: Norton AntiVirus Software by Symantec
- Application Software: MS Office 97, Professional Edition
- Operating System: MS Windows NT 4.0
- Uninterrupted power supply: APC UPS backup 650S or equivalent
- Internet Service for project duration – for e-mail and file transfer ability.

Note: All hardware components and software must be installed before delivery. All software documentation and CD-ROMs for both Microsoft Windows NT and Microsoft Office 97 Professional Edition must be provided.

PC Brands limited to Dell©, Gateway©, NEC© and AST© brands only.

B. Warranty Requirements

The service contract must be in place for the length of the project.

- The service contract will require all repairs to be made on site.
- Any repairs made on purchased equipment will be made by factory certified technicians.
- The warranty will cover all parts & labor as well as technical support
- The service contract must include immediate action customer service (24 Hours).
- If repairs on equipment require removal or replacement, or the equipment becomes unavailable for use longer than 48 hours, a replacement of equal or greater specification must be provided.

C. HP Deskjet Printer (MINIMUM) or equivalent

- 600x600 DPI (Color)
- 2MBRAM
- 6ft power and parallel Cable
- Documentation and user guide

Three year On-site Parts and Labor Warranty.

Construction Methods:

The Project Coordinator shall attend all meetings between the Contractor and the Department, the Contractor and his Subcontractors, and any other meetings which effect the progress of the job. The Project Coordinator shall be knowledgeable of the status of all parts of the work throughout the length of the Contract.

The Contractor shall prepare a Critical Path Schedule in accordance with the pertinent provisions of "Section 1.03 - Award and Execution of Contract," "Section 1.05 - Control of the Work," and "Section 1.08 - Prosecution of Progress" of the Standard Specifications. The schedules shall incorporate the Sequence of Construction as outlined on the Plans and in the Specifications. All other limiting factors that affect construction shall also be incorporated into the Schedules. All milestones or constrained dates within the schedule shall be clearly indicated.

All major elements of the work shall be shown (on a structure by structure basis where applicable), and also be broken out further into their minor components and sequence of assembly.

For this project, the major elements may be indicated to include; but are not limited to, the following items:

- Permit Acquisition
- Shop Drawings
- Utility Relocations
- Engineer's Office
- Construction Staking
- Clearing & Grubbing
- Maintenance & Protection of Traffic
- Erosion Control
- Adjacent Contract Work by Others
- Drainage (Breakdown into Excavation, Bedding Materials, Pip; Manholes, Catch Basins, Fill, Riprap, etc.)
- Removal of Superstructure
- Roadway Construction (Breakdown into Excavation, Fill Subbase, Pavement, Drainage, Curbing, Guiderail, etc.)
- Signing (Breakdown Signs Individually)
- Illumination
- Pavement Markings
- Signalization
- Temporary Markings
- Clean-up

All documents which require approval by the Department shall be clearly identified within the schedule. The Department shall be allocated a minimum of thirty (30) calendar days (exclusive of weekends and holidays) for review and approval of each submittal. Any submittals requiring approval by an outside Agency (ConnDEP, Coast Guard, Army Corps of Engineers, etc.) shall be allocated a minimum of sixty (60) calendar days. The Department shall not be held responsible for any delay associated with the approval or rejection of any substitution or other revisions proposed by the Contractor.

The schedule shall indicate the logic of the work for the major elements and components of work under the Contract, such as the planned mobilization of plant and equipment, sequences of operations, procurement of materials and equipment, duration of activities, type of relationship, lag time (if any), and such other information as it is necessary to present a clear statement of the intended activity.

The schedules shall consist of a network technique of planning, scheduling and control, shall be a clear statement of the logical sequence of work to be done, and shall be prepared in such a manner that the Contractor's work sequence shall be optimized between early start and late start restraints. The Contractor shall utilize the same criteria in a consistent manner throughout the term of the project. If, at any time, the Contractor alters his logic, original durations, descriptions, adds activities, or activity codes or in any way modifies the Baseline Schedule, he must notify the Engineer of the change, in writing, with presentation detailing the reasons for the change. The Engineer reserves the right to approve or reject any such change.

Each Critical Path Schedule submittal shall be in the form of an activity on node diagram (precedence diagramming method) and shall include at a minimum; an Early Start computer sort, a Total Float computer sort, an Activity Number computer sort, a Schedule Diagram in the Time Scaled Logic format and a backup data diskette which includes all Primavera project files.

The diagrams shall be on 2' x 3' sheets. Additional, more detailed, diagrams for important aspects or phases of the work will be required on large or complex projects.

Activity I.D. numbers shall be keyed to the item numbers assigned on the detailed estimate sheet. The first three digits (four digits for highway illumination, signing, traffic signals and utility work) of the activity I.D. number shall be identical to the first three digits of the item number in the contract. The remaining digits may be used to provide unique, orderly and sequential LD. numbers for each activity.

Activity codes shall be added to the schedule dictionary at the direction of the Engineer. At a minimum, activity codes for responsibility (prime, subcontractor by name), location (bridge #, span #, sta. #, etc.) and stage or phase number should be included.

The Project Coordinator shall be required to prepare and submit the following documents:

1. Baseline Submittal requirements

The Contractor shall be guided by the following requirements when submitting the Critical Path Schedules for review and approval.

- a. Within twenty (20) calendar days after contract award, the Contractor shall prepare and submit for review and approval a detailed Critical Path Schedule for all work contemplated for the first construction season. The review and approval process is more fully described in paragraph (c) of this section.

The detailed Critical Patch Schedule for the first construction season shall be prepared in accordance with all requirements of this specification.. The work shall be broken out into sufficient detail such that no activity has a duration greater than fifteen (15) days, unless approved by the Engineer. The Engineer shall be the sole judge as to whether the schedule is sufficiently detailed.

All work contemplated beyond the first construction season shall be shown in sufficient detail such that the Critical Path may be identified and shall incorporate all contract milestones. Upon approval this schedule shall be designated the "Initial Baseline." Failure to submit and gain approval for the "Initial Baseline" shall delay issuance of the "Notice to Proceed."

- b. Within 180 days after contract award the Contractor shall submit to the Engineer, for review and approval, a detailed Critical Path Schedule for all contract work. This schedule shall be prepared in accordance with all requirements of this specification. The work shall be broken out into sufficient detail such that no activity has a duration greater than fifteen (15) calendar days, unless approved by the Engineer. As a guide 25 to 35 activities should be provided per \$1 million of contract work. The Engineer shall be the sole judge as to whether the schedule is sufficiently detailed.

On extremely long or complex projects the Contractor may be allowed, with the approval of the Engineer, to submit Baseline Schedules for each calendar year, construction stage, or other meaningful basis. The proposed Baseline Schedule shall be submitted for review and approval a minimum of ninety (90) calendar days prior to the start of any subsequent work. Proposed Baseline Schedules shall be prepared in compliance with this specification in all other respects.

In no instance will be the Contractor be permitted to commence work on any significant portion of the work for which a Baseline Schedule has not been approved.

- c. The Contractor, represented by the Project Coordinator and/or the Consultant, shall participate with the Engineer in the review and evaluation of each Baseline Schedule submitted. Any and all revisions made necessary as a result of this review shall be made by the Contractor and a revised Baseline Schedule submitted within ten (10) calendar days. Any further revisions required thereafter shall also be submitted for approval within (10) calendar days.

The approval of a Baseline Schedule shall in no way waive the requirements of the contract nor shall it excuse the Contractor from any obligations under the contract.

If the Contractor fails to submit a Baseline Schedule acceptable to the Department for any portion of the work, the Contractor may be found in violation of Article 1.02.02 of the Standard Specifications "for having failed to prosecute work continuously, diligently and cooperatively in an orderly sequence."

2. Monthly Updates

Each month, as of a calendar date mutually acceptable to the Contractor and to the Engineer, the Contractor shall deliver to the Engineer three (3) prints of all required schedule diagrams and tabulations. In addition, the Contractor shall deliver one (1) copy of the project backup data diskette(s) which includes all Primavera project files. The schedule shall be updated to show the work actually accomplished during the preceding months, the actual time consumed for each activity, and the estimated time remaining for any activity which has been started but not completed.

The monthly update shall also include revisions to the CPM schedule necessitated by revisions to the project which have been directed by the Engineer during the month preceding the update. Similarly, any changes to the schedule due to Contractor influences shall also be included within the schedule.

Any changes or revisions made to the approved Baseline shall be identified in narrative form in a cover letter accompanying the monthly update. The Engineer reserves the right to approve or reject any such changes. The narrative shall also describe in general terms the progress of the work since the last schedule update and shall identify any items of special interest.

Except as otherwise authorized by the Engineer, monthly submissions received after the due date are considered late.

The reports required for each monthly update shall include all reports generated for approval of the Critical Path Schedule for that particular portion of the work. On larger or complex projects, the Engineer may require the schedule data sorted by an activity code to better reflect the progression of the work. Summary bar charts may also be required.

3. Biweekly Schedules

The Contractor shall be required to produce and submit to the Engineer a biweekly schedule. This short term schedule may be handwritten but shall clearly indicate all work planned for the two week period.

4. Recovery Schedules

If, in the opinion of the Engineer, the updated schedule indicates that the Contractor has fallen behind schedule, or that a revision in sequence of operations may be necessary for any other reason, the Contractor shall immediately institute all necessary steps to improve his progress, and shall submit such revised network diagrams, tabulations and operational plans, as may be deemed necessary by the Engineer, to demonstrate the manner in which an acceptable rate of progress will be regained.

Should the Contractor not demonstrate an ability to regain an acceptable rate of progress, the Engineer shall require the schedule to be resource loaded with the next monthly update. No additional compensation will be allowed for resource loading the schedule.

5. As-Built Schedules

Within thirty (30) days of completion of each stage or construction season, including all corrective work, the Contractor shall submit an "As-Built Schedule" showing the actual progress of work. The Contractor shall submit three prints of this final Critical Path Schedule and one project backup data diskette which includes all Primavera project files for the Engineer's exclusive use.

Method of Measurement:

Within ten (10) calendar days of the award of the Contract, the Contractor shall submit to the Engineer for approval a breakdown of his lump sum bid price for this item detailing:

1. The development cost to prepare the Critical Path Schedule in accordance with these specifications.
2. The cost per month to provide the services of the Project Coordinator and to update the Critical Path Schedule.
3. Substantiation showing that the costs submitted are reasonable based on the Contractor's lump sum bid.

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

1. Upon approval of the Critical Path Schedule for a particular portion of the work by the Engineer, the lump sum development cost will be certified for payment
2. Upon receipt of each monthly updated Critical Path Schedule, the per month cost for the services of the Project Coordinator will be certified for payment

Basis of Payment:

This service will be paid for at the contract lump sum price for "Project Coordinator" complete, which price shall include the preparation and submission of all schedules, updates and submittals. The lump sum price shall also include the cost of providing a complete, licensed copy of the Primavera software which will remain the property of the, Engineer, and all materials, equipment, labor and work incidental of this service.

The lump sum price will be certified for payment as described in "Method of Measurement" subject to the following conditions:

1. Any month where the CPM schedule is submitted late, without authorization from the Engineer, will result in the following actions:
 - a. The monthly payment for the Project Coordinator item shall be deferred to the next monthly payment estimate. If any monthly submittal is more than thirty (30) calendar days late, there will be no monthly payment for the services of the Project Coordinator.
 - b. The lessor of 5% of the monthly payment estimate or \$25,000 shall be retained until such time as the Contractor submits all required reports.
2. In the event the project extends beyond the original completion date by more than thirty (30) calendar days, and a time extension is granted to the Contractor, the Department may require additional CPM updates which will be paid at the per month cost for the services of the Project Coordinator.
3. Failure of the Contractor to submit a Critical Path Schedule for any portion of the work in accordance with this specification shall result in the withholding of all contract payments until the schedule is submitted to, and approved by, the Engineer.

ITEM #969010A - INSTALLATION OF CONSTRUCTION FIELD OFFICE (TYPE "C")
ITEM #969011A - REMOVAL OF CONSTRUCTION FIELD OFFICE (TYPE "C")
ITEM #969012A - MAINTENANCE OF CONSTRUCTION FIELD OFFICE (TYPE "C")

Description:

Under these items, the Contractor shall provide adequate office space able to comply with the type-of quarters indicated. The office space will be provided by and maintained by the Contractor for the duration of the work - and if required, for a maximum of ninety days thereafter for the exclusive use of the Department forces and others who may be engaged to augment Department forces with relation to the contract. The office quarters shall be located convenient to the work site and installed in accordance with Article 1.08.02. This office shall be separated from any office occupied by the contractor. Ownership and liability of the office quarters shall remain with the Contractor.

Materials:

Materials shall be in new or like-new condition for the purpose intended and shall be approved by the Engineer.

CONSTRUCTION FIELD OFFICE TYPE "C"

Office Requirements:

This office shall have minimum of 2,000 ft² of floor space and a minimum ceiling height of 82 inches and shall be partitioned to show a minimum five (5) rooms: three small rooms and two large rooms with adjoining doors. The three smaller rooms shall be apportioned as follows: two rooms at not less than 120 ft² and one room not less than 200 ft². One of the two large rooms to be not less than 190 ft² and carpeted. Two (2) outside doors and at least (12) windows will be required. The Contractor shall submit the building floor plan to the Engineer for review and approval prior to proceeding with the field office installation.

Interior walls and floors shall be free of marks, marks and in a clean condition. 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, this in addition to the security requirement specified later in this specification. The entrance shall be secure; screened, and fitted key lock entry system as specified and described under the field office security section of this specification.

The contractor shall furnish two (2) lavatories and toilet facilities for Men and (1) for women marked "men" and "women", in separately enclosed rooms which are properly ventilated and comply with applicable sanitary codes one of which shall be ADA accessible. All plumbing fixtures shall be in new or like-new condition. The Contractor shall provide each lavatory with hot and cold running water and flush-type toilets. The Contractor shall also supply lavatory and sanitary supplies as required.

The Contractor shall equip the office with electric lighting to a minimum illumination level of 1076 lx at desk level height, and electric outlets for each desk and drafting table.

92-526

ITEM #969010A
ITEM #969011A
ITEM #969012A

The Contractor shall provide the following additional equipment at the Field Office on this project to include at least the following to the satisfaction of the Engineer.

The Following Furnishings Shall Be Provided In The Field Office:

- 8 - Suitable office desks with drawers, locks and matching chair.
- 20 - Medium back padded task chairs.
- 8 - Fire resistant filing cabinets (legal size/4 drawer), locking.
- 6 - Non-fire resistant filing cabinets (legal size/4 drawer), locking.
- 2 - Storage racks to hold 36 inch x 60 inch display charts.
- 1 - Flat file (4/drawers).
- 2 - Drafting, type tables each 36 inch x 60 inch mm display charts.
- 2 - Drafters' stools.
- 1 - Conference tables, 36 inch x 120 inch.
- 1 - Copier, high speed, dry, plain paper with sorting capability, automatic feeder and reducing capability. The copier shall be capable of producing a minimum of 25 copies per minute. All supplies and maintenance shall be provided by the Contractor.
- 3 - Personal computer tables – 48 inch x 30 inch size and quality for the purpose intended.
- 1 - Hot and cold water dispensing unit, with a refrigerator and adequate supply of cups and bottled water shall be supplied by the Contractor for the duration of the project.
- 4 - Electronic office type printing calculators capable of addition, subtraction, multiplication and division with memory and a supply of printing paper.
- 1 - Telephone answering machine with two (2) line capabilities.
- 6 - Telephone handsets.
- 1 - Standard secretarial type desk with matching chair.
- 8 - Wastebaskets (two – 30 gal, six – 5 gal).
- 2 - Pencil sharpeners.
- 10 - Interior partitions 72 inch x 72 inch (soundproof type), portable, freestanding.
- 2 - Vertical plan racks for 2 sets of 22 inch x 36 inch plans for each rack.
- 2 - Electric wall clocks.
- 1 - Coat rack with 20 coat capacity.
- * - Fire extinguisher(s) - 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.
- 3 - Tables – 30 inch x 72 inch.
- 7 - Computer System as specified under Computer Hardware and Software.
- 1 - Internet Service for project duration – for e-mail and file transfer ability.
- 1 - Color Printer as specified under Computer Hardware and Software.
- 1 - LaserJet as specified under Computer Hardware and Software.
- 1 - Plain paper laser output facsimile (FAX) machine with a dedicated line. The FAX shall have 256KB memory to store up to 10 pages, 30 page auto-document feeder, 24 one-touch/40 speed-dial, 64 gray scale for photo transmissions and capable of transmitting via telephone credit card. Maintenance and supplies shall be provided by the Contractor.
- 2 - Double door (72 inch x 48 inch) supply cabinet - 4 shelf-with lock.
- 1 - Easel/chalkboard.

92-526

ITEM #969010A
ITEM #969011A
ITEM #969012A

- 4 - Open bookcases - 3shelf – 42 inch H x 36 inch W x 12 inch D.
- 1 - Dust pan and broom.
- 1 - Electric vacuum cleaner (upright) suitable for construction field office needs.

The furnishings and equipment required herein shall remain the property of the Contractor. Used equipment and furnishings are not acceptable for satisfying the requirements of this item. 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.

The Contractor shall supply a sign stating “Connecticut DOT Project Field Office” to be mounted on the outside of the office such that it is in plain view of the traveling public.
(See figure # 1)

Parking Facility:

The Contractor shall provide a parking area of sufficient size to accommodate fifteen (15) vehicles. For 90° parking (typical), car space is to be 8'-10" wide, stall depth 17'-8", with sufficient room for backing/turning.

Construction of the parking area and driveway, if necessary, will consist of a minimum of 2 inches of Processed Aggregate Base graded to drain. The base material will be extended to the office entrance. The Contractor shall also provide and maintain exterior illumination of the field office site. The minimum illumination level shall be two foot candles for minimum distance of ten feet on each side of the field office and throughout the parking area. If the field office space provided is in a permanent commercial structure, the external illumination requirements will not apply. The Contractor will provide a covered trash receptacle and weekly trash disposal.

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 exterior door locks
 - A) shall be deadbolts with a minimum throw of 1".
 - B) Keys are to be High Security requiring positive identification for duplication.
 - C) The only acceptable brands are as follows: MEDCO Biaxial, ASSA V10 or Kaba High Security.
 - D) Eight (8) keys shall be furnished to the state.
 - E) The signature authorization for additional keys shall be the contractor.
 - F) Acceptable brands of deadbolts include Lan 4500 Series, MEDCO Maxum or ASSA 6000 Series.
 - G) In addition to the specified deadbolts, an ANSI Grade 1 Lever passage set (without key locking functions) is to be installed on all exterior doors.
3. A six (6) foot chain link fence with 3 strands of barbed wire on extension arms and a twelve (12) foot gate surrounding the compound area. The gate will have a locking device using a standard padlock system with two (2) keys.

Electric Service:

The field office shall be equipped with an electric service panel to serve the electrical requirements of the field office, including: lighting, general outlets, computer outlets, calculators, etc., and meet the following minimum specifications:

- A. 120/140 volt, 1 phase, 3 wire.
- B. Ampacity necessary to serve all equipment (100 amp minimum 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. A computer circuit shall be installed and meet the following specifications:
 - 1. 120 volt, single phase, 20 amp - 1 pole circuit breaker
 - 2. Eight (8) wall-mounted receptacles, duplex, isolated ground, 120 volt, straight blade on a minimum of two circuits.
 - 3. One (1) four gang 120 volt AC outlet, for use by the Telephone Company.
 - 4. Additional 120 volt circuits and duplex outlets as required to meet National Electric Code requirements.
- E. One (1) Exterior (outside) wall mounted GFI receptacle, duplex, isolated ground, 120 volt, straight blade.
- F. After work is complete and prior to energizing, the State's DOT electrical inspector, must be contacted (860-594-2240). **(DO NOT CALL LOCAL TOWN OFFICIALS)**

Telephone Requirements:

This shall consist of the installation of data communication lines, business telephone service with eight (8) voice lines and six (6) hand sets and a dedicated telephone service for the facsimile machine. Four (4) additional wires are required for data communication. Extent of interior telephone system work includes communication terminal board, conduits, wiring system; and communication outlets using electrical products complying with requirements of applicable sections and accordance with the telecommunication wiring standards with the EIA/TIA-568 and EIA/TIA-569 specifications.

The Contractor shall furnish and install a Radio Communication System to the satisfaction of the Engineer.

Communications must terminate in an area where an existing electrical outlets are available and shelving capable of handling all applicable communication hardware. For more information regarding field office communication requirements, please contact the Department's Office of Information Systems in Newington at (860) 594-3544.

Heating, Ventilation and Air Conditioning (HVAC):

The field office shall be equipped with sufficient heating, air conditioning, and ventilation equipment to maintain a temperature 68°F within the field office at all times. The contractor will also be responsible for required maintenance and cleaning on HVAC equipment.

92-526

ITEM #969010A
ITEM #969011A
ITEM #969012A

Insurance Policy:

The Contractor shall provide a separate insurance policy, with no deductible, in the amount of Forty Thousand dollars (\$40,000.), in order to insure all State-owned equipment and supplies (including data processing and computer equipment) used in the office, against all losses. The Contractor shall be named insured on that policy, and the Department shall be an additional named insured on the policy. These losses shall include, but not limited to: theft, fire and physical damage. The Department will be responsible for all maintenance costs of computer hardware it furnishes. In the event of loss, the Contractor shall provide replacement equipment in accordance with current Department equipment specifications, within seven days of notice of the loss. If the Contractor is unable to provide the required replacement equipment within seven days, the Department may provide replacement equipment and deduct the cost of the equipment from moneys due or which may become due the Contractor under the contract or under any other contracts. The Contractor's financial liability under this paragraph shall be limited to the amount of the insurance coverage required by this paragraph.

If the cost of equipment replacement required by this paragraph should exceed the required amount of the insurance coverage, the Department will reimburse the Contractor for replacement costs exceeding the amount of the required coverage.

Computer Hardware and Software:

The software listed below shall be installed on the computer systems specified and is to be stationed in the Department's project field office. The contractor shall provide the computer system with all the required maintenance and repairs (to include labor and parts) throughout the contract life. The computer system furnished shall have all software and hardware necessary for the complete installation of the latest versions of the software listed, and therefore supplements the minimum specifications below. The Engineer reserves the right to expand or relax the specification to adapt to the software and hardware limitations and availability to provide the Department with an operating system that can handle the needs of the project. This requirement is to insure that the rapid changing environment that computer systems have experienced do not leave the needs of the project orphan to what has been specified.

The contractor shall provide the Engineer with a licensed copy registered in the Departments name of the latest versions of the software listed and maintain customer support services offered by each software producer for the duration of the project.

The Contractor shall deliver to the Engineer all supporting documentation for the software and hardware including any instructions or manuals. Original backup diskettes for the software shall be provided by the Contractor.

A. Computer Specification (MINIMUM)Processor:

- Intel 400MHz Pentium II Processor w/ 512K Cache
- Memory: 123MB 100Mhz SDRAM expandable to 384
- Monitor: 17inch color monitor (16.0 inch viewable)
- Graphics Accelerator: AGP 8MB Video Card
- Hard Drive: 6.4GB Ultra ATA hard drive
- Floppy Drive: 3.5inch 1.44MB diskette drive

92-526

ITEM #969010A
ITEM #969011A
ITEM #969012A

- CD-ROM: 13X min./32X max. CD-ROM drive
- Multimedia Package: Wavetable sound card
- Fax/Modem: 56k w/ x2TM Technology
- Case: Mid Tower
- Network Adapter: 3COM PCI 10/100 twisted pair Ethernet
- Back-up Drive: Iomega™ Zip Drive
- Keyboard: 104 + Keyboard
- Mouse: MS compatible 3-button Mouse
- Additional Software: Norton AntiVirus Software by Symantec
- Application Software: MS Office 97, Professional Edition
- Operating System: MS Windows NT 4.0
- Uninterrupted power supply: APC UPS backup 650S or equivalent

Note: All hardware components and software must be installed before delivery. All software documentation and CD-ROMs for both Microsoft Windows NT and Microsoft Office 97 Professional Edition must be provided.

PC Brands limited to Dell®, Gateway®, NEC® and AST® brands only.

B. Warranty Requirements

The service contract must be in place for the length of the project.

- The service contract will require all repairs to be made on site.
- Any repairs made on purchased equipment will be made by factory certified technicians.
- The warranty will cover all parts & labor as well as technical support
- The service contract must include immediate action customer service (24 Hours).
- If repairs on equipment require removal or replacement, or the equipment becomes unavailable for use longer than 48 hours, a replacement of equal or greater specification must be provided.

C. Color Printer Minimum Specifications:

- Print speed - Up to 8ppm (black); 4ppm (color)
- Max resolution - 600dpi color; 600 x 600dpi black
- Paper handling - Letter, legal; A4; AS; B5; #10 or European envelopes, banner paper with built-in 100 sheet feeder
- Must support HP PCL5

D. Laser Printer Minimum Specifications:

- Print speed - 8ppm
- Resolution - 600 x 600dpi
- Papersize-Up to 8.5 x 14
- Footprint - 15.8 x 17.5 x 7.9 inches (W x D x H)
- Weight-24.5 lbs
- RAM - 2MB standard; expandable to 50MB
- Must support HP PCL5

92-526

ITEM #969010A
 ITEM #969011A
 ITEM #969012A

Note: Printer Brands limited to: Hewlett-Packard®, Epson®, Cannon® and Lexmark® brands only. No other brands will be accepted.

E. The contractor is responsible for service and repairs to all computer hardware. All repairs must be performed with-in 24hrs. If the repairs require more than a 24hrs then a replacement must be provided.

Maintenance:

During the occupancy by the Department, the Contractor shall maintain all facilities and furnishings provided under the above requirements, and shall maintain and keep the office quarters clean through the use of weekly professional cleaning to include but not limited to (washing & waxing floors, cleaning restrooms, removal of trash, etc...), exterior areas mowed and clean of debris. A trash receptacle (dumpster) will be located within the fenced area with pickup (trash removal) service provided weekly. Snow removal, sanding and salting of all parking and walkway areas will 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.

At the completion of the construction project, the Contractor will remove all temporary construction, such as furnishings, temporary external illumination fixtures and parking areas, temporary utility services and restore the field office space to its original condition.

Method of Measurement:

The furnishing and installation of construction field office of the type specified will be measured for payment once the field office has actually been installed to the satisfaction of the Engineer.

The removal of construction field office of the type specified will be measured for payment once the field office has actually been removed to the satisfaction of the Engineer.

Monthly payment for the Field Office will not commence until the office is in place and all equipment, utilities, and parking is installed. Monthly payment shall terminate when the field office is removed from the site or 30 days from written notice to remove the office which ever occurs first.

Basis of Payment:

The furnishing and installation of the construction field office will be paid at the listed unit price for the "Installation of Construction Field Office" of the type specified, which price shall include all materials, labor, transportation, utility service installations, the cost of providing and/or constructing the parking area, exterior illumination and work incidental thereto.

The maintenance of the construction field office will be included with the unit price for "Maintenance of Construction Field Office" of the type specified, which includes all costs for trash removal, snow and ice removal, monthly utility costs, computer service agreements with customer support, insurance(s), lavatory and toilet facilities and supplies, taxes, leases,

92-526

ITEM #969010A
ITEM #969011A
ITEM #969012A

maintenance and supplies for all equipment, weekly cleaning and maintenance of the construction field office and site, including parking area, and work incidental thereto.

The removal of the construction field office will be paid at the contract unit price for "Removal of Construction Field Office" of the type specified which price shall include all costs to remove the field office and appurtenances from the site and restore the area to its pre. existing condition.

<u>Pay Item</u>	<u>Pay Unit</u>
Installation of Construction Field Office (Type C)	L.S.
Removal of Construction Field Office (Type C)	L.S.
Maintenance of Construction Field Office (Type C)	Month

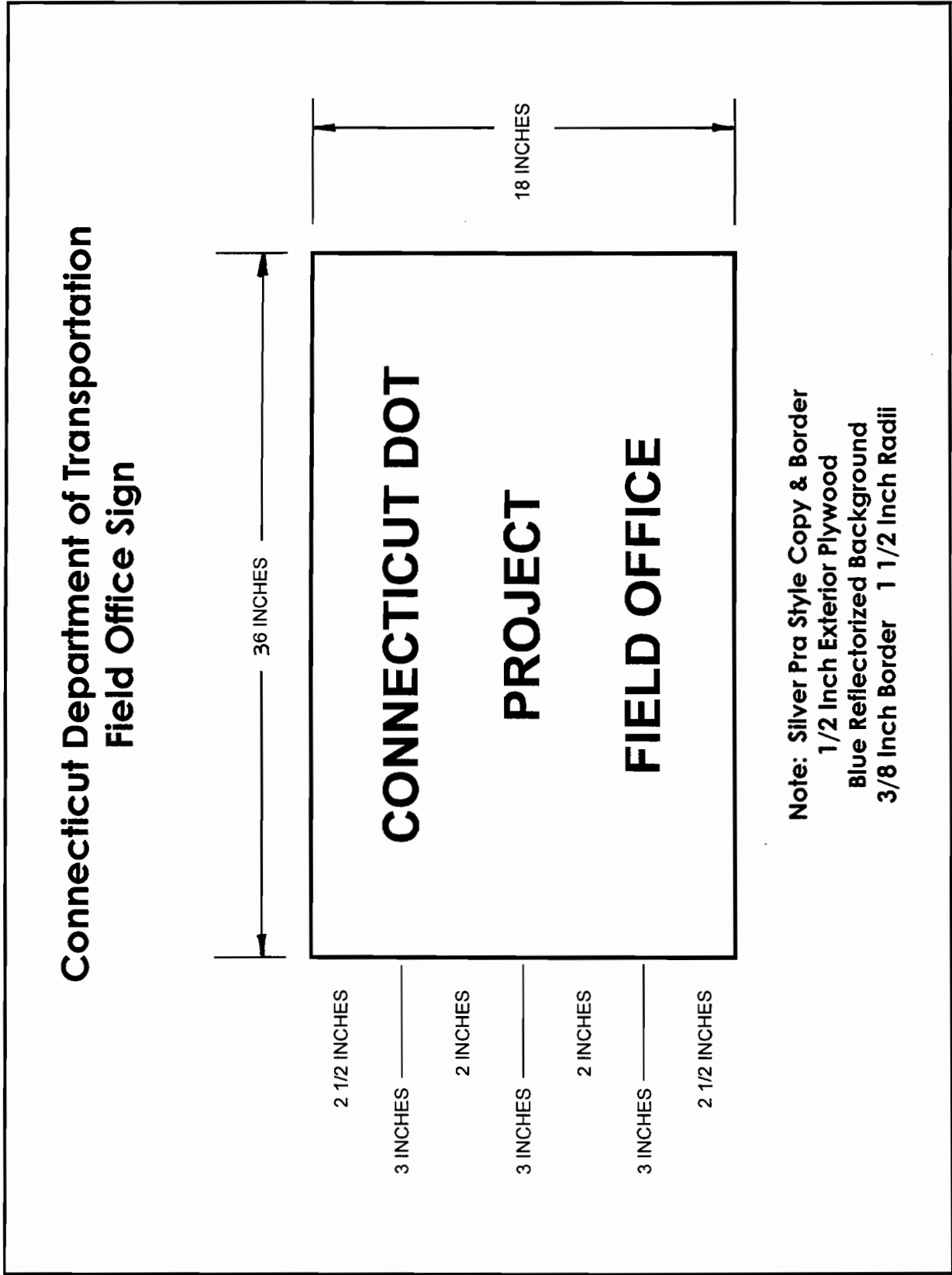


Figure 1

ITEM #971001A - MAINTENANCE AND PROTECTION OF TRAFFIC

The Contractor shall maintain and protect existing traffic operations on Church Street South (U.S. Route 1), Church Street South Extension, Union Avenue (U.S. Route 1, east of Church Street South intersection) and Sargent Drive. Excepted therefrom will be those periods, during the allowable periods, when the Contractor is actively working at which time the Contractor shall maintain and protect traffic on Church Street South, Church Street South Extension, Union Avenue and Sargent Drive as follows:

Church Street South:

Work in the travel lanes (lane closures):

The Contractor shall maintain and protect one lane of traffic on a paved travel no less than 11' in width in the southbound direction and one 11' lane on a paved travel path in the northbound direction for all phases of construction.

- OR -

During the allowable periods, the Contractor shall maintain and protect at least alternating one way traffic on a paved travel path not less than 12' in width.

Work in median:

The Contractor shall maintain and protect two lanes of traffic on a paved travel path of no less than 11' in width in both directions of Church Street South.

When the new island is being built, the turning roadway will be built concurrently and shall be effectively closed to traffic.

When the Contractor is working in the median or island, existing signs in the median or island shall be maintained by relocating them temporarily for as many times necessary during stage construction

Union Avenue

The Contractor shall maintain and protect one lane of traffic no less than 11' in width on a paved travel path in both directions. The Contractor shall provide continuous access to all driveways. At times which construction shall take place in front of commercial driveways, the Contractor shall place a temporary transitional ramp of suitable pavement material. The Contractor shall place signs with the legend "BUSINESS OPEN" in accordance with the Manual on Uniform Traffic Control Devices as not to discourage drivers and to properly direct traffic to the effected commercial establishments. At the Church Street South intersection, The Contractor shall install temporary transitional ramps as needed and in accordance with Connecticut Department of Transportation standards.

- OR -

During the allowable periods, the Contractor shall maintain and protect at least alternating one way traffic on a paved travel path not less than 12' in width.

Sargent Drive

Work in Westbound travel lanes:

The Contractor shall maintain and protect two lanes of traffic on a paved travel path no less than 11' in width in the westbound direction and to maintain and protect the existing bus stop east of the Church Street South Extension intersection. The Contractor shall maintain and protect existing travel paths in the eastbound direction.

Access to The Sargent Manufacturing Company

Prior to the time at which construction along Church Street South Extension shall take place, the Contractor shall build a temporary driveway at the Sargent Drive end of The Sargent Manufacturing Company complex as indicated on the plans or directed by the Engineer. The temporary driveway shall allow for the maintenance and protection of one lane of traffic on a paved travel path in each direction no less than 12' in width and shall be in operation until which time all stage construction along Church Street South Extension is complete. At which time construction of Church Street South is complete, the Contractor shall immediately remove the temporary driveway, install turf establishment and restore property to original condition.

Access to the Community Health Care Center complex

Access shall be maintained and protected using the Church Street South Extension entrance closest to Sargent Drive. Egress shall be maintained and protected using the existing driveway just north of the Community Health Care Center and detour via Brewery St.

Pedestrians

Existing pedestrian movement patterns shall be maintained at all times. At which times construction areas occupy existing sidewalks, pedestrians shall be provided with temporary crosswalks at the closest, safe location in advance of the construction zone unless an existing crosswalk is provided or as directed by the Engineer. Should it be necessary to divert pedestrians to established walking paths in close proximity to construction zones, pedestrians shall be protected with temporary protective fencing staked in ground or otherwise securely mounted. Pedestrian shall be provided with safe walking paths no less than 4' in width as indicated on the plans or directed by the Engineer.

Signing Patterns

The Contractor shall erect and maintain all signing patterns in accordance with the traffic control plans and in conformance with the requirements of the Manual on Uniform Traffic Control Devices. Proper distances between advance warning signs and proper taper length are mandatory unless stated otherwise on the plans or directed by the Engineer.

All temporary concrete barriers, other protective systems and traffic control devices as called by the contract or ordered by the Engineer must be on-hand and available in sufficient quantity for immediate installation.

Detours:

When the Contractor is working on Church Street South Extension traffic will be required to be rerouted. The Contractor must develop a detour signing plan to be submitted to the Engineer for approval at a minimum of two weeks prior to implementing the proposed detour. Any and all detour signing plans shall be accordance with the following detour routes. For all streets affected, detour signing shall incorporate street names, route numbers and directions to clearly guide rerouted traffic to desired location.

Detour: Closure of Church Street South Extension access to Brewery Street

- 1.) Northbound Sargent Drive traffic shall be directed towards Brewery Street at the Church Street South Extension intersection.
- 2.) Southbound Sargent Drive traffic shall be directed to Long Wharf Drive, to Canal Dock Road then back to Sargent Drive. Traffic will then be directed northbound on Sargent Drive to Brewery Street.
- 3.) Traffic from I-95 Southbound off Ramp to Sargent Drive and Canal Dock Road turning onto Sargent drive will be directed northbound on Sargent Drive to Brewery Street. Southbound traffic on Long Wharf Drive shall be diverted at Canal Dock Road and shall follow this same route.

Article 9.71.03 – Construction Method is supplemented by the following:

Pavement Markings – Local Roads and Streets

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

The Contractor shall provide painted pavement markings, where the existing pavement has been disturbed by milling operations or on a newly installed intermediate course of bituminous concrete pavement, by the end of the workday or night. Should any painted or existing pavement markings be in conflict with painted pavement markings in a manner which will confuse drivers, the conflicting pavement markings shall be removed or be covered with black mask tape by the end of the workday or night.

Painted pavement markings, which shall include broken lines, shoulder lines, stop bars, lane use arrows and painted median markings shall be applied on the milled surface and on each intermediate course of bituminous concrete by end of the workday or night. They shall be placed in accordance with the Special Provision “Construction Staking”. If the item “Construction Staking” is not included in the contract, the staking work will be included under the pavement marking items with no separate payment. All painted pavement markings will be paid under the appropriate item.

At which time the final course of bituminous concrete pavement is to be placed, temporary pavement marking tape may be used as an interim pavement marking until which time the permanent pavement markings are installed. Furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor’s Expense.

Final Pavement Markings:

In accordance with the Special Provision contained elsewhere in the contract documents, the Contractor shall install permanent Epoxy Resin Pavement Markings on the final course of bituminous concrete pavement by the end of the workday/night. All of the final pavement resurfaced during the work week shall have epoxy resin pavement markings placed on said surfaces by the end of the Friday workday/night of that week.

The Contractor shall not use painted pavement markings as a substitution for permanent Epoxy Resin Pavement Markings on the final course of bituminous concrete.

Existing Signing

At any time which construction activities should require an existing sign be removed, the sign shall be relocated to the nearest location possible in accordance with the Manual on Uniform Traffic Control Devices. Should the repositioning of the sign cause driver confusion the existing sign shall not be relocated or be covered. This shall include the relocating of sign supports, delineators, regulatory, warning and guide signs as many times as deemed necessary for the stage and will be paid for under the applicable pay items for removal and/or relocation of existing sign.

Pavement Surface

Traffic shall be maintained over reasonably smooth travelway to the satisfaction of the Engineer.

The Contractor will be required to maintain the pavement surface with temporary variable thickness asphalt pavement (Bituminous Concrete Class 4 or similar mix). At intersections, or temporary resurfacing limits temporary pavement transitions will be required to provide a smooth riding surface across pavement constructed in stages.

Drainage

The Contractor shall maintain drainage facilities, old and new, along roadways including detours to the satisfaction of the Engineer. The Contractor shall construct new or temporary drainage within the work zone delineated for each stage or during restrictive periods and shall maintain existing outlet pipes until new outlets are constructed and operational. The cost of maintaining the drainage facilities during the stages of construction will be included in the price bid for Maintenance and Protection of Traffic.

TRAFFIC CONTROL DURING CONSTRUCTION OPERATIONS (English Version)

The following guidelines have been prepared to assist Construction personnel in determining when and what type of traffic control patterns to use for various work items under certain conditions. These guidelines have been prepared to provide for the safe and expeditious movement of traffic through the work area and also to enhance the safety of the work forces working within the work area. In addition, it is necessary that all traffic control patterns be installed in such a manner that they are uniform, neat and orderly so as to command respect from the motorist.

The Basic Principles and Standards as stated below are Minimum: Methods illustrated for controlling traffic through the work areas are typical situations. The proper application of the standard protective devices depends on actual field conditions.

TRAFFIC CONTROL PATTERNS: Traffic control patterns will be used when a work operation requires that all or part of any vehicle protrudes onto any part of the travel lanes or shoulders. The protection prescribed for each situation shall be based on the following:

1. Speed and volume of traffic.
2. Duration of operation.
3. Exposure to hazards.

In the case of a horizontal or vertical sight restriction in advance of the work area, the traffic control pattern shall be extended so as to provide adequate sight distance for the approaching traffic.

If a lane reduction taper is required to shift traffic, the entire length of the taper should be installed on a tangent section of roadway where the entire taper area can be seen by the motorist.

Any existing signs that are in conflict with the traffic control patterns shall be removed, covered, or turned so as not to be readable by oncoming traffic.

When installing an expressway traffic control pattern, a Buffer Area should be provided. The Buffer Area should extend from the end of the Transition Area to the beginning of the Work Area. This area shall be free of equipment, workers, materials and parked vehicles. The length of the Buffer Area shall be between 350' (for 55 mph speeds) and 500' (for 65 mph speeds).

No traffic control patterns will be required when vehicles are on emergency patrol type activity or when short duration stops are made and the equipment can be contained within the shoulder area. Flashing lights and Uniformed Flaggers will be used when required.

Although each situation must be dealt with individually, conformity with these patterns is required. In situations not adequately covered by these provisions or as set forth in the traffic control patterns, the Contractor must contact the Project Engineer for assistance prior to setting up the signing for the work area.

PLACEMENT OF SIGNS: Signs must be placed in such a position to allow motorists the opportunity to reduce their speed prior to the work area. Signs are generally placed on the right side of the roadway. On multilane divided highways, where either a right or left lane closure is required, advance warning signs should be installed on both the right shoulder and left (median) shoulder. However, in order to install the signs for a right lane closure pattern in the median, there must be sufficient width of median shoulder area. On directional roadways, such as an off ramp, where the sight distance to the signs on the right side of the ramp is restricted, a duplication of these signs should be installed on the left side of the ramp.

Allowable Adjustment of Signs and Devices
Shown on the Traffic Control Patterns

The traffic control patterns contained herein indicate the locations and spacings of the signs and devices under ideal conditions. It is desirable to have signs and devices installed as shown on these patterns whenever possible.

Adjustments to these standard signing patterns shall be made only at the direction of the Engineer. The signing patterns are to be installed, as directed by the Engineer, to consider abutting property requirements, driveways, side roads and the vertical and horizontal curvature of the roadway.

If adjustments are made to these standard signing patterns, the adjustments shall always be to improve the visibility of the signs and devices and to better control traffic operations.

The Engineer may require that the signing pattern be located significantly in advance of the work area in order to provide better sight line to the signing and safer traffic operations through the work area.

Table I indicates the minimum taper length required for a lane closure based on the posted speed limit of the roadway. These taper lengths shall only be used when the recommended taper lengths shown on the traffic control patterns cannot be achieved.

TABLE I - MINIMUM TAPER LENGTHS

POSTED SPEED LIMIT MILES PER HOUR	MINIMUM TAPER LENGTH IN FEET FOR A SINGLE LANE CLOSURE
30 OR LESS	180
35	250
40	320
45	540
50	600
55	660
65	780

SECTION 1. WORK ZONE SAFETY MEETINGS

- 1.a) Prior to the commencement of work, a work zone safety meeting will be conducted with representatives of DOT Construction, Connecticut State Police (Local Barracks), Municipal Police, the Contractor (Project Superintendent) and the Traffic Control Subcontractor (if different than the prime Contractor), to review the contract requirements and discuss the Department's procedures. Other work zone safety meetings during the course of the project should be scheduled as needed.
- 1.b) A Work Zone Safety Meeting Agenda, (see Section 9), shall be developed and utilized at the meeting in order to outline the anticipated traffic control issues that can be expected to be encountered during the construction of this project. Any issues and/or disagreements that can't be resolved at these meetings will be brought to the attention of the District and the Office of Construction.

SECTION 2. INSTALLING AND REMOVING SIGN PATTERNS

- 2.a) Lane Closures shall be installed beginning with the advanced warning signs and proceeding forward toward the work area.
- 2.b) Lane Closures shall be removed in the reverse order, beginning at the work area, or end of the pattern, and proceeding back toward the advanced warning signs.

- 2.c) Stopping traffic may be allowed:

As per the contract for such activities as blasting, steel erection, etc.

During paving, milling operations, etc. where, in the middle of the operation, it is necessary to flip the signing pattern to complete the operation on the other half of the roadway and traffic should not travel across the longitudinal joint or difference in roadway elevation.

To move slow moving equipment across live traffic lanes into the work area.

- 2.d) Under certain situations when the safety of the traveling public and/or that of the workers may be compromised due to conditions such as traffic volume, speed, roadside obstructions, or sight line deficiencies particular to the location, as determined by the Engineer and/or State Police, traffic may be briefly impeded while installing and/or removing the advanced warning signs and the first two arrow signs only. Appropriate measures shall be taken to safely slow traffic. If required, State Police may utilize traffic slowing techniques, including the use of Truck Mounted Impact Attenuators (TMAs) as appropriate, for a minimum of one mile in advance of the sign pattern starting point. Once the advanced warning signs and the first two arrow signs are installed/removed, the two TMAs and sign crew should continue to install/remove the pattern as described in Section 4c and the traffic should be allowed to resume their normal travel.

- 2.e) The Contractor must adhere to utilizing the proper signs, placing the signs correctly, and insuring the proper spacing of signs.
- 2.f) Additional signing is required on entrance ramps, exit ramps, and/or intersecting roads to warn and/or move traffic into the proper travel path prior to merging/exiting with/from the main line traffic. This shall be completed before installing the mainline pattern past the ramp or intersecting roadway.
- 2.g) Prior to installing a sign pattern, any conflicting existing signs shall be covered with an opaque material. Once the sign pattern is removed, the covered existing signs shall be uncovered.
- 2.h) On limited access roadways, workers are prohibited from crossing the travel lanes to install and remove the advance warning signs on the opposite side of the roadway. The advance warning signs on the opposite side of the roadway shall be installed and removed separately.

SECTION 3. USE OF HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

- 3.a) On limited access roadways, one Flashing Arrow shall be utilized for each lane that is required to be closed. The Flashing Arrow shall be installed concurrently with the installation of the sign pattern and its placement shall be as shown on the traffic control plan. In multiple lane closure situations, one Flashing Arrow is required for each lane closed. For example, when closing the two right lanes as shown in "Work in Right Two Lanes - Traffic Control Plan 2", two Flashing Arrows are required, one in the right shoulder for the first lane closure and a second in the closed right lane for the second lane closure. If conditions warrant, additional Flashing Arrows should be employed (i.e.: curves, major ramps, etc.).
- 3.b) On non-limited access roadways, the use of a Flashing Arrow for lane closures is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to utilize the Flashing Arrow.
- 3.c) The Flashing Arrow shall not be used on two lane, two-way roadways for temporary alternating one-way traffic operations.
- 3.d) The Flashing Arrow board display shall be in the "arrow" mode for lane closures and in the "caution" mode (horizontal bar or four corners) for shoulder work, blocking the shoulder, or roadside work near the shoulder.
- 3.e) The Flashing Arrow shall not be used on a multi-lane roadway to laterally shift all lanes of traffic, because unnecessary lane changing may result.
- 3.f) If the required number of Flashing Arrows is not available, the sign pattern shall not be installed.

SECTION 4. USE OF TRUCK MOUNTED IMPACT ATTENUATOR VEHICLES (TMAs)

- 4.a) On limited access roadways, a minimum of two TMAs shall be utilized to install and remove sign patterns closing a lane(s) of traffic. If two TMAs are not available, the sign pattern shall not be installed.
- 4.b) On non-limited access roadways, the use of TMAs to install and remove sign patterns closing a lane(s) is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to utilize the TMAs.
- 4.c) Generally, to establish the advance and transition signing, one TMA shall be placed on the shoulder and the second TMA shall be 1000 feet ahead blocking the lane. The sign truck and workers should be immediately ahead of the second TMA. In no case shall the TMA blocking the lane be utilized as the sign truck. Once the transition is in place, both TMAs shall travel in the closed lane until all Changeable Message Signs, signs, Flashing Arrows, and cones/drums are installed.
- 4.d) A TMA shall be placed prior to the first work area in the sign pattern. If there are multiple work areas within the same lane closure/pattern, then additional TMAs may be positioned at each additional work area in the sign pattern as needed.
- 4.e) TMAs shall be positioned a sufficient distance prior to the workers or equipment being protected to allow for appropriate vehicle roll-ahead in the event that the TMA is hit, but not so far as to allow errant vehicles to travel around the TMA and into the workers/equipment. For additional placement and use details, refer to the specification entitled "Type 'D' Portable Impact Attenuation System". Some operations, such as paving and concrete repairs, do not allow for placement of the TMA(s) within the specified distances. In these situations, the TMA(s) should be placed at the beginning of the work area and shall advance as the paving or concrete operations proceed.
- 4.f) TMAs should be paid in accordance with how the unit is utilized. When it is utilized as a TMA and is in the proper location as specified, then it should be paid at the specified hourly rate for "Type 'D' Portable Impact Attenuation System". When the TMA is utilized as a Flashing Arrow, it should be paid at the daily rate for "High Mounted Internally Illuminated Flashing Arrow". If a TMA is used to install and remove a sign pattern and then is used as a Flashing Arrow, the unit should be paid as a "Type 'D' Portable Impact Attenuation System" for the hours used to install and remove the pattern, typically 2 hours (1 hour to install and 1 hour to remove), and is also paid for the day as a "High Mounted Internally Illuminated Flashing Arrow".
- 4.g) If the required number of TMAs is not available, the sign pattern shall not be installed.

SECTION 5. USE OF STATE POLICE OFFICERS

- 5.a) State Police may be utilized only on limited access highways and secondary roadways under their primary jurisdiction. At least one Officer should be utilized per critical sign pattern. Shoulder closures and right lane closures can generally be implemented without the presence of a State Police Officer. Likewise in areas with moderate traffic and wide, unobstructed medians, left lane closures can be implemented without State Police presence. Certain situations may require State Police presence, if one is available, even though the general guidelines above indicate otherwise. Examples of this include: 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.
- 5.b) Once the sign pattern is in place, the State Police Officer should be positioned in a non-hazardous location at the beginning of the sign pattern or at one of the work areas not protected by a TMA. If traffic backs up beyond the beginning of the sign pattern, then the State Police Officer should be repositioned prior to the backup to give warning to the oncoming motorists. Where State Police Officer and TMA are in close proximity to each other, the TMA should be placed to protect the State Police Officer's vehicle from the oncoming traffic.
- 5.c) Other functions of the State Police Officer(s) shall include:
- *Assisting entering/exiting construction vehicles within the work area.
 - *Enhancing worker visibility/safety for workers in close proximity to the open travel lane(s).
 - Speed control of traffic within the work area.
 - Enforcement of speed and other motor vehicle laws within the work area.
- Typically, the State Police Officer should be out of the vehicle for the functions marked with an asterisk (*).
- 5.d) "Trafficpersons assigned to a work site are to only take direction from the Engineer", as specified in the Item entitled "Trafficperson".

SECTION 6. USE OF (REMOTE CONTROL) CHANGEABLE MESSAGE SIGNS

- 6.a) On limited access roadways, one Changeable Message Sign shall be utilized in advance of each sign pattern, which closes a lane(s). Prior to installing the lane closure sign pattern, the Changeable Message Sign shall be installed and in operation, displaying the appropriate lane closure information (i.e.: Left Lane Closed - Merge Right). The Changeable Message Sign shall be positioned 1/2 - 1 mile ahead of the lane closure taper. No more than two (2) displays shall be used within any message cycle.

- 6.b) On non-limited access roadways, the use of Changeable Message Signs for lane closures is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to utilize the Changeable Message Sign.
- 6.c) The advance Changeable Message Sign is typically placed off the right shoulder, 5 feet (from the edge of pavement. In areas where the Changeable Message Sign cannot be placed beyond the edge of pavement, it may be placed on the paved shoulder with a minimum of five (5) traffic drums placed in a taper in front of it to delineate its position on the pavement. For long term usage, greater than 36 hours, the advance Changeable Message Sign shall be adequately protected.
- 6.d) When the Changeable Message Signs are no longer required, they should be removed from the clear zone and have the display screen cleared and turned 90° away from the roadway.
- 6.e) The Changeable Message Sign generally should not be used for generic messages (ex: Road Work Ahead, Bump Ahead, Gravel Road, etc.).
- 6.f) The Changeable Message Sign should be used for specific situations which need to command the motorist's attention which cannot be conveyed with standard construction signs (Examples include: Exit 34 Closed Sat/Sun - Use Exit 35, All Lanes Closed - Use Shoulder, Workers on Road - Slow Down).
- 6.g) Messages that need to be displayed for long periods of time, such as during stage construction, should be displayed with construction signs. For special signs, please coordinate with the Office of Construction and the Division of Traffic Engineering for the proper layout/dimensions required.
- 6.h) Section 10 contains the messages that are allowed on the Changeable Message Sign. For any other message(s), approval must be received from the Office of Construction prior to their use.
- 6.i) If the required number of Changeable Message Signs is not available, the sign pattern shall not be installed.

SECTION 7. USE OF TRAFFIC DRUMS AND TRAFFIC CONES

- 7.a) Traffic drums are required for any long-term uses, such as stage construction lane closures/shifts and for delineating raised catch basins or other hazards.
- 7.b) ~42" Traffic cones may be used for temporary lane closures or traffic patterns (i.e.: one work shift or a continuous shift that lasts less than a 72-hour duration).
- 7.c) Traffic cones less than 42 inches in height shall not be used on limited access roadways.
- 7.d) Typical spacing of traffic drums and/or cones shown on the Traffic Control Plans in the Contract are maximum spacings and may be reduced to meet actual field conditions as

required. Areas where spacings should be reduced include entrance and exit ramps, gore areas, and actual work locations.

SECTION 8. GENERAL

- 8.a) If the required minimum number of signs and equipment (i.e. one High Mounted Internally Illuminated Flashing Arrow per lane closure, two TMAs, Changeable Message Sign, etc.) are not available, the sign pattern shall not be installed.
- 8.b) The Contractor shall have back-up equipment (TMAs, High Mounted Internally Illuminated Flashing Arrow, Changeable Message Sign, construction signs, etc.) available at all times in case of mechanical failures, etc. The only exception to this is in the case of sudden equipment breakdowns in which the sign pattern may be installed but the Contractor must provide replacement equipment within 24 hours.
- 8.c) Failure of the Contractor to have the required minimum number of signs and equipment, which results in the sign patterns not being installed, shall not be a reason for a time extension.
- 8.d) In cases of legitimate differences of opinion between the Contractor and the Inspection staff, the Inspection staff shall err on the side of safety. The matter shall be brought to the District Office for resolution immediately or, in the case of work after regular business hours, on the next business day.

SECTION 9. WORK ZONE SAFETY MEETING AGENDA

- 1) Review Project scope of work and time.
- 2) Review Section 1.08, Prosecution and Progress of the Special Provisions.
- 3) Review Section 9.70, Trafficperson of the Specifications.
- 4) Review Section 9.71, Maintenance and Protection of Traffic of the Special Provisions, including "Work Zone Safety Procedures".
- 5) Review Contractor's schedule and method of operations.
- 6) Review areas of special concern: ramps, turning roadways, medians, lane drops, etc.
- 7) Open discussion of work zone questions and issues.
- 8) Discussion of review and approval process for changes in contract requirements as they relate to work zone areas.

**SECTION 10. WORK ZONE SAFETY PROCEDURES - ALLOWABLE VMS
MESSAGES**

<u>Message No.</u>	<u>Frame 1</u>	<u>Frame 2</u>	<u>Message No.</u>	<u>Frame 1</u>	<u>Frame 2</u>
1	LEFT LANE CLOSED	MERGE RIGHT	9	LANES CLOSED AHEAD	REDUCE SPEED
2	2 LEFT LANES CLOSED	MERGE RIGHT	10	LANES CLOSED AHEAD	USE CAUTION
3	LEFT LANE CLOSED	REDUCE SPEED	11	WORKERS ON ROAD	REDUCE SPEED
4	2 LEFT LANES CLOSED	REDUCE SPEED	12	WORKERS ON ROAD	SLOW DOWN
5	RIGHT LANE CLOSED	MERGE LEFT	13	EXIT XX CLOSED	USE EXIT YY
6	2 RIGHT LANES CLOSED	MERGE LEFT	14	EXIT XX CLOSED USE YY	FOLLOW DETOUR
7	RIGHT LANE CLOSED	REDUCE SPEED	15	2 LANES SHIFT AHEAD	USE CAUTION
8	2 RIGHT LANES CLOSED	REDUCE SPEED	16	3 LANES SHIFT AHEAD	USE CAUTION

NOTES FOR TRAFFIC CONTROL PLANS
NUMBERS 1 THROUGH 18

1. TRAFFIC DRUMS MAY BE SUBSTITUTED FOR TRAFFIC CONES WITH THE APPROVAL OR AT THE DIRECTION OF THE ENGINEER.
2. SIGNS (A) AND (D) MAY BE OMITTED WHEN THESE SIGNS HAVE ALREADY BEEN INSTALLED TO DESIGNATE A LARGER WORK AREA THAN THAT WORK AREA THAT IS ENCOMPASSED ON THIS PLAN.
3. IF A TRAFFIC STOPPAGE OCCURS IN ADVANCE OF SIGN (A) THEN AN ADDITIONAL SIGN (A) SHALL BE INSTALLED IN ADVANCE OF THE STOPPAGE.
4. ON EXPRESSWAYS WHERE THE MEDIAN SHOULDER WIDTH IS INADEQUATE, ADVANCE SIGNING IN THE MEDIAN IS NOT REQUIRED FOR RIGHT LANE CLOSURES.
5. SEE TABLE #1 FOR ADJUSTMENT OF TAPERS IF NECESSARY.
6. ANY LEGAL SPEED LIMIT SIGNS WITHIN THE LIMITS OF A ROADWAY / LANE CLOSURE AREA WILL BE COVERED WITH AN OPAQUE MATERIAL WHILE THE CLOSURE IS IN EFFECT AND UNCOVERED WHEN THE ROADWAY / LANE CLOSURE IS REOPENED TO ALL LANES OF TRAFFIC.
7. FOR LANE CLOSURES ONE (1) MILE OR LONGER, A "REDUCE SPEED TO 45 (40) MPH" SIGN SHALL BE PLACED AT THE ONE MILE POINT AND EACH MILE THEREAFTER.
8. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THE EXISTING CONFLICTING PAVEMENT MARKINGS SHALL BE ERADICATED OR COVERED AND TEMPORARY PAVEMENT MARKINGS THAT DEPICT THE PROPER TRAVELPATHS SHALL BE INSTALLED.
9. IF THIS PLAN IS TO REMAIN IN OPERATION DURING THE HOURS OF DARKNESS, INSTALL BARRICADE WARNING LIGHTS (TYPE B - HIGH INTENSITY) ON ALL DIAMOND SIGNS LOCATED IN THE ADVANCE WARNING AREA.
10. DISTANCES BETWEEN SIGNS IN THE ADVANCE SIGN AREA MAY BE REDUCED TO 200' ON LOW SPEED URBAN ROADS AND INCREASED TO 500' ON RURAL ROADS.
11. POLICE OFFICERS SHOULD BE USED WITH THIS PLAN.
12. (K) (L) & (M) ARE NOT REQUIRED IF PAVEMENT MARKINGS ARE CHANGED TO REFLECT THE NEW TRAVELPATH.
13. A CHANGEABLE MESSAGE SIGN SHALL BE UTILIZED ONE HALF TO ONE MILE IN ADVANCE OF THE LANE CLOSURE TAPER.
14. A CHANGEABLE MESSAGE SIGN MAY BE UTILIZED ONE HALF TO ONE MILE IN ADVANCE OF THE LANE CLOSURE TAPER.
15. A HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW MAY BE UTILIZED WITH THIS PLAN.

REV'D 11-99

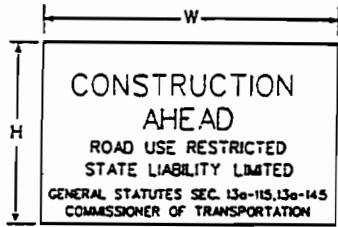


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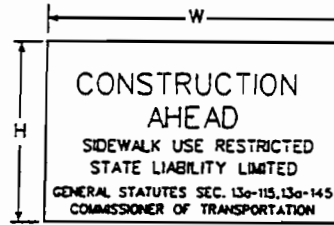
TRAFFIC CONTROL PLAN
NOTES
(CONSTRUCTION)

SERIES 16 SIGNING

SERIES 16 SIGNING SHALL BE INSTALLED ON ALL ROADWAYS AFFECTED BY CONSTRUCTION ACTIVITIES.



		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"	

THE 16-S SIGN SHALL BE USED ON ALL PROJECTS THAT REQUIRE SIDEWALK RECONSTRUCTION OR RESTRICT PEDESTRIAN TRAVEL ON AN EXISTING SIDEWALK.

CONSTRUCTION PROJECTS

SERIES 16 SIGNING SHALL BE INSTALLED IN ADVANCE OF THE TRAFFIC CONTROL PATTERNS TO PERMIT MOTORISTS THE OPPORTUNITY TO AVOID A WORK AREA. ON MULTI-LANE HIGHWAYS, THESE SIGNS SHALL BE LOCATED IN ADVANCE OF THE NEAREST UPSTREAM EXIT RAMP AND ON ANY ENTRANCE RAMPS PRIOR TO OR WITHIN THE WORK AREA LIMITS.

THE LOCATION OF SERIES 16 SIGNING CAN BE FOUND ELSEWHERE IN THE PLANS OR INSTALLED AS DIRECTED BY THE ENGINEER.

SIGN 16-E SHALL BE USED ON ALL 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.



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CONNECTICUT
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DIVISION OF TRAFFIC ENGINEERING

TRAFFIC CONTROL PLAN
SERIES 16 SIGNS
(CONSTRUCTION)

APPROVED *[Signature]* DATE 11-22-99
PRINCIPAL ENGINEER

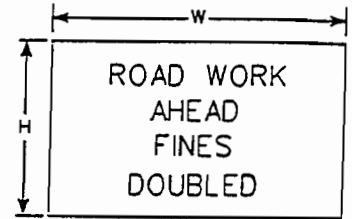
ITEM #971001A

REQUIRED REGULATORY SIGNING

THE REGULATORY SIGN "ROAD WORK AHEAD. FINES DOUBLED" SHALL BE INSTALLED ON ALL CONSTRUCTION PROJECTS WHICH OCCUR ON ANY STATE HIGHWAY IN CONNECTICUT, WHEN THERE ARE WORKERS ON THE HIGHWAY OR WHEN THERE IS OTHER THAN EXISTING TRAFFIC FLOWS.

ALL CONSTRUCTION OPERATIONS SHALL USE SIGN CATALOG NO. 31-1906.

DRAWINGS FOR THESE SIGNS CAN BE OBTAINED FROM THE DIVISION OF TRAFFIC ENGINEERING.



W H
31-1906 48" x 42"

LOCATION OF REGULATORY SIGN

TEMPORARY / STATIONARY WORK ZONE PATTERNS

THE "ROAD WORK AHEAD FINES DOUBLED" REGULATORY SIGN WILL BE THE FIRST SIGN PLACED IN ANY TRAFFIC CONTROL PATTERN. IT WILL BE PLACED IN ADVANCE OF THE SERIES 16 "ROAD WORK AHEAD" DIAMOND. IT SHOULD BE MOUNTED ON THE SAME TYPE OF TEMPORARY SIGN SUPPORT AND AT THE SAME HEIGHT AS THE OTHER CONSTRUCTION SIGNS IN THE PATTERN.

THE 16 SERIES SIGN MUST BE MOUNTED IN ADVANCE OF THE SIGNING PATTERN.

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

LONG TERM STAGE CONSTRUCTION, REDUCED LANE WIDTHS OR LANE SHIFTS WHICH REQUIRE POST MOUNTED WORK ZONE PATTERNS

THE "ROAD WORK AHEAD FINES DOUBLED" REGULATORY SIGN WILL BE THE FIRST SIGN PLACED IN THE SIGNING PATTERN. IT WILL BE PLACED IN ADVANCE OF THE "ROAD WORK AHEAD" DIAMOND. IT SHOULD BE POST MOUNTED AND AT THE SAME HEIGHT AS THE OTHER CONSTRUCTION SIGNS IN THE PATTERN.

THE 16-SERIES SIGN MUST BE MOUNTED IN ADVANCE OF THE SIGNING PATTERN.

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

MOVING WORK ZONE PATTERNS

MOVING PATTERNS ON EXPRESSWAYS (TRAFFIC CONTROL PLAN NOS. 20, 21, 22 AND 23) WILL REQUIRE THE INCLUSION OF TWO SIGNS "ROAD WORK AHEAD FINES DOUBLED" AND "END WORK ZONE". THE "ROAD WORK AHEAD FINES DOUBLED" SIGN WILL BE PLACED ON THE BACK OF VEHICLE NO 2 AND THE "END ROAD WORK" SIGN WILL BE PLACED ON THE BACK OF VEHICLE NO 5 (THE WORK VEHICLE).

MOVING PATTERNS ON TWO-LANE ROADS (TRAFFIC CONTROL PLAN NO. 24) WILL REQUIRE THE INCLUSION OF TWO SIGNS "ROAD WORK AHEAD FINES DOUBLED" AND "END WORK ZONE". THE "ROAD WORK AHEAD FINES DOUBLED" SIGN WILL BE PLACED ON THE BACK OF VEHICLE NO 2 AND THE "END ROAD WORK" SIGN WILL BE PLACED ON THE BACK OF VEHICLE NO 4 (THE LEAD VEHICLE).

THESE REGULATORY SIGNS SHALL NOT BE INSTALLED ON TOWN ROADS LOCATED WITHIN THE CONSTRUCTION AREA.

CONSTRUCTION PROJECTS

THE PROJECT ENGINEER SHALL VERIFY THE LOCATIONS OF REGULATORY SPEED SIGNS (BLACK & WHITE) WITHIN THE WORK AREA. SUPPLEMENTAL SPEED LIMIT SIGNS MAY BE REQUIRED WITHIN THE WORK ZONE FOR LONG TERM OPERATIONS.



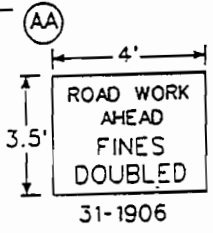
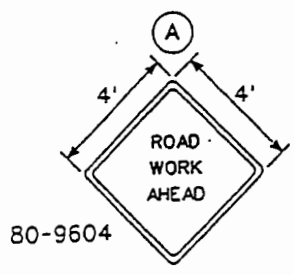
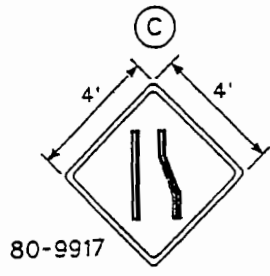
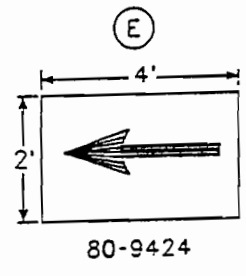
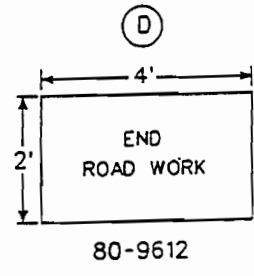
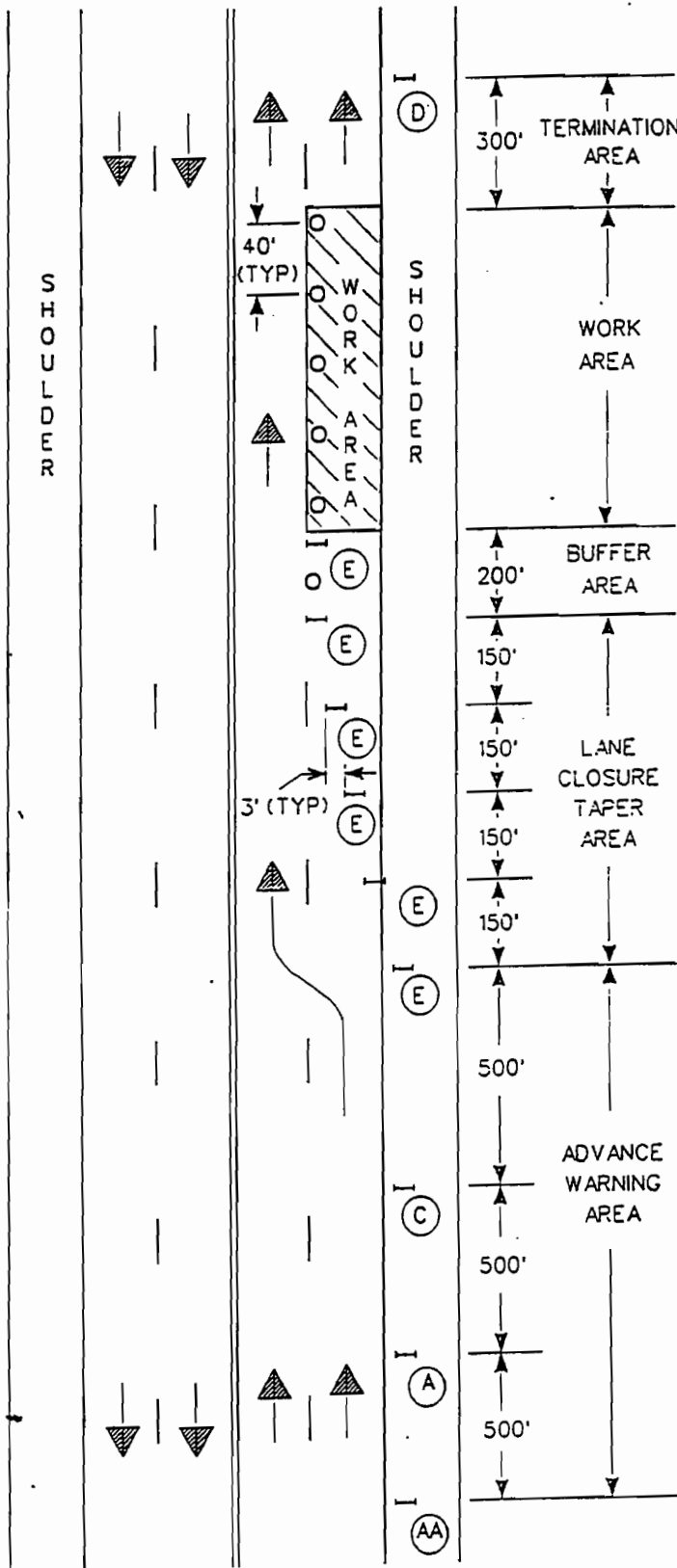
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CONNECTICUT
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DIVISION OF TRAFFIC ENGINEERING

TRAFFIC CONTROL PLAN
FINES DOUBLE SIGN
(CONSTRUCTION)

WORK IN RIGHT LANE 4 LANE UNDIVIDED HIGHWAY

SIGN FACE
102 SQ. FT (MIN)



O DENOTES TRAFFIC CONE OR TRAFFIC DRUM
 HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

SEE NOTES 1, 2, 3, 5, 9, 10, 14 & 15

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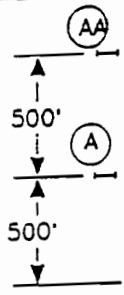
TRAFFIC CONTROL PLAN
PLAN 10

SCALE NONE

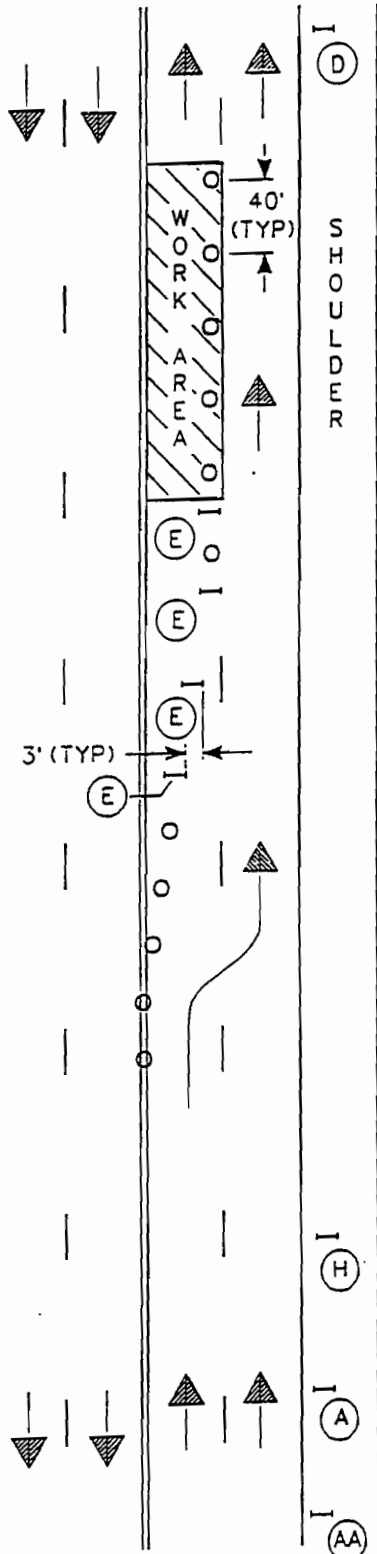
APPROVED DATE 11-22-99
 PRINCIPAL ENGINEER
 ITEM #971001A

WORK IN LEFT LANE 4 LANE UNDIVIDED HIGHWAY

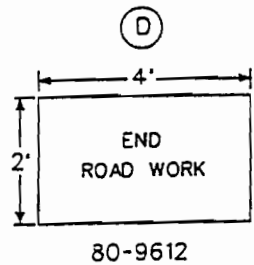
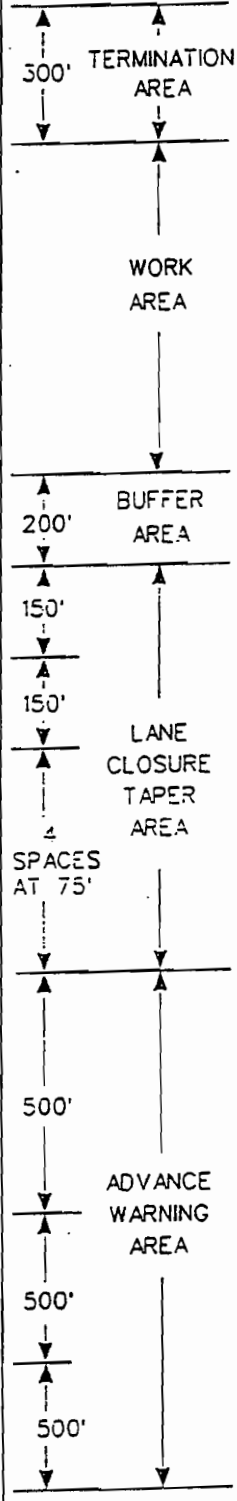
SIGN FACE
116 SQ. FT (MIN)



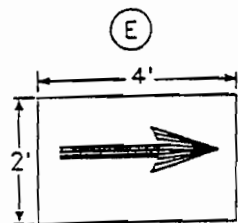
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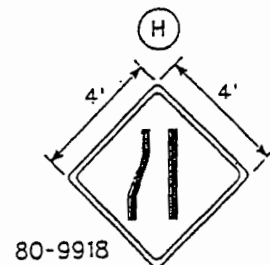
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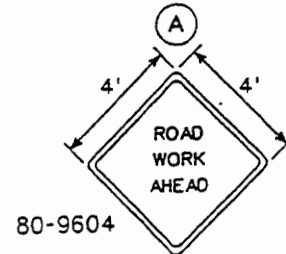
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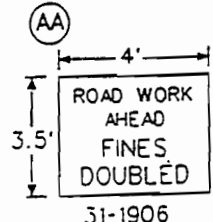
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HIGHWAY OPERATIONS
DIVISION OF TRAFFIC ENGINEERING

TRAFFIC CONTROL PLAN
PLAN 11

SCALE NONE

NOTE:
PLACE THE FIRST TWO TRAFFIC CONES ON THE CENTERLINE THEN PROVIDE ONE FOOT OFFSET BETWEEN THE REMAINING TRAFFIC CONES.
O DENOTES TRAFFIC CONE OR TRAFFIC DRUM

SEE NOTES 1, 2, 3, 5, 9, 10, 14 & 15

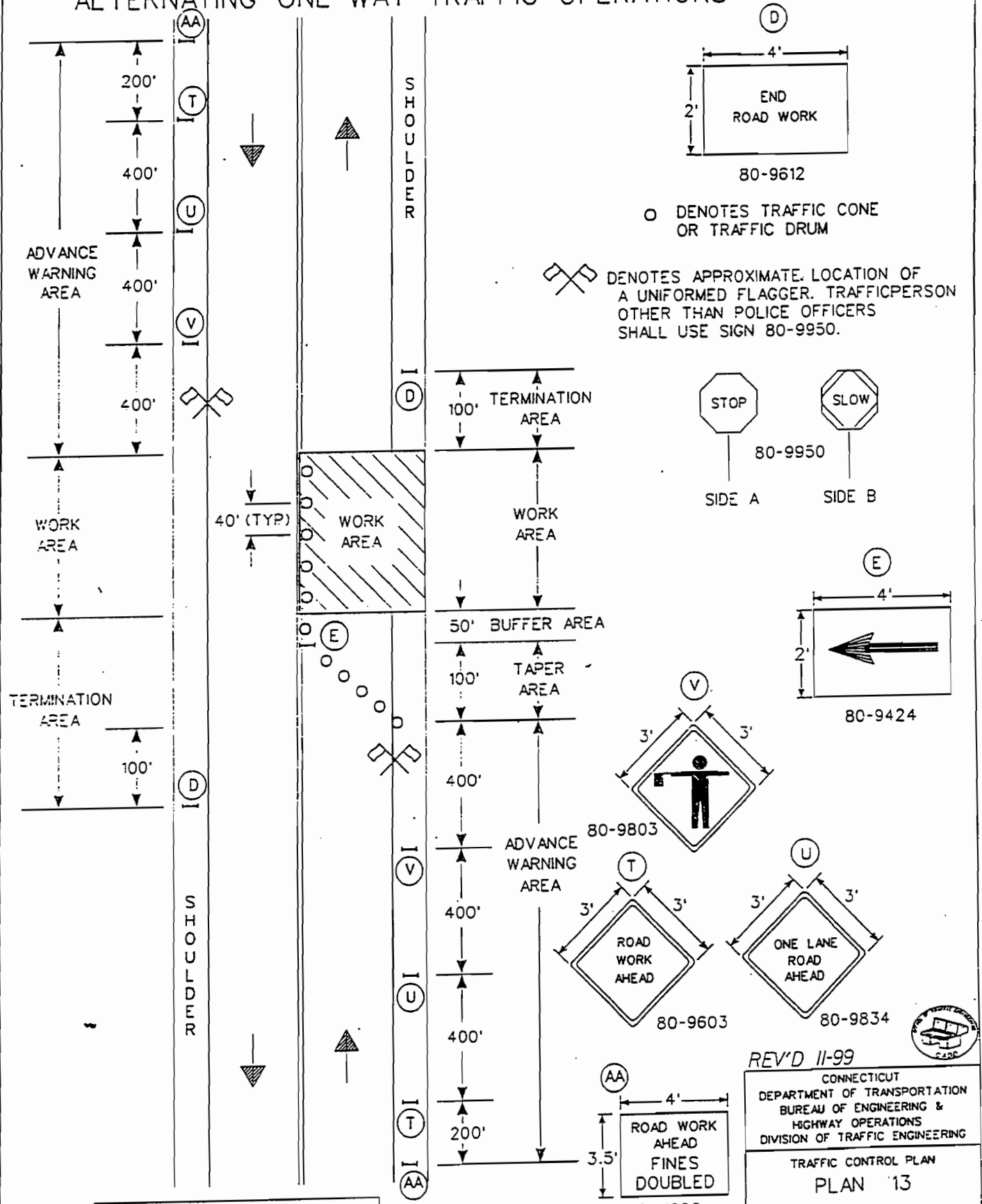


31-1906

APPROVED *[Signature]* DATE 11-22-99
TTRM #971001A

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

SIGN FACE
106 SQ. FT (MIN)



SEE NOTES 1, 5, 9 & 10

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CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING &
HIGHWAY OPERATIONS
DIVISION OF TRAFFIC ENGINEERING

TRAFFIC CONTROL PLAN
PLAN 13

SHEET 1 OF 2 SCALE NONE

APPROVED *[Signature]* DATE 11-22-99
PRINCIPAL ENGINEER
ITEM #971001A

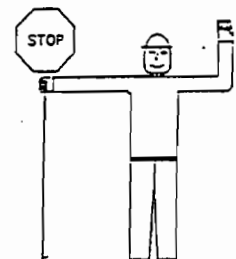
WORK IN TRAVEL LANE AND SHOULDER TWO LANE HIGHWAY ALTERNATING ONE-WAY TRAFFIC OPERATIONS

HAND SIGNAL METHODS TO BE USED BY TRAFFICPERSON

THE FOLLOWING METHODS THAT ARE OUTLINED IN SECTION 6F-4 OF THE "MANUAL ON UNIFORMED TRAFFIC CONTROL DEVICES" ARE TO BE USED BY TRAFFICPERSONS WHEN DIRECTING TRAFFIC THROUGH A WORK AREA. THE STOP/SLOW SIGN PADDLE (SIGN NO. 80-9950) SHOWN ON THE STANDARD DETAIL SHEET ENTITLED "SIGNS FOR CONSTRUCTION AND PERMIT OPERATIONS" SHALL BE USED.

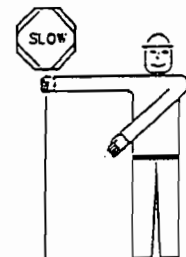
1. TO STOP TRAFFIC

THE UNIFORMED FLAGGER (CERTIFIED) SHALL FACE TRAFFIC AND EXTEND THE STOP SIGN PADDLE IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FREE ARM IS RAISED WITH THE PALM TOWARD APPROACHING TRAFFIC.



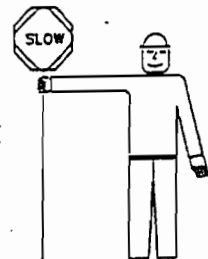
2. TO PROCEED TRAFFIC

WHEN IT IS SAFE FOR TRAFFIC TO PROCEED, THE UNIFORMED FLAGGER (CERTIFIED) SHALL FACE TRAFFIC WITH THE SLOW SIGN PADDLE HELD IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE UNIFORMED FLAGGER MOTIONS TRAFFIC AHEAD WITH THE FREE HAND.



3. TO ALERT AND SLOW TRAFFIC

WHEN IT IS DESIRED TO ALERT OR SLOW TRAFFIC, THE UNIFORMED FLAGGER (CERTIFIED) SHALL FACE TRAFFIC WITH THE SLOW SIGN PADDLE HELD IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY.



REV'D 11-99

CONNECTICUT
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TRAFFIC CONTROL PLAN
PLAN 13

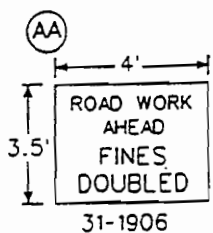
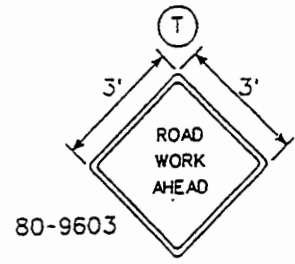
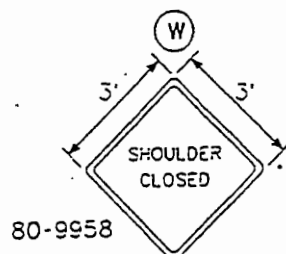
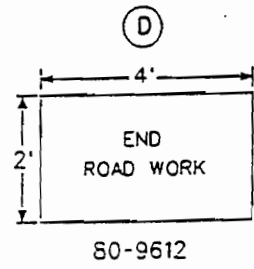
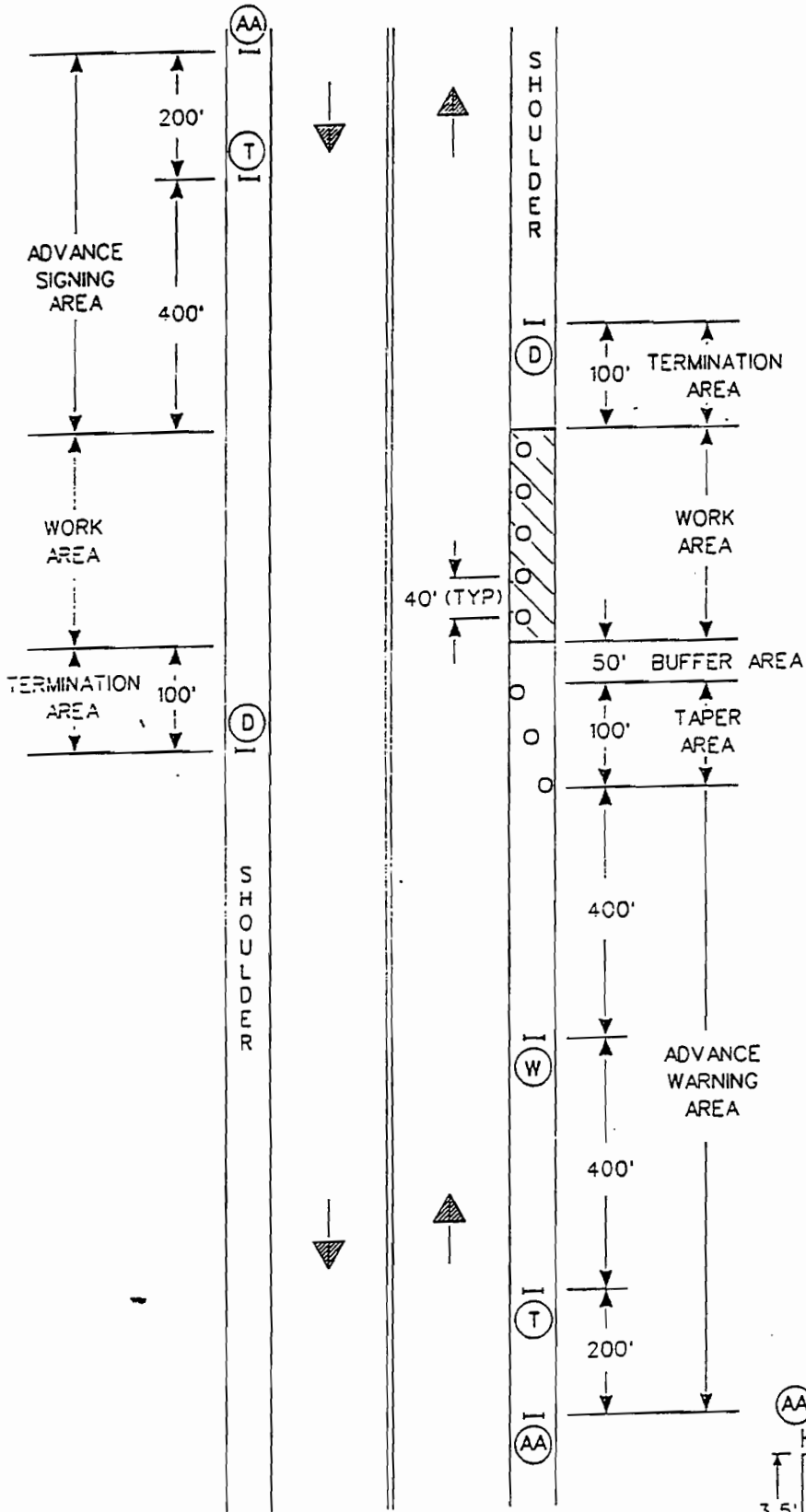
SHEET 2 OF 2

SCALE NONE

SEE NOTES 1, 5, 9 & 10

WORK IN SHOULDER - TWO LANE HIGHWAY

SIGN FACE
71 SQ. FT (MIN)



O DENOTES TRAFFIC CONE OR TRAFFIC DRUM

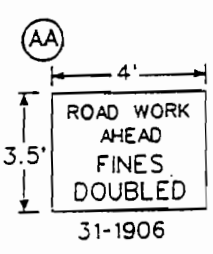
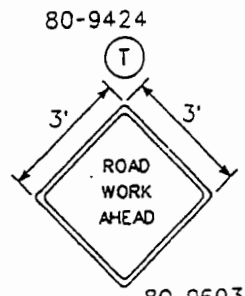
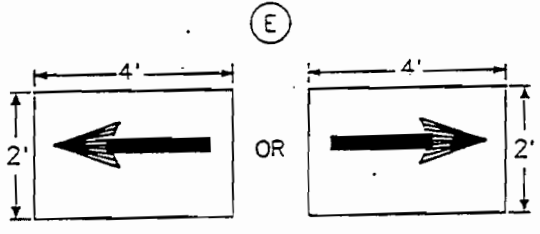
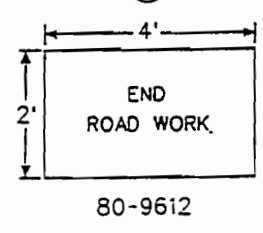
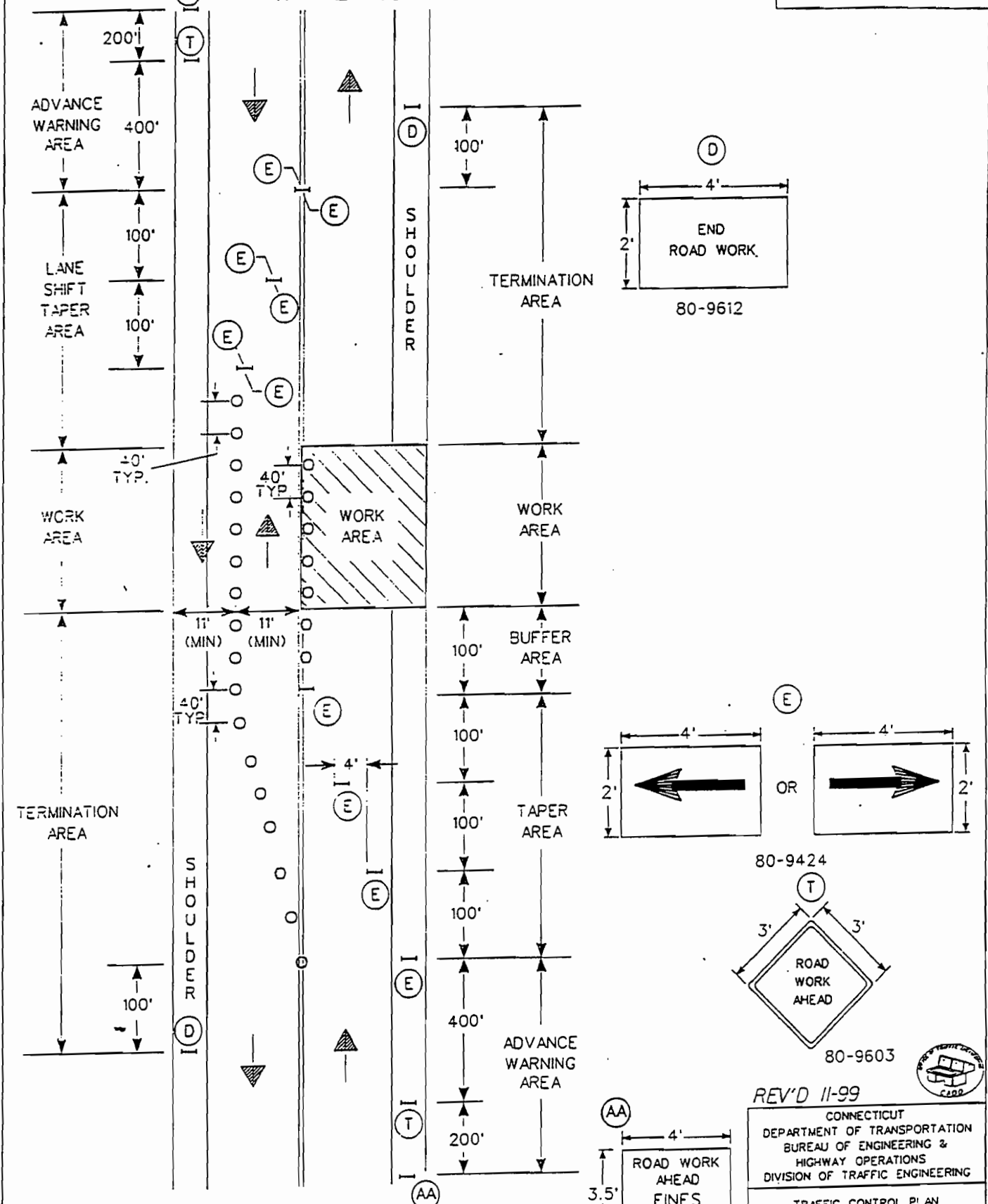
SEE NOTES 1, 5, 9 & 10

REV'D 11-99
CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING &
HIGHWAY OPERATIONS
DIVISION OF TRAFFIC ENGINEERING

TRAFFIC CONTROL PLAN
PLAN 14
SCALE NONE

WORK IN TRAVEL LANE AND SHOULDER TWO LANE HIGHWAY

SIGN FACE
142 SQ. FT (MIN)



REV'D 11-99

CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING &
HIGHWAY OPERATIONS
DIVISION OF TRAFFIC ENGINEERING

TRAFFIC CONTROL PLAN
PLAN 15

SCALE NONE

O DENOTES TRAFFIC CONE OR TRAFFIC DRUM
SEE NOTES 1, 5, 9 & 10

ITEM #974001A - REMOVAL OF EXISTING MASONRY

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

Article 9.74.02 - Construction Methods: Add the following:

The concrete shall be removed to the limits shown on the plans. The concrete shall be saw cut to delineate the removal limits. Pneumatic hammers or any other method approved by the Engineer may be used to remove the concrete. Maximum 30 pound hammers shall be used for general removal while maximum 15 pound hammers shall be used near reinforcing steel that is to remain. Pneumatic tools shall not be placed in direct contact with the reinforcing steel that is to remain.

Reinforcing steel shall be cut and removed as shown on the plans. Loose and small concrete fragments shall be cleaned from the reinforcing steel required to be left in place.

The Contractor shall take necessary precautions to prevent any damage to the portions of the structure to remain. Any damage shall be repaired by the Contractor, as directed by the Engineer, and at no cost to the State.

When removing the concrete and reinforcing steel, the Contractor shall take necessary precautions to prevent debris from dropping to areas below the structure in to the stream or onto adjacent traffic lanes.

All debris shall be disposed of, from the site, by the Contractor.

Article 9.74.05 - Basis of Payment Delete in its entirety and replace with the following:

This work will be paid for at the contract unit price per cubic yard for "Removal of Existing Masonry", which price shall include all equipment, tools and labor incidental thereto.

ITEM #1002907A – 30' LIGHT STANDARD(ANCHOR BASE)

Work under these items shall conform to the requirements of Section 10.03 supplemented and amended as follows:

Materials:

M.15.04 – Light Standards: The following paragraph (d) shall replace the standard paragraph (d).

(d) Davit Arms: The davit arms shall be fabricated of tubular elliptical aluminum which after fabrication shall have a mechanical strength not less than that of T-6 temper of 6063 alloy and T-5 temper for 6005 alloy. The davit arm and shaft shall be one continuous piece and both shall be furnished with a finish similar to each other to insure uniformity of appearance. Davit arm lengths shall be as indicated on plans.

ITEM #1003884A - DECORATIVE PILASTER LIGHT FIXTURE

Description:

Work under this item shall consist of furnishing and installing decorative light fixtures with shell, glazing, ballasts, lamps, sockets, reflectors, fuses, conductors, elastomeric pads, complete in place, as shown on the plans, and in accordance with these specifications.

The fixture manufacturer shall have a minimum of 5 years experience in the manufacture of similar units, and shall meet or exceed the requirements of the plans and specifications for design, size, gauge of metal parts and fabrication.

Materials:

A. Housing

The fixture shall be constructed from fine detailed cast aluminum components, of rugged, welded construction, and shall be gasketed throughout. The lamp compartment, glazed with textured UV stabilized polycarbonate, shall have a hinged access door secured with a positive, spring loaded latching mechanism. The cap and base of the lamp compartment shall be fabricated from the same shaped castings.

The ballast shall be housed in the fixture base, mounted to a separate mating cast aluminum base pan. The pan shall have openings for all electrical conduit, expansion bolting to the concrete pylons, two grounding connections (one for lightning), and shall be drilled and tapped all around for connection to the housing. Access to the wiring shall be provided by means of a removable, cast aluminum access door in the fixture base, gasketed and secured by four (4) AISI Type 316 stainless steel ¼ inch diameter bolts. The door shall bear the name CONN D.O.T. 2003 in raised letters.

All cast aluminum components shall be cast from Aluminum Association alloy number 319.0 in the F temper, and shall have a minimum thickness of 0.187 inches. All castings shall be straight and true. The fixtures shall be constructed and reinforced as required to resist winds of 90 mph plus a 1.3 gust factor.

B. Electrical

The fixture shall be supplied factory prewired and ballasted. The wire shall be type TFFN only, rated for 200 degree F service minimum.

All ballasts shall be high power factor (>90%), regulator type, in full compliance with current ANSI lamp/ fixture specifications. All ballasts shall have a minimum starting temperature of -5 degrees F and a line voltage limit of plus or minus 5%.

The ballasts and electrical components shall have quick disconnect connections.

Lamp holders shall be mogul base porcelain and shall have brass screw shells. Operating voltages shall be 240 volts. Lamps shall be 70 Watt high pressure sodium.- ED 23 1/2.

The refractor shall be of glass with an Alzac reflector. The reflector support bracket, stem and stem support bracket shall be of brass.

C. Finish

All aluminum shall be cleaned, primed and finish painted using a gray polyester resin based powder coating applied by the electrostatic process to a thickness of .0025 inch minimum.

D. Mounting

The adhesive bonding material shall be a resin compound specially formulated to anchor steel bars in holes drilled into concrete for the purpose of resisting tension pull-out. The adhesive bonding material shall be selected from the Connecticut Department of Transportation Approved Product List and shall be compatible with the resin coating.

The grout used for leveling pads shall be non-shrink grout conforming to Article M.03.01-12.

Anchor bolts shall be stainless steel and conform to the requirements of ASTM F593 (AISI Type 316). All washers shall be standard size and conform to ANSI B18.22.1, Type A Plain.

Molded pads shall conform to the requirements of Item "Metal Bridge Rail (Combination) (Type I)".

Construction Methods:

The light fixture shall be installed as shown on the plans and details, and shall be easily accessible for maintenance purposes. The circuit for the light fixture shall be as shown on the plans and details.

The Contractor shall submit a wiring diagram, installation drawing and list of equipment to be furnished for approval prior to starting his electrical work. All electrical work shall be strictly in accordance with the requirements of the National Electrical Code.

Each fixture base pan shall be set level on a leveling bed of non-shrink cement grout. The fixture shall be attached to the base pan with ½ inch diameter stainless steel FH machine screws countersunk into the fixture base, using one screw per facet as a minimum.

Holes shall be drilled into the concrete pylon at the locations and at the spacing required for the proper anchoring using the adhesive bonding system.

Drilling methods shall not cause spalling, cracking, or other damage to the concrete. Those areas damaged by the Contractor shall be repaired by him in a manner suitable to the Engineer and at no expense to the State.

Care shall be taken not to drill holes into or through reinforcing steel.

For the adhesive bonding material, a Materials Certificate will be required in accordance with Article 1.06.07, confirming the conformance of the adhesive bonding material to the requirements set forth in these specifications.

The adhesive bonding material and the anchor bolts shall be installed in accordance with the written directions supplied by the manufacturer of the adhesive bonding material.

Method Of Measurement:

This work will be measured for payment by the number of fixtures of the type called for, installed and accepted.

Basis Of Payment:

This work will be paid for at the contract unit price each for "Decorative Pilaster Light Fixture" of this type called for, complete in place, which price shall include all materials, labor, tools, and equipment.

ITEM #1008462A - 1 INCH RIGID METAL CONDUIT
ITEM #1008468A - 4 INCH RIGID METAL CONDUIT
ITEM #1015045A – PULL BOX REHABILITATION

Description:

Work under these items shall include furnishing and installing rigid metal conduit raceways as shown on the plans, including risers on wood poles, and in conformity with these specifications. Work shall also include the rehabilitation of existing pull boxes to make them watertight and raintight.

The work shall include all materials, equipment and labor incidental for the completion of all work specified.

General:

The following shall be submitted:

Product Data: Provide manufacturer's literature and catalog cuts for all products/materials.

Project Record Documents:

Record on as-built plans the actual as installed routing and elevations of underground conduit and duct.

Regulatory Requirements:

Conform to the requirements of NFPA No. 70 (National Electrical Code) and ANSI C2 (National Electrical Safety Code).

Provide products listed and classified by UL as suitable for the purpose specified and indicated on the plans.

Project Conditions:

Verify that field measurements are as indicated.

Verify locations of manholes prior to excavating for installation.

Manhole, handhole and pull box locations are shown in approximate locations unless dimensions are indicated. Locate as required to complete raceway system.

Coordination: The plans indicate the extent and the general location and arrangement of the work. The Contractor shall study the plans and details so that the work will be properly located and readily accessible. If conflicts occur necessitating departures from the plans, the Contractor shall submit details

92-526

ITEM#1008462A
ITEM#1008468A
ITEM#1015045A

of departures and reasons therefor shall be submitted as soon as practicable for written approval of the Engineer.

Capacities of materials shall not be less than capacities indicated on the plans.

Workmanship:

General: Materials and equipment shall be installed in accordance with the approved recommendations of the manufacturer, unless otherwise specified. The installation shall be accomplished by workmen skilled in this type of work.

Materials:

Raceway Systems: Conduits shall be provided where indicated below grade in trench and above grade mounted on pipe racks and other locations. Junction boxes shall be installed where indicated, for the purpose of splicing or connecting cables. Junction boxes and covers shall be made of stainless steel (NEMA 4X), and of the sizes indicated. Gaskets shall be installed between the junction box and cover for water tightness. A sufficient number of stainless steel cover screws shall be installed to hold the cover firmly in place along its entire contact surface. The inside dimensions of the junction boxes shall be as indicated on the plans.

Metal Conduit System: All exposed steel conduits, including those on concrete walls, shall be rigid metal conduit (rigid hot dipped galvanized steel conduit) conforming to Section M.15, Subsection M.15.09.1 of the Standard Specifications. Rigid metal conduit shall be provided with a factory applied 0.020 inch to 0.040 inch thick coating of polyvinyl chloride or polyethylene. The coating shall be applied over a binder recommended by the plastic manufacturer and shall adhere to the entire exterior surface of the conduit except threads. Where the manufacturer's standard process requires no separate binder, the bond between the metal and plastic shall be equal to or greater than the tensile strength of the plastic material. Coupling, bends, and other fittings shall be coated and for 2 inches on each side of the fitting. Precoated couplings, bends or fittings shall be used. Where precoated conduit and fittings are used and the manufacturer does not normally recommend that an adhesive be used for a satisfactory installation, the Contractor shall submit for approval certified test reports indicating that normal installation practices will result in a watertight and fumetight conduit connection. Field bends shall be made in accordance with the manufacturer's recommendations that normally require use of one size larger bend than would be required for uncoated conduit. Strap type wrenches shall be used to tighten conduit connections to prevent marring of conduit coating. The use of cast metal fittings in the exposed conduit system will not be permitted.

Pull Box Rehabilitation: Existing pull boxes where indicated on the plans shall be rehabilitated to make them watertight and raintight. These pull boxes are partially embedded in the wall. The portion extending outside of the wall shall be removed and replaced by a box and cover made of stainless steel, Type 316, and of the size required to mate with the existing 36"Lx18"H embedded portion. Depth of the addition shall be 18"D. Neoprene gaskets shall be installed between the pull box and cover and between the pull box and wall for water tightness. A sufficient number of stainless steel cover screws shall be

installed to hold the cover firmly in place along its entire contact surface. The inside dimensions of the existing pull boxes shall not be reduced by the rehabilitation.

Construction Methods:

The installation shall conform to the requirements of the National Electrical Code, the National Electrical Safety Code and the requirements specified.

Exposed steel conduits (rigid metal conduit) shall be secured at 4 foot intervals with 2 hole stainless steel conduit clips and screws. Stainless steel anchors shall be used on concrete walls for conduit and pull box support.

Grounding:

Grounds shall conform to applicable requirements in the National Electrical Code, the National Electrical Safety Code, and to requirements specified.

Ground all metal parts in the pull boxes and manholes with thermit welded connections.

Ground rods shall be made of copper or copper clad steel, not less than 1 inch by 10 feet long.

Ground rods shall be driven into the earth at least 10 feet.

Method of Measurement:

The work will be measured per each or per linear foot, as applicable, complete in place and accepted.

Basis of Payment:

The work will be paid for at the respective contract unit price.

The prices shall include all costs to provide for the completion of all work specified.

<u>Pay Item</u>	<u>Pay Unit</u>
1 Inch Rigid Metal Conduit	Linear Foot
4 Inch Rigid Metal Conduit	Linear Foot
Pull Box Rehabilitation	Each

92-526

ITEM#1008462A
ITEM#1008468A
ITEM#1015045A

ITEM #1010001A – CONCRETE HANDHOLE

Description:

Work under this item shall include furnishing and installing precast concrete electric handholes as shown on the plans and in conformity with these specifications.

The work of these items includes, but is not limited to, concrete work with reinforcement, gravel, crushed stone and grounding.

The work shall include all materials, equipment and labor incidental for the completion of all work specified.

General:

The following shall be submitted:

Product Data: Provide manufacturer's literature and catalog cuts for all products/materials.

Shop Drawings and Calculations:

The Contractor shall submit shop drawings and calculations stamped by a professional engineer registered in the State of Connecticut for the precast concrete electric handholes.

Indicate dimensions, reinforcement, size and locations of openings, and accessory locations for precast electric handholes on the shop drawings.

Mix Design: Submit concrete mix design for precast concrete electric handholes.

Manufacturer's Instructions: Provide manufacturer's instructions for precast electric handhole installation.

Project Record Documents:

Record on as-built plans the actual as installed routing and elevations of underground conduit and duct, and locations and sizes of electric handholes.

Regulatory Requirements:

Conform to the requirements of NFPA No. 70 (National Electrical Code) and ANSI C2 (National Electrical Safety Code).

Provide products listed and classified by UL as suitable for the purpose specified and indicated on the plans.

Project Conditions:

Verify that field measurements are as indicated.

Verify locations of electric handholes prior to excavating for installation.

Electric handhole locations are shown in approximate locations unless dimensions are indicated. Locate as required to complete raceway system.

Coordination: The plans indicate the extent and the general location and arrangement of the work. The Contractor shall study the plans and details so that the work will be properly located and readily accessible. If conflicts occur necessitating departures from the plans, the Contractor shall submit details of departures and reasons therefore shall be submitted as soon as practicable for written approval of the Engineer.

Capacities of materials shall not be less than capacities indicated on the plans.

Workmanship:

~~General: Materials and equipment shall be installed in accordance with the approved recommendations of the manufacturer, unless otherwise specified. The installation shall be accomplished by workmen skilled in this type of work.~~

Materials:

Precast Concrete Electric Handholes:

Precast concrete electric handholes shall be designed by a professional engineer registered in the State of Connecticut.

Description: Precast electric handhole designed in accordance with ASTM C 858, as applicable, comprising modular, interlocking sections complete with accessories. Joints shall be watertight utilizing a joint sealant material. Joints between raceways and handhole walls shall be watertight utilizing a joint sealant.

Loading: Coopers E72 loading.

Shape: Square as indicated on the plans.

Nominal Inside Dimensions: As indicated on the plans.

Wall Thickness: 5 inches.

Base Section: Include two 1-inch ground rod openings.

Joint Sealant: Shall be bentonite\butyl rubber

Frames and Covers: ASTM A 48, Class 30B, gray cast iron, 30 inch size, machine finished with flat bearing surfaces. Provide cover marked ELECTRIC as indicated on the plans.

Duct Entry Provisions: Window knockouts.

Duct Entry Locations: As indicated on the plans.

Duct Entry Size: 4 inches.

Dampproofing: Exterior surfaces of the precast concrete handholes shall be given an application of dampproofing (bituminous dampproofing) conforming to Section M.12, Subsection M.12.05 of the Standard Specifications.

Source Quality Control: Inspect handholes in accordance with ASTM C 1037.

Gravel shall conform to Section M.02, Subsection M.02.01.2 (bank or crushed gravel), Grading A, of the Standard Specifications.

Crushed stone shall conform to Section M.02, Subsection M.02.01.1 (broken or crushed stone), of the Standard Specifications, except crushed stone shall be Grading C.

Construction Methods:

The installation shall conform to the requirements of the National Electrical Code, the National Electrical Safety Code and the requirements specified.

Earthwork shall be in accordance with Section 2.05 and Section 2.13 of the Standard Specifications as applicable as well as the appropriate Special Provisions.

Reinforcing steel work shall be in accordance with Section 6.02 of the Standard Specifications as applicable.

Concrete work shall be in accordance with Section 6.01 of the Standard Specifications as applicable.

Crushed stone shall be placed as required.

Precast electric handhole installation shall be in accordance with the relevant provisions of Section 5.07, Subsection 5.07.03 as applicable, and the manufacturer's instructions, unless otherwise specified.

Install electric handholes plumb.

Bring electric handhole cover to finished elevation.

Grounding:

Grounds shall conform to applicable requirements in the National Electrical Code, the National Electrical Safety Code, and to requirements specified.

Install a ground rod in all electrical handholes, and ground all metal parts in the electric handholes with thermit welded connections.

Ground rods shall be made of copper or copper clad steel, not less than 1 inch by 10 feet long.

Ground rods shall be driven into the earth at least 10 feet.

Method of Measurement:

The work will be measured per each complete in place and accepted.

Basis of Payment:

The work will be paid for at the respective contract unit price.

The prices shall include all costs to provide for the completion of all work specified.

The cost of the work for the electric handholes shall include, but not be limited to, gravel, crushed stone, and grounding.

Excavation shall be paid under the item "Trench Excavation (0 - X')

<u>Pay Item</u>	<u>Pay Unit</u>
Concrete Handhole	Each

ITEM #1012232A – CABLE TESTING

Description:

Work under this item shall include the testing of cable.

The work shall include all materials, equipment and labor incidental for the completion of the work specified.

General:

Cable Testing:

Cable shall receive standard manufacturer's physical and electrical tests prior to shipment from the factory. Tests shall be as described by ICEA S-68-516, Section 6. Certificates of compliance shall be submitted to the Engineer after shipment of the cable.

Tests after installation shall be performed as specified.

The Contractor shall engage the services of a recognized independent testing laboratory for the purpose of performing inspections and tests as specified, to be witnessed by the Connecticut Department of Transportation (CDOT) and the Engineer.

The testing laboratory shall provide all material, equipment, labor and technical supervision to perform such tests and inspections.

The tests and inspections shall determine the suitability for energization.

Upon completion of the tests and inspections, and acceptance by the Engineer, a label shall be provided in accordance with the NETA Labeling Policy.

Applicable Standards:

All inspections and tests shall be in accordance with the following applicable codes and standards, except as otherwise specified.

Connecticut Electrical Code (CEC).

National Electrical Manufacturers Association (NEMA).

American Society for Testing and Materials (ASTM).

Institute of Electrical and Electronics Engineers (IEEE).

National Electrical Testing Association (NETA).

American National Standards Institute (ANSI).

Insulated Power Cable Engineers Association (IPCEA).

Association of Edison Illuminating Companies (AEIC).

OSHA Part 1910: Subpart S. 1910.308.

State and Local Codes and Ordinances

All inspections and tests shall utilize the following references:

Project Design Specifications.

Project Design Plans.

Manufacturer's instruction manuals applicable to each particular apparatus.

Qualifications of Testing Agency:

The testing laboratory shall meet federal OSHA criteria for accreditation of testing laboratories, Title 29, Part 1907. Membership in the National Electrical Testing Association constitutes proof of meeting such criteria.

The testing laboratory shall submit proof of the above qualifications to the Engineer.

Division of Responsibility:

The Contractor shall perform routine insulation resistance, continuity and rotation tests for all distribution and utilization equipment prior and in addition to tests performed by the testing laboratory specified herein.

The Contractor shall supply a suitable and stable source of test power to the test laboratory at each test site. The testing laboratory shall specify requirements.

The Contractor shall notify the testing laboratory when equipment becomes available for acceptable tests. Work shall be coordinated to expedite project scheduling.

The Contractor shall supply a complete set of electrical plans, specifications and any pertinent change orders to the testing laboratory prior to commencement of testing.

The testing laboratory shall notify the Engineer prior to commencement of any testing.

The testing laboratory shall be responsible for implementing all final settings and adjustment on protective devices and tap changers in accordance with the Engineer's specified values.

Any system material or workmanship that is found defective on the basis of acceptance tests shall be reported directly to the Engineer. All corrections shall be made by the Contractor, as required, without additional cost to the Department.

The testing laboratory shall maintain a written record of all tests and upon completion of project, assemble and certify a final test report.

General Testing Requirements:

Test Instrument Traceability:

The testing laboratory shall have a calibration program that maintains all applicable test instrumentation within rated accuracy.

The accuracy shall be traceable to the National Bureau of Standards in an unbroken chain.

Instruments shall be calibrated in accordance with the following frequency schedule:

Field instruments: 6 months, maximum.

Laboratory instrument: 12 months.

Leased specialty equipment: 12 months. (Where accuracy is guaranteed by lessor, i.e. Doble.)

Dated calibration labels shall be visible on all test equipment.

Test Report:

The test report shall include the following:

Summary of project.

Description of equipment tested.

Description of test.

List of test equipment used in calibration and calibration date.

Test results.

Conclusions and recommendations.

Appendix, including appropriate test forms.

The test report shall be bound and its contents certified.

Furnish 10 copies of the completed report to the Engineer no later than 30 days after completion of project, unless directed otherwise by the Engineer.

Safety and Precautions:

Safety practices shall include, but are not limited to, the following requirements:

Occupational Safety and Health Act of 1970 – OSHA.

Accident Prevention Manual for Industrial Operations, Seventh Edition, National Safety Council, Chapter 4.

Applicable State and Local safety operating procedures.

All acceptance tests shall be performed with apparatus de-energized except where otherwise specifically required herein.

The testing laboratory shall have a designated safety representative who shall be present on the project and supervise operations with respect to safety.

Circuits operating in excess of 600 volts between conductors shall have conductors shorted to ground by a hot-line grounded device approved for the purpose.

In all cases, work shall not proceed until the safety representative has determined that it is safe to do so.

The testing laboratory shall have available sufficient protective barriers and warning signs to conduct specified tests safely.

Visual and Mechanical Inspections:

Inspect exposed section for physical damage.

Verify cable is supplied and connected in accordance with single line diagram.

Inspect for shield grounding cable support, and termination.

Visible cable bends shall be checked against IPCEA or manufacturer's minimum allowable bending radius.

Inspect for proper fireproofing in common cable areas.

Electrical Tests:

Perform DC Hypotential Test:

Each conductor shall be individually tested with all other conductors grounded. All shields shall be grounded.

Terminations shall be properly corona suppressed by guard ring, field reduction sphere, or other suitable methods.

A direct current hypotential shall be applied in at least eight equal increments until maximum test voltage is reached. DC leakage current shall be recorded at each step after a constant stabilization time consistent with system charging current decay.

A graphic plot shall be made of leakage current (X axis) versus voltage (Y axis) at each increment.

The test conductor shall be raised to a maximum test voltage and held for a total of 10 minutes. Readings of leakage current (Y axis) versus time (X axis) shall be recorded and plotted on 30 second intervals for the first 2 minutes and every minute thereafter.

The applied conductor test potential shall be reduced to zero and grounds applied for a period adequate to drain all insulation stored potential.

Maximum test voltages shall be in accordance with Table 3.4.1.

Perform a shield continuity test by ohm meter method. Ohmic value shall be recorded.

Test Values:

D C hypotential test results.

Step voltages slope shall be reasonably linear.

Absorption slope should be flat or negative. In no case shall slope exhibit positive characteristic.

Maximum leak current shall not exceed I_L , corrected to 60 degrees F, when:

$$I_L = \frac{E}{K \text{LOG} \frac{D}{d}}$$

K = insulation specific resistance Megohm, MFT at 60 degrees F.

D = diameter over insulation

d = diameter under insulation

E = maximum test voltage

TABLE 3.4.1.

HIGH VOLTAGE ACCEPTANCE TEST

<u>Rated Circuit Voltage, Phase to Phase, Volts</u>	<u>Conductor Size, AWG or MCM</u>	<u>Test Voltage, kV</u>	
		<u>100 Percent Insulation Level</u>	<u>133 Percent Insulation Level</u>
2001-5000	8-1000	25	25
5001-8000	6-1000	35	35
8001-15000	2-1000	55	65
15001-25000	1-1000	80	100
25001-28000	1-1000	85	---
28001-35000	1/0-1000	100	---

ACCEPTANCE TEST MAXIMUM DC VOLTAGE REFERENCES

<u>Cable Type</u>	<u>Standard</u>	
Rubber	IPCEA S-19-81	Table 6 - 17
Varnish Cambric	IPCEA S-65-375	Table 3 - 4*
Thermoplastic	IPCEA S-61-402	Table 6 - 10
Cross Linked PE	IPCEA S-66-524	Table 6 - 9
Ethylene Propylene (EPR)	IPCEA S-68-516	Table 6 - 9
Armored Cable	IPCEA S-67-401	80% of factory

*For DC tests multiply table value by 2.

Cable, Low Voltage (600 Volts and Less):

Visual and Mechanical Inspection:

Cables shall be inspected for physical damage and proper connection in accordance with single line diagram.

Cable connection shall be torque tested to manufacturer's recommended values.

Electrical Test:

Perform insulation resistance test on each cable with respect to ground and adjacent cables.

Perform continuity test to insure proper cable connection.

Test Values:

Insulation resistance test shall be performed at 1000 volts DC for 1/2 minute.

When insulation resistance is to be determined with all switchboards, panelboards, fuse holders, switches, and overcurrent devices in place, the insulation resistance when tested at 500 volts DC shall be no less than that shown in Table 3.5.1.

TABLE 3.5.1

MINIMUM INSULATION RESISTANCE

<u>Conductor or Circuit Size</u>	<u>Minimum Resistance</u>
No. 14 and 12 AWG	1,000,000 ohms
25 ampere circuits and above	250,000 ohms

System Function Tests:

Upon completion of tests, the system functional tests shall be performed. It is the intent of system functional tests to prove the proper interaction of all sensing, processing and action devices to effect the design end product or results.

Implementation:

The testing laboratory shall develop a test matrix that consists of:

Input signal or stimuli.	Example:	Current transformers Potential transformers
Decision process.	Example:	Pilot wire relay system
Action device.	Example:	Circuit breaker – OCB
End product or result.	Example:	Zone fault protection

All interlocks safety devices and fail safe functions shall be tested in addition to design function.

The testing laboratory shall propose methods to initiate the sensing device by physical stimuli and quantitatively monitor the end result or output by measurement.

Method of Measurement:

The work will be measured on a lump sum basis, complete and accepted.

Basis of Payment:

The work will be paid for at the contract lump sum price for Cable Testing.

The price shall include all costs to provide for the completion of the work specified.

<u>Pay Item</u>	<u>Pay Unit</u>
Cable Testing	Lump Sum

ITEM #1015034A - GROUNDING AND BONDING

Description:

This item shall consist of furnishing and installing grounding conductors and related appurtenances as shown on the plans and in accordance with these specifications, or as ordered.

Materials:

The materials for this work shall conform to the requirements of Article M.15.13, as amended herein and as indicated on the plans.

Construction Methods:

The grounding conductor and related appurtenances including lugs, clamps, studs, anchors and bonding jumpers, necessary to bond the proposed structural steel, shall be installed where shown on the structure. The grounding of the structure to the Metro-North Railroad grounding system shall be performed by railroad forces after the bridge grounding system has been completed by the Contractor.

Method of Measurement:

This work will be paid for at the contract lump sum price for "Grounding and Bonding". The price shall include all materials, equipment, tools, labor and work necessary and incidental to the work under this item.

ITEM #1017032A - SERVICE (METERED)

Description:

The work under this item shall consist of furnishing and installing a metered electric service at the location shown on the plans or as directed by the Engineer.

Materials:

At locations served by United illuminating or Wallingford Electric Division, the meter socket shall be rated at 100 amps, with manual lever by-pass, and be provided with a locking metal cover for the glass enclosure on the meter. The Contractor shall contact the engineering representative for a list of approved meter sockets.

At locations served by Connecticut Light and Power Co., the meter socket shall be an underground service type capable of accepting a 75 mm (3") rigid conduit, rated at 200 amps, with a manual lever by-pass, and be provided with a locking metal cover for the glass enclosure on the meter. The Contractor shall contact the engineering representative for a list of approved meter sockets.

Construction Methods:

The Contractor shall completely install a meter socket with associated equipment on the outside of the controller cabinet, as indicated on the typical plans. The meter sod shall be mounted approximately 1.5 meters (60") above the ground. This item shall include all conduit, connectors and expansion fittings required between ground level and the meter socket. A continuous nylon pull rope of at least 90 Kg. (200lbs.) breaking strength shall be installed in the 75mm (3") conduit between the meter socket and the service pole. All work shall conform to the National Electric Code. D.O.T. Traffic Electrical will complete the required service request forms for locations on State roads. The Contractor will be responsible for all others.

At locations served by United Illuminating, the Engineer or his designated representative shall contact the United illuminating, Work in Progress office, to report the job number and that the work is according to the National Electric Code. The job number shall have been previously assigned by United Illuminating.

At locations served by Wallingford Electric Division, The Contractor shall contact the Electric Division, Engineering Office to arrange for service and/or to schedule work by the Electric Division on utility poles above 3 meters (10'). The Service Location form (provided by Wallingford Electric Division) shall be completed by the Contractor and returned to the Electric Division. The Engineer or his designated representative shall notify the Electric Division 24 hours prior to the desired connection date.

At locations served by Connecticut Light and Power Co. and all other electric power providers, the Contractor shall contact the engineering representative for exact requirements of the service. The Contractor will be responsible for all riser fees and any other installation charges required of an underground metered service.

This item shall include all required service conductors on the load side of the meter socket, which shall be #8 AWG unless otherwise specified.

All circuit breakers in the controller cabinet shall be off when service is connected by the utility company.

At all locations, the installation shall be inspected and approved by the Engineer or his designated representative prior to the service being energized.

The Contractor shall record the date service is connected and the meter number for billing purposes.

Method of Measurement:

The installation of the Service (Metered) will be measured for payment by the number of metered electric services of the type specified, completed, with service connected, and accepted in place.

Basis of Payment:

This work will be paid for at the contract unit price each for "Service (Metered)" complete and accepted in place which price shall include the meter socket with manual bypass, locking metal cover, pull rope, load side service conductors, fittings, all utility company riser and installation charges, and all material, equipment, tools, labor and incidentals thereto.

ITEM #1017200A - SURGE ARRESTERS

ITEM #1017201A - SURGE ARRESTERS – SIGNAL POWER SYSTEM

Description

The work under this Section consists of furnishing, installing and testing surgearresters for the traction power feeding and signal power systems, as shown on the plans and specified herein.

Applicable Standards

Pertinent provisions of the following listed standards shall apply to the work of this Section, except as they may be modified herein, and are hereby made a part of this Specification to the extent required:

<u>Organi- zation</u>	<u>Number</u>	<u>Title</u>
ANSI	C62	Guides and Standards for Surge Protection

Submittals

Submit the following:

Complete manufacturer's descriptions, catalog data, and service performance data.

Manufacturer's general detail and arrangement drawings, and installation instructions, material/procurement specifications.

Design and production test plan, test procedures and certified test reports.

Materials

The surge arresters shall conform to or be interchangeable with the Railroad's standard surge arresters.

Surge arresters shall be of the non-linear resistor type. Each traction power system surge arrester shall have the following ratings:

Rated voltage (r.m.s.)	27kV
Maximum switching surge sparkover	73 kV
Minimum 60Hz sparkover	40kV
Impulse voltage withstand	200kV

Surge arresters for the signal power system shall also be of the non-linear resistor type, and shall have the following ratings:

Rates voltage (r.m.s.)	18kV
Maximum discharge voltage with 10kA discharge	
Current, 8x20 wave	40kV
Impulse voltage withstand	150kV

Surge arresters for both traction power and signal power systems shall have the capability of withstanding the effects of external industrial and chemical contamination.

Construction Methods

Install surge arresters at locations as shown on the plans as per manufacturer's recommendations.

Each surge arrester shall be bonded to the grounding system as per plans. Each grounding connection shall be tested individually in accordance with the manufacturer's instructions.

See specification section entitled "Factory Testing" for requirement for design and production tests.

Method of Measurement

The work will be measured for payment based on the actual number of surge arresters installed.

Basis for Payment

This work will be paid for at the contract unit price for the following pay item which price shall include all transportation, materials, equipment, tools and labor incidental thereto:

<u>Pay Item</u>	<u>Pay Unit</u>
SURGE ARRESTERS	EA
SURGE ARRESTERS – SIGNAL POWER SYSTEM	EA

ITEM #1020001A - WOOD POLE
ITEM #1020021A - POLE HARDWARE

Description:

Work under these items shall include furnishing and installing utility poles and pole hardware as shown on the plans and in conformity with these specifications.

The work shall include all materials, equipment and labor incidental for the completion of the work specified.

Items including, but not limited to, insulators, cutouts, wire, conduit and grounding shall be as specified in these specifications.

General:

Rules: The installation shall conform to the requirements of the National Electrical Code, the National Electrical Safety Code and the requirements specified. The pole line installation shall comply with the requirements and recommendations of the National Electrical Safety Code for light loading conditions, grade B construction. Maximum loading of conductors, poles, wire support hardware, crossarms, guys, anchors and insulator assemblies shall include force resulting from a wind pressure of 26 psf at a temperature of 60 degrees F.

Coordination: The plans indicate the extent and the general location and arrangement of the work. The Contractor shall study the plans and details so that equipment will be properly located and readily accessible. If conflicts occur necessitating departures from the plans, details of departures and reasons therefor shall be submitted as soon as practicable for written approval of the Engineer.

Capacities of equipment and materials shall not be less than capacities indicated on the plans.

Approval of Materials and Equipment:

Approval of materials and equipment will be based on the manufacturer's published data.

Approval of Equipment Which Differs from that Specified: The Engineer may, at his option, approve equipment submitted by the Contractor that may differ from that indicated in the contract documents. These differences shall not affect the performance of the equipment, the quality of the materials or the general intent of the design. These differences might include, but shall not be limited to, differences in layout configuration, foundation and mounting requirements. When the Contractor selects to use equipment that requires such design changes, the Contractor shall be responsible to make all changes required in all trades necessary to install the equipment at no additional cost to the Department. In addition, the Contractor shall submit, as shop drawings for approval, revised plans showing all modifications required in all trades. The originals of the plans shall be revised "as-built" before completion of the project.

Shop Drawings:

Shop drawings shall be submitted for equipment not completely identifiable by information submitted in the materials and equipment lists, in accordance with requirements contained in the SPECIAL PROVISIONS. Submit shop drawings for items including, but not limited to, poles, pole line hardware, crossarms and anchors. Shop drawings shall include bills of materials and manufacturer's bulletins. Shop drawings shall demonstrate that the equipment has been properly coordinated, and will provide for safe operating. Approved departures shall be made at no additional cost to the Department.

Workmanship:

General: Materials and equipment shall be installed in accordance with the approved recommendations of the manufacturer, unless otherwise specified. The installation shall be accomplished by workmen skilled in this type of work.

Materials:

Wood Poles:

Wood poles shall conform to Section M.16, Subsection 16.04, of the Standard Specifications.

Guy Strand:

Zinc coated, ASTM A 475, copper covered steel ANSI C7.18, aluminum covered steel strand with a uniformly bonded aluminum covering over the steel core comprising at least 25 percent of the wire area and so distributed that its thickness is not less than 10 percent of the radius of the wire.

Pole Line Hardware:

Zinc coated, EEI TDJ-1 through TD-24 inclusive, except 7, 8, 9, 13, 17, 18, 20 and 22; steel hardware material, ASTM A 575 or A 576.

Wood Preservatives for Poles and Crossarms:

AWPA C25, P1, P8 and P9.

Zinc Coating for Ferrous Metals:

ASTM A 123 or A 153.

Pole Hardware:

Crossarms, where indicated, shall conform to the details shown on the plans. Climbing space, wire clearances, and vertical and longitudinal strength of crossarms shall conform to the National Electrical

Safety Code. Crossarms shall be manufactured of dense southern pine, free of defects. Each crossarm shall show on one end or the other an average of at least six annual rings per inch and at least one-third summer wood. Contrast between spring and summer wood shall be distinct. Crossarms shall be machined, chamfered, trimmed, and bored before pressure treatment. Dimensions, with their respective allowable variations, shall be as shown. Crossarms shall be manufactured so that the heartwood occurs at the bottom whenever possible. Holes shall be smooth and free from excessive splintering where the bit breaks through. Holes shall not admit without forcing a gauge 1/32 inch smaller when tested immediately after boring. Air or steam seasoning of crossarms is optional, except that steam seasoning is required where moisture content exceeds 18 percent of oven dry weight. Air seasoned crossarms shall be inspected immediately before treatment for evidence of decay. Pressure treatment shall be creosote conforming to AWPA C25. Double crossarms shall be securely held in place by means of 1/2 inch double arming bolts. Each double arming bolt shall be equipped with four nuts and four square washers. Crossarms shall be bolted to poles with 5/8 inch through bolts with square washers at each end. Bolts shall extend not less than 1/8 inch and not more than 2 inches beyond the nut. Crossarms will be considered defective and shall not be used when the following limitations are exceeded:

Knots: No loose, encased or unsound knots or clusters are permitted. Any knot within 2 inches of the center bolt hold shall not exceed 1/2 inch. No knot shall exceed 2 inches in diameter and the sum of least diameters of all knots, and holes in any other 2-inch longitudinal section shall not exceed 1 inch plus 1/16 inch for each inch along the crossarm from the center bolt hole to the center of section under consideration.

Diagonal grain on any face shall not be greater than the slope of the diagonal unless pith appears near the center of both ends in which case the slope may be 1 inch in each 15 inches of length.

Wane will not be permitted.

Decay and worm holes will not be permitted.

Shakes and Checks: Ends of crossarms shall not show loose heart, shakes or splits. Longitudinal checks exceeding 12 inches in length, or 3/4 inches in depth, or otherwise affecting strength or durability will not be permitted.

Pitch pockets shall not exceed 8 inches in length or 2 square inches in area, and shall not enter holes, nor appear on more than one face of the crossarm.

Warp will be permitted in one plane only and shall not exceed 1/10 inch per foot of total arm length.

Compression wood shall not exceed 5 percent of the cross section and shall be covered by at least 1/2 inch of normal growth containing at least 4 annual rings.

Crossarm braces shall be provided on all crossarms and shall be zinc coated structural steel in conformance with ASTM A 36, A 575, or A 576. Flat braces shall be 1/4 inch by 1-1/4 inches, and not less than 28 inches long. Flat braces shall be bolted to crossarms with 3/8 inch carriage bolts with round

washer between bolt head and crossarm and secured to poles with 1/2 inch by 4 inch lag screws after crossarms are leveled and aligned.

Guys shall be provided at the locations, with leads and strengths indicated, and elsewhere as required wherever conductor tensions are not balanced, as at angles, corners, dead ends, and in conformity with the National Electrical Safety Code. Guys shall be as shown on the plans. Where a single guy will not provide the required strength, two or more guys shall be provided. Where guys are wrapped around poles, at least two guy hooks shall be provided and pole shims shall be provided where guy tension exceeds 6,000 pounds. Three bolt or offset type guy clamps or approved guy grips shall be provided at each guy terminal. Guys shall be grounded. Treated log or swamp anchors shall be provided in marshy ground; rock anchors in rock, installed at right angles to the guy; elsewhere anchors shall be of an approved expanding type. All guy anchors and attachments shall provide a strength exceeding the required guy strength. Thimbles or thimble eyes shall be provided on all anchor rod and eye bolt guy attachments to protect the strand. An approved half-round steel guy protector, not less than 8 feet long, shall be provided at the anchor of each guy, securely clamped to the guy or anchor at bottom and top. When field conditions prevent the indicated guy lead, anchors shall be placed in a location approved by the Engineer, and the guy strength increased by the ratio of the sine of the lead angle indicated to the sine of the lead angle provided, except that the lead angle shall be not less than 15 degrees. Guy strand shall be 7 strand, grade 30 HS or 30 EHS copper covered steel, Class A, zinc coated steel, utilities, high strength, or extra high strength grade at the option of the Contractor with a breaking strength not less than 6,000 pounds, nor less than indicated on the plans, except where two or more guys are used to provide the required strength.

Pole line hardware shall be hot dip galvanized except that anchor rods of the copper molten welded to steel type with non-ferrous corrosion resistant fittings may be used. Suitable washers shall be installed under bolt heads and nuts on wood surfaces. Washers used on through bolts and double arming bolts shall be approximately 2-1/4 inches square and 3/16 inches thick. The diameter of holes in washers shall be the correct standard size for the bolts on which the washers are used. Washers for use under the heads of carriage bolts shall be of proper size to fit over the square shank of the bolt. Eyebolts, bolt eyes, eye nuts, strain load plates, lag screws, guy clamps, fasteners, hooks, shims, and clevises shall be used wherever required to adequately support and protect the poles, crossarms, guy wires, and insulators.

Pole steps shall be 5/8 inch by 10 inch galvanized steel, standard drive hook type with fitter drive thread and pilot point. Locate in accordance with the National Electrical Code Standard above 8 feet 0 inches above grade.

Wood Pole Installation:

Wood poles shall be installed as shown on the plans. The top six feet of the hole for the pole shall be dug to dimensions as required to prevent cave in of hole. The bottom four feet of the hole shall be dug by mechanical means and its diameter shall only be large enough to accept the pole and the tamper. The geotextile shall be placed in the hole. The pole shall be placed in the hole and the hole shall be backfilled with compacted granular fill per the Special Provisions and Standard Specifications.

Painting And Finishing:

Unless otherwise specified, items fabricated from ferrous metal shall be factory finished with a weather resistant finish that withstands 500 hours of exposure to the salt spray test specified in ASTM B 117, except a 20 percent sodium chloride solution shall be used (20 plus or minus 2 parts of sodium chloride in 80 plus or minus 2 parts by weight of water). Immediately after completion of the test, the specimen shall show no sign of blistering, wrinkling, cracking, or loss of adhesion and no sign of rust creepage beyond 1/8 inch on either side of the scratch mark.

Method of Measurement:

The work will be measured per each, complete in place and accepted.

Basis of Payment:

The work will be paid for at the respective contract unit price.

The prices shall include all costs to provide for the completion of the work specified.

Excavation shall be paid under the item "Structure Excavation - Earth"

Backfill shall be paid under the item "Compacted Granular Fill"

Geotextile shall be paid under the item "Geotextile"

<u>Pay Item</u>	<u>Pay Unit</u>
Wood Pole	Each
Pole Hardware	Each

ITEM #1104072A - 60' STEEL MAST ARM ASSEMBLY(18' MOUNTING HEIGHT)
ITEM #1104074A - 60' STEEL MAST ARM ASSEMBLY(32' MOUNTING HEIGHT)

Article 11.04.03- Construction Methods:

Add the following at the beginning of the first paragraph:

Prior to the start of fabrication, the contractor shall, in the field, verify the location of the foundations, and establish and verify all elevations, dimensions and longitudinal grades. The contractor shall submit a cross section for each mast arm assembly prior to the submission of the shop drawings. The cross section scale shall be 1:100, submitted on a 213(8.5") x 275(11") sheet.

ITEM #1104254A – 6-FOOT CCTV CAMERA POLE MOUNTING BRACKET
ITEM #1104255A – 25-FOOT CCTV CAMERA POLE MOUNTING BRACKET

Description:

Work under this item shall consist of furnishing and installing camera mounting brackets, of the size indicated, on mast arm and/or light standard poles at the location shown on plans or as directed by the Engineer and in conformity with these specifications.

Materials:

The pipe shall be made of ASTM-A501 steel and the bracket shall be finished with H.D. Galvanized to ASTM-A123 standards. The hardware shall be finished with H.D. Galvanized to ASTM-153 standard. The brackets shall be mounted to the pole by means of a heavy duty type double galvanized clamp and shall support a minimum load 7900 pounds. The Contractor shall verify the clamp size with the support pole manufacturer's shop drawings and in the field.

Construction Methods:

The camera supporting brackets shall be erected perpendicular to the centerline of the roadway, unless otherwise shown on the plans. The mounting height shall be a nominal 40-feet measured from the tip of the bracket to the pavement directly below, unless otherwise shown on the plans. The location and alignment of the bracket shall be approved by the project engineer prior to the installation. The final adjustment to the bracket alignment shall be done after observing the video coverage by the camera to eliminate any obstructions to the camera field of view.

After the installation of the bracket and the camera dome, the pole shall be raked or adjusted to achieve a plumb mount from all directions so it is vertically aligned. All the joints at the supporting bracket shall be sealed with a silicone caulk or with a recommended sealant by the camera manufacturer.

Method of Measurement:

This work will be measured for payment by the number of brackets of the type specified installed, completed and accepted in place.

Basis of Payment:

This work will be paid for at the contract unit price each for "CCTV Camera Bracket," of the size indicated, which price shall include all materials, miscellaneous hardware, labor, alignment of the bracket, support pole, light standard or mast arm to achieve a true vertical plumb of camera, alignment of the bracket to eliminate any obstructions after the installation of the camera, and all materials, equipment, tools and labor incidental thereto.

ITEM #1105105A - 1 WAY, 5 SECTION MAST ARM TRAFFIC SIGNAL
ITEM #1105107A - 2 WAY, 3 SECTION MAST ARM TRAFFIC SIGNAL
ITEM #1105125A - 2 WAY, 3-5 SECTION MAST ARM TRAFFIC SIGNAL

Article M.16.06 - Traffic Signals

Sub Article 5-Optical Unit:

Sub Article 6- Lamp Socket:

Combine Sub Article 6 with Sub Article 5.
Rename Sub Article 5 "Optical Unit, Incandescent".

Create a new Sub Article 6 as follows:

Sub Article 6 - Optical Unit, Light Emitting Diode:

The Light Emitting Diode (LED) traffic signal lamp shall be made up of an internal beam controlling optical faceted lens, a smooth surfaced outer shell, multiple LED light sources, a regulated power supply and a backcover, assembled into a sealed unit. Each LED light source shall be mounted on a temperature resistant positioning plate. The mechanical alignment and assembly mechanism must ensure that each LED is retained in a pre-determined position. LED lamps shall utilize advanced indium based technology for long life and shall be warranted for a minimum of five years. Arrow LED lamp units shall be double line type with the exception of the Bicolored Arrow unit (Green/Yellow). The replacement of one or more LED's as well as the replacement of one or more LED circuits must be possible without soldering.

(a) Mechanical Requirements:

Diameter:

The LED traffic signal unit shall fit into standard 300 mm (12") or 200 (8") mm housing.

Enclosure materials:

UV (Ultraviolet) stabilized polycarbonate shell and backcover.

Operating temperature:

-40 degrees Celsius to 45 degrees Celsius.

The lamp unit shall be sealed and waterproofed to eliminate dirt contamination and be suitable for installation in all weather conditions.

(b) Parallel Circuits:

Red, Green and Yellow Units:

300mm (12") Unit shall be comprised of 6 parallel circuits.

200mm (8") Unit shall be comprised of 3 parallel circuits.

Green and Yellow Arrow Units:

One burned out LED shall not effect more than 5 percent of the total circuit.

(c) Optical Requirement:

Beam Color:

Shall meet ITE Specification.

Beam Intensity:

Red, Green, Green Arrow, Yellow Arrow and Bicolored Arrow shall meet ITE specifications.

300 mm (12") and 200 mm (8") Yellow:

The intensity shall be twice the ITE requirement for reds.

Each Red LED lamp shall have a vertical cone of view which remains visible at department approved distance for a 55 mph approach speed during windy conditions, until obscured by the visor.

(d) Electrical Requirement:

Operating voltage:

89 to 135 Volts AC

Power requirements:

Circular Indications 300 mm (12") - 14 to 30 Watts

Circular Indications 200 mm (8") - 12 to 16 Watts

Arrows 300 mm (12") - 6 to 8 Watts

A regulated power supply shall be engineered to protect the LED's from electrical surges and transient voltages.

ITEM #1106002A - 2 WAY PEDESTRIAN SIGNAL POLE MOUNTED
ITEM #1106004A - 2 WAY PEDESTRIAN SIGNAL PEDESTAL MOUNTED

Replace Sub Article 11.06.01 with the following:

11.06.01 - Description:

This item shall consist of furnishing and installing a pedestrian signal at locations shown on the plans or as indicated by the Engineer in conformity with these specifications. The pedestrian signal shall be of the type specified and as shown on the Typical Installation Detail Sheet.

11.06.03-Construction Methods:

In the first sentence delete the words "Walk-Don't Walk".

Replace Sub Article M.16.07 Sub Article **A. General**, with the following:

A. General: The pedestrian signal shall be one section, rectangular in shape, and shall conform to the latest edition of the Manual on Uniform Traffic Control Devices for Streets and Highways. The overall size of the pedestrian signal, including visor, shall be as shown on the Typical Installation Details. The pedestrian signal shall be L. E. D. (Light Emitting Diode) type unless indicated on plan as incandescent. The display shall be the international symbols for walk and don't walk as shown on the detail installation sheets. The symbol shall be attention-attracting and clearly visible when illuminated. The Symbols shall have dimensions as shown on the plans. The Walk Symbol shall be Lunar White. The Don't Walk Symbol shall be Portland orange.

Combine Sub Article **B.** with Sub Article **C.**, as Sub Article **B. Housing.**

Combine Sub Article **E.**, **F.**, and **G.**, as Sub Article **C. Optical Unit** (1) Incandescent, and begin the sub article with the following sentence:

The Incandescent optical unit shall consist of a lens, reflector, reflector frame, lamp socket, and traffic signal lamp.

Create new Sub Article. **C. Optical Unit** (2) L.E.D. as follows:

C. Optical Unit:

(2) L. E. D. (Light Emitting Diode):

The L. E. D. optical unit shall consist of multiple L. E. D. light sources and a regulated power supply assembled in a sealed unit. The L. E. D. optical unit shall be warranted for a period of five years. It shall fit into a standard pedestrian signal housing so that it may be retro-fit to an incandescent pedestrian signal. The L. E. D. optical unit shall be capable of partial loss of L. E. D. s and still maintain message symbol integrity. The

beam color shall match that of the incandescent message: Hand - Portland Orange, Walking Symbol - Lunar White. The beam pattern and intensity shall meet ITE specifications. The intensity may not degrade by more than 10% per annum.

Electrical Requirements:

- Input Voltage: 89 VAC to 135 VAC
- Wattage: 15 Watts
- Input Impedance at 60 Hz must satisfy all conflict monitor requirements.
- A regulated power supply shall be engineered to protect the L. E. D.s from electrical surges and transient voltages.

Designate Sub Articles **E**, **F**, and **G**. as Vacant

ITEM #1108187A - SYSTEM INTEGRATION

Description:

This item shall consist of the successful integration of the Full Actuated Local Traffic Controller furnished under this Contract with the City of New Haven existing system. This item shall include all required creations, additions, and modifications to the graphics subsystem, data base, system software, and all other hardware and software necessary to complete the integration of the traffic signals into the City of New Haven system.

Materials: As required

Construction Methods:

All integration work shall be performed by:

JHK and Associates
1255 Wilbur Cross Highway
Berlin, Connecticut 06037

Contact Mr. Kevin Burnharn 4 weeks in advance to arrange a schedule. Telephone number (860) 828-8433.

Integration shall be accomplished with minimal interruption of the operation of the existing local traffic controllers and coordination system. The Contractor shall keep the City Traffic Engineer apprised of all work scheduled and in progress. Where applicable, City Engineers are to be included, and so instructed, in the system integration process.

Method of Measurement:

This item shall be measured at the contract Lump Sum price for the successful integration of both intersections into the City of New Haven system, to the satisfaction of the City of New Haven.

Basis of Payment:

This work shall be paid for as part of the item for "RCU Termination Panel and Harness". The integrated contract price shall include all software and hardware modifications, graphics creations, materials, equipment, tools, labor, and incidentals thereto.

ITEM #1108214A - RCU TERMINATION PANEL AND HARNESS IN NEW CABINET

The Contractor shall furnish and install at the locations shown on the plans an RCU termination panel and harness for connecting a remote communications unit (RCU). The Contractor shall also furnish and install all connecting wiring between the RCU termination panel and the appropriate controller and detector termination points in the cabinet to provide the operation specified herein.

Termination Panel

The termination panel backplate shall be constructed of 5052 sheet aluminum alloy with a minimum 3.175 mm (0.125-inch) thickness. The maximum dimensions of the backplate shall be 228.6 mm x 304.8 mm (9 x 12 inches). The backplate shall be prepared from a single sheet of material. No seams or joints of any kind will be permitted. All edges and holes shall be smooth and free of burrs. The backplate shall be painted using white enamel, which shall be baked-on to ensure a durable finish. The backplate will be drilled, as necessary, to mount the barrier strips and other attachments specified below.

Four (4) barrier strips shall be mounted on the panel backplate as shown on the plans. The barrier, strips shall have the following minimum features:

- "Feed-through" type for connecting harness conductors to the back of the termination panel.
- 20-position, 9.525 mm (3/8-inch) centers
- Stainless steel screw terminals
- Interposing barriers between each terminal position
- 15 ampere rating

Terminals shall be labeled as shown on the plans using black enamel in a silk-screen process upon a properly prepared panel surface. The legends shall be in alignment with the terminal strips, and shall consist of block letters at least 2.54 mm (0.10 inches) in height.

Harness and Connectors

Two harnesses and connectors shall be provided with each termination panel as follows:

- Output harness/connector
- Input harness/connector

Each harness shall be neatly formed using lacing or other approved methods, and shall remain flexible at -34.4°C (-30°F). Each harness shall be 24388 mm (8 feet) long.

The conductors of the two harnesses shall have the following minimum features:

- AWG #20 Stranded
- Rated 600 volts
- MIL-W-16878D, Type B
- Irradiated PVC insulation

The insulation of the Input harness conductors shall be blue. The insulation of the Output harness conductors shall be orange.

Each conductor of the harness shall be permanently labeled using numbered heat-shrink tubing. Each conductor of the harness shall be soldered onto the appropriate feed-through terminal on the back of the terminal panel.

The other end of each harness shall be equipped with a connector. The connector, or the harness within 304.8 mm (12 inches) of the connector, shall be permanently labeled as "INPUT" or "OUTPUT" as appropriate. The connectors and pin assignments shall conform to the requirements listed in Exhibits 1 and 2. Pins noted as reserved shall have a conductor wired in the harness, which shall be capped and have enough slack to terminate anywhere on the back of the panel. Connector shells shall be wired to chassis ground.

The input connector shall be a 61-pin, female, metal shell, 1/4 turn MS connector with gold-plated contacts (MS 3116-24-61SX, note insert position X). The connector hood shall have an appropriate strain relief and/or cable clamp.

EXHIBIT 1. RCU INPUT CONNECTORS AND PIN ASSIGNMENTS

Pin	Description	Type	Abbr.	Pin	Description	Type	Abbr.
A	Communications receive (tip)	Modem Connection	RECV	l	System detector 5	(NEMA Input)	SD5
B	Communications receive (ring)	Modem Connection	RECV	j	System detector 6	(NEMA Input)	SD6
C	Communications transmit (tip)	Modem Connection	XMIT	k	System detector 7	(NEMA Input)	SD7
D	Communications transmit (ring)	Modem Connection	XMIT	m	Walk monitor, phase 8	(AC Input)	W8
E	Local detector, phase 1	(NEMA Input)	LD1	n	Special function 1 input	(AC Input)	SF1
F	Local detector, phase 2	(NEMA Input)	LD2	p	Special function 2 input	(AC Input)	SF2
G	Local detector, phase 3	(NEMA Input)	LD3	q	Local preempt monitor	(AC Input)	PRE
H	Local detector, phase 4	(NEMA Input)	LD4	r	Conflict monitor	(AC Input)	CFM
J	Local detector, phase 5	(NEMA Input)	LD5	s	Flash monitor	(AC Input)	FSH
K	Local detector, phase 6	(NEMA Input)	LD6	t	Drum lock monitor	(AC Input)	DL
L	Local detector, phase 7	(NEMA Input)	LD7	u	AC input common	(AC Common)	
M	Local detector, phase 8	(NEMA Input)	LD8	v	System detector 8	(NEMA Input)	SD8
N	Green monitor, phase 1	(AC Input)	G1	w	Special function input 1	(NEMA Input)	SF1
P	Green monitor, phase 2	(AC Input)	G2	x	Special function input 2	(NEMA Input)	SF2
R	Green monitor, phase 3	(AC Input)	G3	y	Special function input 3	(NEMA Input)	SF3
S	Green monitor, phase 4	(AC Input)	G4	z	Special function input 4	(NEMA Input)	SF4
T	Green monitor, phase 5	(AC Input)	G5	AA	Local preempt monitor	(NEMA Input)	PRE
U	Green monitor, phase 6	(AC Input)	G6	BB	Manual control	(NEMA Input)	MAN
V	Green monitor, phase 7	(AC Input)	G7	CC	(reserved)	(AC Input)	
W	Green monitor, phase 8	(AC Input)	G8	DD	(reserved)	(AC Input)	
X	Walk monitor, phase 2	(AC Input)	W2	EE	(reserved)	(AC Input)	
Y	Walk monitor, phase 4	(AC Input)	W4	FF	(reserved)	(AC Input)	
Z	Walk monitor, phase 6	(AC Input)	W6	GG	(reserved)	(AC Input)	
a	Ped pushbutton, phase 2	(NEMA Input)	PB2	HH	Drop address, position 1	(NEMA Input)	
b	Ped pushbutton, phase 4	(NEMA Input)	PB4	JJ	Drop address, position 2	(NEMA Input)	
c	Ped pushbutton, phase 6	(NEMA Input)	PB6	KK	Drop address, position 4	(NEMA Input)	
d	Ped pushbutton, phase 8	(NEMA Input)	PB8	LL	Drop address, position 8	(NEMA Input)	
e	System detector 1	(NEMA Input)	SD1	MM	(reserved)	(AC Input)	
f	System detector 2	(NEMA Input)	SD2	NN	Drop address, position 16	(NEMA Input)	
g	System detector 3	(NEMA Input)	SD3	PP	NEMA input/output common	(NEMA Common)	
h	System detector 4	(NEMA Input)	SD4				

EXHIBIT 2. RCU OUTPUT CONNECTORS AND PIN ASSIGNMENTS

Pin	Description	Type	Abbr.	Pin	Description	Type	Abbr.
A	Filtered AC+	RCU Power Input	AC+	e	Special function output 1	(Relay – C)	SF1
B	Filtered AC-	RCU Power Input	AC-	f	Special function output 1	(Relay – NO)	SF1
C	Chassis (AC) ground	RCU Safety Ground	CHAS	g	Special function output 2	(Relay – NC)	SF2
D	Hold-on-line 1	(Relay – NC)	HOL1	h	Special function output 2	(Relay – C)	SF2
E	Hold-on-line 1	(Relay – C)	HOL1	i	Special function output 2	(Relay – NO)	SF2
F	Hold-on-line 1	(Relay – NO)	HOL2	j	Special function output 3	(Relay – NC)	SF3
G	Hold-on-line 2	(Relay – NC)	HOL2	k	Special function output 3	(Relay – C)	SF3
H	Hold-on-line 2	(Relay – C)	HOL2	m	Special function output 3	(Relay – NO)	SF3
J	Hold-on-line 2	(Relay – NO)	HOL2	n	Special function output 4	(Relay – NC)	SF4
K	Hold	(Relay – NC)	HLD	p	Special function output 4	(Relay – C)	SF4
L	Hold	(Relay – C)	HLD	q	Special function output 4	(Relay – NO)	SF4
M	Hold	(Relay – NO)	HLD	r	(reserved)	Special	
N	Advance	(Relay – NC)	ADV	s	GND, internal logic supply	Special	
P	Advance	(Relay – C)	ADV	t	Analog input 1	Special	
R	Advance	(Relay – NO)	ADV	u	Analog input 2	Special	
S	Force off	(Relay – C)	FO	v	(reserved)	(NEMA Output)	
T	Force off 1	(Relay – NO)	FO1	w	(reserved)	(NEMA Output)	
U	Force off 2	(Relay – NO)	FO2	x	(reserved)	(NEMA Output)	
V	Call all	(Relay – C)	CAL	y	(reserved)	(NEMA Output)	
W	Call all	(Relay – NO)	CAL	z	(reserved)	(NEMA Output)	
X	Flash	(Relay – NC)	FSH	AA	(reserved)	(NEMA Output)	
Y	Flash	(Relay – C)	FSH	BB	(reserved)	(NEMA Output)	
Z	Flash	(Relay – NO)	FSH	CC	(reserved)	(NEMA Output)	
a	Preempt	(Relay – NC)	PRE	DD	(reserved)	(NEMA Output)	
b	Preempt	(Relay – C)	PRE	EE	(reserved)	(NEMA Output)	
c	Preempt	(Relay – NO)	PRE	FF	(reserved)	(NEMA Output)	
d	Special function output 1	(Relay – NC)	SF1	GG	(reserved)	(NEMA Output)	
				HH	+24 VDC, 50 ma	(NEMA Source)	

The output connector shall be a 55-pin, female, metal shell, 1/4 turn MS connector with gold-plated contacts (MS 3116-22-55SW, note insert position W). The connector hood shall have an appropriate stain relief and/or cable clamp.

Installation and Connections

The RCU termination panel, complete with connecting harness, shall be installed on the inside of the controller cabinets on the door of the cabinet in an area accessible to the 31.75 mm (1-1/4 inch) bushed nipple between the controller cabinet and the Auxiliary Termination Cabinet. The panel shall be mounted with a minimum of four bolts. All mounting hardware shall be stainless steel machine bolts with stainless steel lockwashers and nuts.

The Contractor shall furnish and install all wiring and connections from the RCU termination panel to the controller, system detectors, and related cabinet functions in accordance with the following operational requirements:

OUTPUTS

- **HOLD-ON-LINE (HOL)** - When the HOL output is energized at an actuated controller:
 - coordinated phase detectors, if any, shall be inhibited.
 - all output functions of the internal time-base coordination shall be inhibited. In the absence of the HOL output, the coordination output functions shall be activated.
 - maximum green no. 2 shall be activated for all phases.
 - in the absence of conflicting calls, the controller shall rest in coordinated phase pedestrian signals, timed-out WALK.
- **HOLD (HLD)** - When the HLD output is energized at an actuated controller, the controller shall rest in coordinated phase green. Removal of the HLD output shall permit the controller to advance out of the coordinated phase (YIELD) and into the next eligible phase.
- **FORCE-OFF 1 (FO1)** - When the FO1 output is energized, it shall cause the controller to terminate the current non-coordinated phase in Ring 1 (actuated controllers only).
- **FORCE-OFF 2 (FO2)** - When the FO2 output is energized, it shall cause the controller to terminate the current non-coordinated phase in Ring 2 (actuated controllers only).
- **FLASH (FSH)** - When the FSH output is energized, it shall cause the controller to begin flashing operations at the beginning of the coordinated green phase. Removal of the FSH output shall cause the controller to return to stop-and-go operation (actuated and electromechanical controllers).
- **SPECIAL FUNCTION (SF1-SF4)** - When the SF1 output is energized, it shall cause the exclusive actuated pedestrian phase to be omitted and the pedestrian signals (WALK and DONT WALK) to go dark. Removal of the SF1 output shall cause the controller to return to normal servicing of the pedestrian phase (actuated controllers only).

When the SF4 output is energized, the exclusive pedestrian phase shall be omitted.

No connections shall be made by the Contractor between the SF2 and SF3 terminals and the controller except as described above.

- **CALL ALL (CALL)** - When the CALL output is energized, it shall place all phases on minimum recall or pedestrian recall as appropriate. It shall also energize HOL through a diode such that HOL shall not energize CALL.

INPUTS

- **GREEN MONITOR (G1-G8)** - connections shall be made between the signal load field terminations inside the controller cabinet and the appropriate terminals of the RCU termination panel in accordance with NEMA traffic movement convention (e.g., when the coordinated Phase Green signals are on, the Phase 2 and 6 Green inputs are energized) as shown on the plan, or as directed by the Engineer. The Walk light of an exclusive pedestrian phase shall be treated as a phase 3 green signal (G3).
- **WALK MONITOR (W2, W4, W6, W8)** - connections shall be made between the walk signal load field terminations inside the controller cabinet and the appropriate terminal of the RCU termination panel such that a concurrent walk during NEMA movement 2 energizes W2, a concurrent walk during NEMA movement 4 energizes W4 and so forth. The walk monitor shall not be used for walk lights which are on only during exclusive pedestrian phases.
- **SPECIAL FUNCTION (SF1-SF4)** - the controller cabinet and RCU termination panel shall be wired such that the SF1 input is continuously energized whenever the phase omit function for an exclusive actuated pedestrian phase is active.
- **LOCAL PREEMPT (PRE)** - the controller and RCU termination panel shall be wired such that the appropriate PRE input (NEMA or AC) is energized whenever the intersection is being preempted. The PRE input shall remain energized until the end of preemption.
- **FLASH (FSH)** - the controller cabinet and RCU termination panel shall be wired such that the appropriate FSH input (NEMA, AC) is continuously energized whenever the intersection is on flash, whether initiated by the FSH output or other means.
- **CONFLICT MONITOR (CFM)** - controller's conflict monitor and the RCU termination panel shall be wired such that the CFM input is energized whenever the conflict monitor has been triggered. The CFM input shall remain energized until the conflict monitor is reset (actuated controllers only).
- **MANUAL CONTROL (MAN)** - the controller cabinet and the RCU termination panel shall be wired such that the MAN input is energized whenever the controller has been placed in manual operation.

- **SYSTEM DETECTOR (SD-SD8)** - the detector amplifiers and the RCU termination panel shall be wired such that the appropriate SD1-SD8 inputs, as shown on the plans, are energized during the time which the corresponding system detector channels are in the "ON" state.
- **LOCAL DETECTOR (LD1-LD8)** - connections shall be made between the RCU termination panel and the detector amplifier for local actuation loop detectors such that the LD1—LD8 inputs, as shown on the plans, are energized during the time that the corresponding local detector channels (NEMA convention) are in the state.
- **RECEIVE/TRANSMIT (RECV/XMIT)** - a four wire phone cable, of sufficient length to reach anywhere in the Auxiliary Termination Cabinet, shall connect to the RECV and XMIT terminals, or other termination block connected to these terminals and conveniently located in the cabinet, using spade lugs. The other end shall be terminated with an RJ-11 connector. The color code shall be _____ / _____ for RECV and _____ / _____ for XMIT.
- **ADDRESS** - the Contractor shall be responsible to wire the address by grounding the appropriate address terminals as directed by the Engineer.
- **PUSH BUTTON (PB)** - shall be connected to the CHECK ϕ terminal on the backpanel for Phase 3 where the exclusive pedestrian phase is located on that phase.

The AC+ terminal shall be wired to the filtered side of the 120 VAC cabinet power. The AC-, AC RETURN, and NEMA RETURN terminals shall be wired to the main cabinet ground bus using individual connectors. The CHASSIS GROUND terminal shall be wired to the ground. The AC+, AC-, and CHASSIS GROUND connections shall be as follows:

Cabinet - RFI Filter - Termination Panel Terminals

All wiring from the RCU termination panel to the controller, system detectors, and related cabinet functions shall be AWG #20 stranded rated 600 volts, MIL-W-16878D Type B, irradiated PVC. The connecting conductors shall be terminated on the screw terminals of the RCU termination panel using ring lugs or other approved connectors. All such wiring shall be neatly routed and laced throughout the cabinet

Modification of Existing Controller Equipment

The Contractor shall modify, as required, existing controllers and cabinets which are to remain to install the RCU termination panel and harness, to provide the connections between the panel and the controller and cabinet, and to satisfy the operational and functional requirements specified herein. The modification shall include, but not be limited to, controller and cabinet modifications; relocating existing panels, terminal strips and devices within the cabinet; installation of remote relays, system detector equipment and connections, and all other work that may be required to effect proper operation.

Method of Measurement:

The quantity to be paid for under this item will be the number of RCU termination panels and harnesses, of the type specified, installed, completed, tested in-place, and accepted.

Basis of Payment:

This work will be paid for at the contract unit price for "RCU Termination Panel and Harness" of the type specified, which price shall include the termination panel, barrier strips, lightning protection devices, harnesses and connectors, all hardware necessary to mount the panel, all wiring and connections, modifications of existing controllers and cabinets, transportation, storage and other incidentals necessary to complete the work.

ITEM #1108215A - REMOTE COMMUNICATIONS UNIT (RCU)

The Contractor shall furnish and install, at the locations shown on the plans, a remote communications unit (RCU). The RCU shall be a JHK & Associates Series 2000 RCU Model #J1211-1. The unit shall be fully compatible with the New Haven Series 2000 Traffic Control System.

The following manufacturers have manufactured the same or similar RCUs as are required:

Total Traffic Technologies
337 Skidmore Road
Deer Park, NY 11729
(516) 242-4292
Richard Marsanico

Solid State Devices
2125 West 7th Street
Tempe, AZ 85251
(602) 967-4712
Jim Jensen

WSA Systems, Inc.
5680 Oakbrook Parkway, Suite 145
Norcross, GA 30093
(404) 242-7501
Alex Rosa

A license agreement between the manufacturer and JHK is required before fabrication of the RCU.

Once assembled, the RCUs must be sent to JHK in Norcross, Georgia, for testing and installation of firmware.

Testing, installation of firmware, and shipment of each RCU back to New Haven for installation by the Contractor shall take no more than forty-five (45) days.

Warranty

The Contractor shall guarantee the remote communications equipment provided under this Contract for one year after final RCU test and acceptance by the City. All guarantees shall be provided in writing on Company or Corporation letterhead stationary by the Contractor with a list of names and telephone numbers where persons designated by the Contractor can be reached to give notification of any alleged defects for which the Contractor has repair or replacement responsibility.

This guarantee will obligate the Contractor to total and complete responsibility for providing an operating hardware facility for the warranty period. During the warranty period all malfunctioning or defective parts not caused by misuse or accident through fault or negligence by the City or its representatives shall be replaced with new standard parts and all necessary equipment adjustments occasioned by such defective parts shall be made by the Contractor at his

expense, including labor, parts, and transportation costs, if any. Parts which have been replaced shall become property of the Contractor.

In addition to other requirements of the warranty, the Contractor shall either provide on-site service capabilities in New Haven or provide a sufficient number of replacement components and equipment during the warranty period for remove and replace maintenance by the City.

No separate payment will be made for this work as the cost is identical to, and shall be included in, the various items bid by the Contractor.

Any units returned to the Contractor for repair and/or replacement shall be repaired and returned to the City within 30 calendar days following delivery of the defective unit to a carrier designated by the Contractor.

Any unit or subassembly which experiences more than three failures during the warranty period shall be replaced with a new unit and the defective unit or subassembly shall be returned to the City for disposal.

Each unit repaired by the Contractor shall be returned with a full description of the repairs performed including but not limited to a list of the components replaced, the reason (or possible reason) for the failure, and a design review to determine if the failure could have been caused by a design defect. The description shall also list the labor hours and the time and material charges which would have applied to the repair of said unit if the warranty did not apply. The description shall include the name of the technician(s) effecting repairs, the serial number of the unit and subassembly, and the date and time repairs were completed. All repaired units shall be subjected to testing, inspection, and burn-in prior to return to the City. Appropriate certifications shall accompany the unit.

ITEM #1108578A- FULL ACTUATED CONTROLLER 8 PHASE (MODIFIED)

Description:

This specification sets forth the minimum requirements for a shelf-mounted eight phase full-actuated solid state Naztec Model NT-980 or equal controller unit with Internal Time-Based Coordination/Background Cycle Time (TBC/BCT), Railroad / fire run (emergency vehicle) preemption and hardwire interconnect.

2.0 General:

2.1 The controller unit shall meet the requirements of NEMA Standards Publication No. TS 2-1992(TS2), latest edition. Where a difference occurs, these requirements shall govern.

2.2 All inputs and outputs to the controller unit shall conform to all interface and environmental standards in NEMA TS 2-1992.

2.3 Each controller unit shall have a unique serial number that is permanently and neatly displayed on the face of the unit. If this serial number is not on the face of the unit, then an additional temporary label that is neatly printed or typed shall be affixed to the controller unit face.

2.4 The controller unit shall meet all applicable requirements of the State of Connecticut DOT form 814A Standard Specifications and include the following as minimum requirements for the "Keyboard Entry Controller

A. The Keyboard Entry Controller must be type tested and approved by the City of New Haven prior to the bid.

B. The controller unit shall retain all intersection data on an EEPROM module. This module shall be removable from the unit via a plug-in type module with a handle. The module shall be keyed for correct type installation.

C. In the event of power failure, a capacitor shall be provided so the clock continues to operate for a minimum of 48 continuous hours per outage while maintaining a

cumulative accuracy of +/-0.005% over a temperature range of -30 degrees F to +165 degrees F per day, regardless of the number of power failures. Batteries will not be allowed.

- D. The controller unit shall be capable of two thru eight phase operation with a separate exclusive pedestrian phase (ninth phase) and eight keyboard programmable overlaps.
- E. The controller shall have the following configurations, as a minimum, shall be programmed within the controller unit and be user selective:
 - 8 Phase NEMA
 - 8 Phase Sequential
 - NEMA phasing to the left of the barrier, sequential phasing to the right of the barrier (quad sequential).
 - 4 Phase NEMA
 - User Program mode
- F. The controller unit shall be designed to provide pedestrian phasing with any phase(s).
- G. Eight (8) overlaps shall be provided and designated as overlaps A, B, C, D, E, F, G, and H. All overlaps shall be programmable through the keyboard and shall function as described in NEMA TS1-1989, paragraph 14.3.7. Each overlap shall have an associated green time independent of the parent phase(s), and shall time at the termination of the parent phase(s).
- H. The controller shall have a configuration which allows the user programmable barriers (compatibility lines, reference points to assure there shall be no concurrent selection and timing of conflicting phases). A minimum of four (4) barriers will be available in this configuration.

I. The controller shall have programmable conflicting phase setting where simultaneous operation of compatible phases is not allowed. This shall be selective by time of day

J. The controller unit shall be capable of operating as a volume density controller.

K. The controller unit shall have internal Time Base Coordination (TBC) logic. As a minimum, the controller shall have the following:

16 independent cycle lengths
4 offsets per cycle
1 split per cycle length

L. The controller unit shall use a standard RS232 port for data transfer to another controller, printer, or PC. A minimum of four (4) RS232 ports shall be provided. Baud rates shall be keyboard programmable as follows:

Port 1 600 to 19.2 KBaud
Port 2 600 to 19.2 KBaud
Port 3 600 to 4800 Baud
Port 4 600 to 4800 Baud

M. The firmware updates shall be accomplished by use of an IBM compatible PC. It shall not be necessary to physically replace hardware components to update the firmware. The update procedure shall be accomplished by connecting the upload/download unit to a communication port on the controller and transferring the new firmware from files on the PC to controller's FLASH PROM memory. The components shall accept a minimum of 1000 firmware updates. The following components shall be supplied to accomplish the firmware update:

IBM PC compatible software program to accomplish the transfer with a verification routine.

One RS232 cable for interconnecting the upload/download unit to the controller/On-Street Master.

One (1) copy of the instruction manual for the entire process.

- N. A direct reading alphanumeric liquid crystal display with back lighting shall be provided on the front panel

of the unit. The display shall be clearly readable in ambient light including the cabinet light, in full sunlight, or in the absence of light from a distance of approximately 3.5' at a 45 degree angle. The display shall automatically adjust to the optimum contrast level without the need of external devices to accomplish this feature. A temperature compensating circuit shall be included as part of the unit's design for display contrast control. The display shall have an automatic time-out feature that is user programmable from two (2) minutes to ninety-nine (99) minutes in one (1) minute increments. The display shall blank out per the programmable display time-out feature after the last keystroke is made.

- O. The display is a minimum 40 character X 4 line display.
- P. All ICs with fourteen (14) or more pins shall be mounted in machine tooled sockets. All sockets shall have two-piece, machined contacts and closed end construction to eliminate solder wicking. The outer sleeve shall be brass with tin or gold plating and tapered to allow easy IC insertion. The inner contact shall be beryllium copper subplated with nickel and plate with gold. All sockets shall have thermoplastic bodies meeting Underwriters Laboratory (UL) Specification 94V-0. Zero insertion force sockets will not be allowed.
- Q. The controller unit shall have a security code function. The unit shall contain a minimum of 64 programmable security codes each capable of a unique one (1) to four (4) digit code. Each code shall then be capable of programming a level of security, with a minimum of five (5) clearance levels.
- R. The controller unit shall have six (6) internal preempts with the capability of six unique sequences. Each preempt sequence shall be fully user programmable for timing and signal display in response to an individual preempt command input.
- S. One (1) data transfer cable and one (1) printer cable

shall be provided with each unit.

T. A "D" harness shall be provided with each controller

Cabinet unit to access preemption and coordination functions when required.

Communication inputs shall be included in the cabinet, and an EDCO SRA-64-C-030 or equal surge protection shall be provided.

The controller unit shall be capable of communicating with the following internal or external devices:

Spread Spectrum Radios .Hopping or Direct Sequence

FSK twisted pair modems

Dial up telephone modems

Direct frequency radios

Microwave radios

Fiber Optic modems

These devices shall be all interchangeable without the need for adding additional hardware to the unit. Modem type (if required) will be specified elsewhere.

V. A Naztec Conflict Monitor/Power Monitor Model NM-S 12-EI 23 or equal shall be provided with each controller

The conflict Monitor shall conform to these minimum requirements as well as those detailed under the Enhanced Conflict Monitor Specification.

The conflict monitor shall have a programmable RS232 user selective from 1200 to 9600 baud. The monitor shall have a true tactile feed back keyboard, 20 position, with four (4) red function keys, six (6) grey cursor keys, and ten (10) white numeric keys. The menus shall be easily identifiable and programmable. The display shall show the following additional indications:

Current cabinet voltage .real time display
24 volts 1 & 2 .real time display

The monitor shall be of the same manufacture as the controller Master/Secondary unit The monitor shall communicate to the local secondary controller unit through port four (4) which shall route all conflict monitor data, reports, trace reports to the central software package.

A monitor output shall be wired to provide a critical alarm for the central software system.

W. The manufacture or a certified manufacturer's representative shall be present at the turn on to facilitate assistance in field check out, programming, wiring, and any necessary field assistance, etc.

The controller shall be completely furnished with the number of phases called for in the item and as shown on the plans. The cabinet to house the controller shall meet the specifications set forth by the City of New Haven. The cabinet shall be completely wired and all sub-bases shall be complete with load switches and flash relays as specified in the Functional Specifications For Traffic Control Equipment. The cabinet shall also have all necessary auxiliary equipment required to provide the sequence and timing indicated on the plans. A time switch shall be installed in each cabinet along with a sub panel with a 20-amp circuit breaker mounted to it to provide power for cameras.

Specification for the City of New Haven cabinet are specified as set and also 1.0 to 6.0

1.0 TS 2 CABINET ASSEMBLY

1.1 This specification describes the minimum acceptable requirements for a TS 2 cabinet assembly to house a NEMA TS 2 Type 1 solid state full-actuated controller unit. The assembly shall include the cabinet, flasher, card rack(s), a Conflict Monitor Unit, an external power supply, and six flash transfer relays. For cabinet assemblies of configuration 4 (16 position), the assembly shall include 16 load switches and for cabinet assemblies of configuration 3 (12 position), the assembly shall include 12 load switches.

1.2 Cabinet Design Requirements

1.2.1 The cabinet shall be constructed using sheet aluminum with a minimum thickness of 3.2 mm. No wood, wood fiber products, or other flammable material shall be used in the cabinet. All welds shall be neat and of uniform consistency.

1.2.2 The size of the cabinet shall be size 5 or size 6 as defined by TS 2 Clause 7.3 of the NEMA Standard Publication TS 2 - 1992, as specified by the plans. The load bay shall be configuration 3 (12 position) or configuration 4 (16 position) as defined by TS 2 Clause 5.3, as specified by the plans.

Cabinet Options	Size of Cabinet	Backpanel Config	Size of Load Bay
Option 1	Pole Mount TS 2 Size 5	Configuration 3	12 position load bay
Option 2	Base Mount TS 2 Size 5	Configuration 3	12 position load bay
Option 3	Base Mount TS 2 Size 6	Configuration 3	12 position load bay
Option 4	Base Mount TS 2 Size 6	Configuration 4	16 position load bay

Cabinet sizes as defined in TS2 specification and modified by New Haven:

Size	Width	Height	Depth
5	30	58	16
6	52	52	24

1.2.3 The inside of each cabinet will be painted white including all shelves and fan panels.

1.2.4 Vertical shelf support channels shall be provided to permit adjustment of shelf location in the field. The channels shall have a single continuous slot to allow shelves to be placed at any height within the cabinet. Channels with **fixed notches or holes are not acceptable.**

1.2.5 Each cabinet shall be equipped with an extra set of unistrut channels or a keyhole panel on either side of the front section of the cabinet to permit the purchaser to mount additional equipment as necessary.

1.2.6 Shelves shall be at least 330 mm (13-inches) deep and be located in the cabinet to provide a 12.5 mm (1/2-inch) clearance between the back of the shelf and the back of the cabinet. A 38 mm (1 1/2 -inch) drawer shall be

provided in the cabinet, mounted directly beneath the controller support shelf. The drawer shall have a hinged top cover and shall be capable of storing documents and miscellaneous equipment. This drawer shall support to 22.5 kg (50 lbs) in weight when fully extended. The drawer shall open and close smoothly. Drawer dimensions shall make maximum use of available depth offered by the controller shell and be a minimum of 600 mm (24 inches).

- 1.2.7 Two shelves shall be provided in the cabinet and shall be at minimum 305 mm (12 inches) apart in height. There shall be sufficient shelf space to accommodate a controller unit 330 mm (13 inches) high, an MMU, one 8 position card rack and external power supply. An additional space at least 305 mm (12 inches) high, 325 mm (13 inches) wide, and 305 mm (12 inches) deep shall be provided. The controller unit, Conflict Monitor Unit, card racks, and power supply shall be placed on the shelves in such a manner that sufficient ventilation is provided to all components. Labels showing the proper placement of each component shall be provided along the shelves to ensure proper placement.
- 1.2.8 The cabinet shall be vented and cooled by 2 thermostatically controlled fans. The fans shall be a commercially available model with a capacity of at least 2.7 m³ (95 cu. ft.) per min. The thermostats shall be adjustable range of 20°C (54° F) to 43°C (95°). A press-to-test switch shall be provided to test the operation of the fans.
- 1.2.9 The cabinet shall be provided with a unique five digit serial number which shall be stamped directly on the cabinet or engraved on a metal or metalized mylar plate, epoxied or riveted with aluminum rivets to the cabinet. The digits shall be at least 5 mm (1/4 inch) in height and located on the upper right sidewall of the cabinet near the front.
- 1.2.10 The MMU shall have a DB9, RS232 connector on the front panel, which will allow it to communicate with a lap-top or a traffic controller. The MMU shall contain three reports; one to give indications of power fluctuations, cycles missed, and power outages. The second report to record and report the last 20 stored conflicting conditions. The third report will be to give a trace of the last 20 states of the monitor recorded to the nearest .01 seconds. This report is necessary to display the conditions that led to the conflicting condition.
- 1.2.11 The exterior of the cabinet shall be painted Dark Green

1.3 Cabinet Door

- 1.3.1 The cabinet shall be provided with one door in front that will provide access to the cabinet. The door shall be provided with three hinges with non-removable stainless steel pins, or a full-length piano hinge with stainless steel pins spot welded at the top of the hinge. The hinges shall be mounted so that it is not possible to remove them from the door or cabinet without first opening the door. The bottom of the door opening shall extend at least to the bottom level of the back panel. The door and hinges shall be braced to withstand a 74 kg per vertical meter (50 lbs. per ft.) of door height load applied to the outer edge of the door standing open. There shall be no permanent deformation or impairment of any of the door or the cabinet body when the load is removed.
- 1.3.2 The cabinet door shall be fitted with a Number 2 Corbin lock and a stainless steel handle with a 16 mm (minimum) diameter shaft (or equivalent cross-sectional area for a square shaft) and a three point latch. The lock and latch design shall be such that the handle cannot be released until the lock is released. One key shall be provided for each cabinet. A gasket shall be provided to act as a permanent dust and weather resistant seal at the controller cabinet door facing. The gasket material shall be of a nonabsorbent material and shall maintain its resiliency after long term exposure to the outdoor environment. The gasket shall have a minimum thickness of 6.25 mm (1/4 inch). The gasket shall be located in a channel provided on the cabinet or on the door(s). An "L" bracket is acceptable in lieu of this channel if the gasket is fitted snugly against the bracket to

insure a uniform dust and weather resistant seal around the entire door facing. Any other method is subject to purchaser approval during inspection of an order.

- 1.3.3 A locking auxiliary police door shall be provided in the door of the cabinet to provide access to a panel that shall contain a signal shutdown switch, a signal flash switch, a manual-automatic switch, and a manual advance push-button switch on a six foot retractable cord. Manual control of the controller unit from the police door shall override any external control (external logic, etc.) in effect when the Manual-Automatic switch is in the manual position. Each actuation of the manual advance push-button switch shall advance the controller to the next interval. Manual control shall not override any calls for preemption. The police door shall be gasketed to prevent entry of moisture or dust and the lock shall be provided with one brass key.
- 1.3.4 The intake for the vent system shall be filtered with a permanent air filter. The minimum filter dimensions shall be 406.4 mm (16 inch) wide by 304.8 mm (12 inch) high by 25 mm (1 inch) thick. The filter shall be securely mounted so that any air entering the cabinet must pass through the filter. The cabinet opening for intake of air shall be large enough to use the entire filter. The air intake and exhaust vent shall be screened to prevent entry of insects. The screen shall have opening no larger than 8.1 mm². The total free air opening of the exhaust vent shall be large enough to prevent excessive backpressure on the fan.

1.4 Wiring

- 1.4.1 All wiring within the cabinet shall be neat and routed such that opening and closing the door or raising or lowering the back panel will not twist or crimp the wiring. All wiring harnesses shall be either braided, sheathed in nylon mesh sleeving, or made of PVC or polyethylene insulated jacketed cable. Wiring leading to the cabinet door shall be sheathed in nylon mesh sleeving or be PVC jacketed cable only. All SDLC cabling shall be Belden #7203 A or equivalent.
- 1.4.2 **Size**
 - A. All conductors between the main power circuit breakers and the signal power bus shall be a minimum size 10 AWG stranded copper. All conductors carrying individual signal lamp current shall be a minimum size 16 AWG stranded copper. All AC service lines shall be of sufficient size to carry the maximum current of the circuit or circuits they are provided for. Minimum cabinet conductor wire size shall be 22 AWG stranded copper. All wiring and insulation shall be rated for 600 V or greater.
 - B. Conductors for AC common shall be white. Conductors for equipment grounding shall be green. All other conductors shall be a color different than the foregoing.
 - C. No P.C. boards will be allowed on the back panel of the cabinet. All wiring must be done from the Controller outputs to the Load Switches using standard 19-gauge wiring.
- 1.4.3 A barrier terminal block with a minimum of three compression fitting terminals designed to accept up to a #4 AWG stranded wire shall be provided for connection of the AC power lines. The block shall be rated at 50 Amperes.
- 1.4.4 All terminals shall be permanently identified in accordance with the cabinet wiring diagram using an anodized silk screening process on the aluminum panel. Where through-panel solder lugs or other suitable connectors are used, both sides of the panel shall have the terminals properly identified. Identification shall be placed as close to the terminal strip as possible.

- A. Each controller input and output function shall be distinctly identified with no obstructions, at each terminal point in the cabinet, with both a number and the function designation. The same identification must be used consistently on the cabinet wiring diagrams.
 - B. Each load switch socket shall be identified by phase number, overlap number, and pedestrian phase number as applicable. No cabinet equipment, including the load switches themselves, may obstruct these identifications.
 - C. Each flash transfer base and power relay base shall be properly identified with no possible obstructions.
 - D. Each harness within the cabinet shall be distinctly identified by function on the connector end.
 - E. The flasher socket shall be distinctly identified with no possible obstruction.
 - F. All other sockets needed within the cabinet to fulfill the minimum requirements of the Invitation to Bid, or attachments thereof, shall be distinctly identified.
- 1.4.5 The controller unit harness (A plug) shall be long enough to reach any point 400 mm above the timer shelf. The conflict monitor harness and any. required auxiliary harness shall reach 600 mm from the conflict monitor shelf:
- 1.4.6 An unused, spare terminal block providing ten terminals shall be provided. This block shall be double 8-32 X 5/16" binder head screw design with shorting bars. These terminal strips shall be located on the lower third of either side of the cabinet.
- 1.4.7 Copper ground buses shall be provided for both the power supply neutral (common) and chassis ground. Each bus bar must provide a minimum often unused terminals with 8-32 X 5/16" or larger screws. The AC neutral and chassis ground buses shall be jumpered together with a minimum #10 AWG wire.
- 1.4.8 A 20 Ampere and a 50 Ampere thermal type circuit breaker shall be mounted and wired in the cabinet. The 20 ampere breaker shall protect the base light, trouble light, GFCI receptacle, modem duplex receptacle, and fans. The 50 ampere breaker shall protect the signal load circuits, controller circuits, conflict monitor, flasher, and card rack detector power supply. The breakers shall be Square "D" QUO 150 Series, no other brand will be allowed.
- 1.4.9 The circuit breakers shall be equipped with solderless connectors and installed on the right side wall (facing the cabinet) or lower right hand side of the back panel inside the cabinet. The breakers shall be easily accessible. The breakers shall be positioned so that the rating markings are visible.
- 1.4.10 A Ground Fault Circuit Interruption (GFCI) type duplex receptacle shall be mounted and wired in the lower right side wall of the cabinet. An additional duplex receptacle (for use with communications modems) shall be mounted and wired in the upper left side of the cabinet behind the preempt/interconnect panel. These receptacles shall be wired on the load side of the 20 Amp circuit breaker.
- 1.4.11 The above breakers are in addition to any auxiliary fuses which may be furnished with the controller to protect component parts, such as transformers. etc.
- 1.4.12 The load side of the main circuit breaker shall be protected by a two stage lightning surge suppresser, equivalent to the EDCO APC340 (with LED indication along with a set dry contacts for alarm capabilities to indicate proper operation).
- 1.4.13 The suppresser ground connection shall be connected to the cabinet by means of a short, heavy copper ground strap. The strap shall be bonded to the cabinet.

- 1.4.14 The suppresser shall be connected to the line filter as recommended by the manufacturer. Number 10 AWG or larger wire shall be used for connections to the suppresser, line filter and load switch bus.
- 1.4.15 A fluorescent light, with switch and a rapid start ballast, shall be installed in the cabinet. This light shall be turned on when the cabinet door is opened, and turn off when the cabinet door is closed. An MOV or other such transient suppression device shall be placed across the AC power input to the light.
- 1.4.16 A radio frequency interference (RFI) suppresser shall be provided and installed on the load side of the signal circuit breaker and shall be protected by the surge protector. This filter shall be rated at 50 amperes and shall provide a minimum attenuation of 50 decibels over the frequency range of 200 Kilohertz to 75 Megahertz.
- 1.4.17 Transient suppression devices shall be placed on the coil side of all relays in the cabinet. DC relay coils shall have, as a minimum, a reversed biased diode across the coil. AC relays shall have MOV's or equivalent suppression across their coils. RC networks are acceptable. One suppression device shall be supplied for each relay.
- 1.4.18 Except where soldered, all wires shall be provided with lugs or other approved terminal fittings for attachment to binding posts. Insulation parts and wire insulation shall be insulated for a minimum of 600 volts.
- 1.4.19 The outgoing traffic control signal circuits shall be of the same polarity as the line side of the power source.
- 1.4.20 A switch shall be provided on the inside face of the cabinet door that shall be labeled Test-Normal. When the switch is in the Normal position, call for flashing operation shall remove the power from the controller unit. When the switch is in the Test position, the call for flashing operation shall permit the controller unit to continue to run so that its operation can be observed.
- 1.4.21 A switch shall be provided near the Test-Normal switch to cause the controller unit, and any auxiliary equipment, to stop timing. It shall be labeled "STOP TIMING".
- 1.4.22 The cabinet shall be wired so that activation of the Conflict Monitor Unit will cause the controller unit, and any auxiliary equipment, to stop timing.
- 1.4.23 Conflict and manual flash shall be wired for all red or as detailed on the intersection sequence plans.
- 1.4.24 The cabinet shall be designed and equipped with enough transfer relays for the purchaser to change any mainstreet indications (movements 2, 6, and/or 1, 5) to amber for the conflict and/or manual flash operation on the face of the back panel or a side panel, using only simple tools.
- 1.4.25 Transfer relays shall be the plug-in type manufactured by Midtex (Part No. 136-62T3A1) or AEMCO (Part No. 136-4992), or equivalent. The relays shall have contacts a minimum of 3/8" diameter in size and shall be rated at a minimum of 30 Amps 102/240 VAC, 20 Amps 28 VDC.
- 1.4.26 The red enable and remote reset from the conflict monitor shall be terminated on the face of the back panel.
- 1.4.27 A 75 Amp. solid state relay shall be wired between the RFI filter output and the load switch power bus. The relay shall be controlled by the signal shutdown switch and the flash switch. The relay shall be mounted to a heat sink designed to allow maximum current flow at 74 C (150° F) without damaging the relay.

- 1.4.28 All exposed AC wiring points, including the RFI filter, surge suppresser, and solid state relay shall be covered with a clear non-conductive plastic cover to prevent accidental contact. Unless otherwise noted in this specification, wiring at terminal strips is exempt from this requirement.
- 1.4.29 An input point shall be provided on the backpanel to allow external reset of the Conflict Monitor Unit.
- 1.4.30 The load switch outputs shall be brought out through posted 10-32 X 5/16" binder head screw terminals. Field wiring for the signal heads shall be connected at this terminal strip.

2.0 DETECTOR PANEL AND CARD RACK

- 2.1 The cabinet shall have a loop detector panel mounted on the left side of the cabinet. This panel shall provide for all connections between loops at the street and the detector amplifiers as described in the following sections.

2.2 Detector Card Rack

- 2.2.1 The card rack for cabinet configurations one, two, and three (12 position backpanel) shall be TS 2 detector rack configuration 2 and shall accommodate up to eight (8) two (2) channel TS 2 detector units. Two card racks, one TS 2 detector rack configuration 1 and one TS 2 detector rack configuration 2, shall be provided for cabinet configuration four (16 position backpanel) and shall accommodate up to twelve (12) two (2) channel TS 2 detector units.
- 2.2.2 The detector card rack shall have a rigid frame and shall be fabricated from aluminum and shall have slots set in a modular fashion such that the PCB edge connectors shall plug into the rear while sliding between top and bottom card guides for each module. Mounting flanges shall be provided and be turned outward for ease of access. The detector card rack shall be bolted to a cabinet shelf. It shall be possible to unbolt the rack using simple tools.
- 2.2.3 All wiring to the rack shall be labeled and neatly run to other parts of the cabinet and detector termination panel.
- 2.2.4 The slots shall be numbered 1 to 8 left to right when viewed from the front of the rack. A flange shall be provided on the top and the bottom of the rack to label each individual channel.
- 2.2.5 The Detector DC Supply shall be bussed to a common point and wired to the Intersection Detector Panel.
- 2.2.6 The Chassis Ground shall be bussed to a common point and wired to the Detector Panel.
- 2.2.7 The Logic Ground shall be bussed to a common point and wired to the Detector Panel.
- 2.2.8 The Data Address for the detector channels shall be according to TS 2.
- 2.3 Detector Panel
 - 2.3.1 The Detector Panel shall provide all connections between the detector loops and the detector amplifiers.
 - 2.3.2 The panel shall be constructed of 3.2 mm (1/8-inch) aluminum.
 - 2.3.3 The panel shall contain a 76 mm (3-inches) horizontal slot in each corner to accommodate 6.3 mm (1/4 inch) mounting bolts.

- 2.3.4 All inputs from the loops shall be brought through posted 10-32 X 5/16 inch binder screw terminals or 8-32 X 5/16 inch binder screw terminals.
- 2.3.5 Each loop pair shall be protected by lightning surge suppresser. The suppressers must be mounted behind the panel using feed through screw terminals to attach the suppressers.
- 2.3.6 Each detector will have a test switch such that when the switch is closed, a call is placed upon that detector input. The test switch will have three positions; no effect, permentaly on, and momentarily on.
- 2.3.7 The detector panel for cabinet configurations one, two, and three (12 position) shall provide the following connection points as a minimum for sixteen (16) detectors:

<u>CONNECTION POINT</u>	<u>NO. OF CONNECTION POINTS</u>
EXTERNAL 24V POWER SUPPLY	1
LOOP INPUTS	32,2 FOR EACH DETECTOR
LOGIC GROUND	1
SPARES	6
CHASSIS GROUND BUS	1 BUS

The detector panel for cabinet configuration four (16 position) shall provide the following connection points as a minimum for twenty-four (24) detectors:

<u>CONNECTION POINT</u>	<u>NO. OF CONNECTION POINTS</u>
EXTERNAL 24V POWER SUPPLY	1
LOOP INPUTS	24, 2 FOR EACH DETECTOR
LOGIC GROUND	1
SPARES	0
CHASSIS GROUND BUS	1 BUS

- 2.3.8 A chassis ground bus bar shall be provided on the panel and connected to the cabinet by an insulated braided copper ground strap. The strap shall be bonded to the cabinet.

3.0 PREEMPT / COMMUNICATION PANEL

- 3.1 A preempt / communication panel shall be provided that contains all interface circuits and wiring for preemption and communication functions. The panel shall be located on the left side of the cabinet interior.
- 3.2 Three input relay circuits, with 120 VAC coil and contacts rated for the application, shall be provided on the preempt panel. These circuits shall be used to isolate the incoming preempt commands from the controller unit logic circuitry. The circuits shall be programmable to operate with either a normally open or normally closed relay contact by jumpers on a terminal strip. A barrier strip protected from accidental contact by service personnel shall be supplied to connect the external input. It shall be possible to use either a neutral or hot 120 VAC input. Relays used shall be plug-in Potter Brumfield K10P series/Magnecraft W-78 series or interchangeable equivalent. The relays shall be mounted in relay sockets.
- 3.3 Adequate protection of the input relay circuits as well as the preemptor circuitry shall be provided to eliminate damage or false preemption commands caused by line transients or lightning surges. The devices shall have a minimum rating of 20 Joules.
- 3.4 Three momentary test switches, one for each preempt circuit, shall be provided on the preempt panel. The operator shall not be exposed to hazardous voltages during operation of the test switches.

- 3.5 All necessary interconnection cables and mounting hardware shall be provided.
- 3.6.1 There shall be a switch on the preempt/communication panel, which shall release the local controller to operate in an isolated, full-actuated manner, when necessary for maintenance purposes. The switch positions shall be labeled "SYSTEM" and "FREE".
- 3.6.2 A second switch shall provide a switched Logic Ground output for use with external preemption equipment. This switched output shall be brought to a spare terminal on the Preemt Panel.
- 3.7 Terminal connections for 3 twisted pair communication lines and one telephone line shall also be provided. The protection will consist of series 25 ohm resistors, 15 volt transorbs, and other devices, which allow protection including primary overvoltage protection, resettable overcurrent protection, secondary clamping voltage protection, and fast transient filtering. The secondary overvoltage stage shall allow peak voltages of no more than 250 volts. The fast transient filtering stage. shall provide no less than 40 dB/decade of attenuation to transients above the required pass band. The protection shall be provided in an integrated closure with eight (8) input/output terminations and ground connection.

4.0 POWER SUPPLY

- 4.1 The power supply shall be a shelf mounted, enclosed, 24 VDC power supply in accordance to Clause 5.3.5 of the NEMA Standards Publication TS 2-1992.
- 4.2 One power supply cable per power supply shall be furnished and installed in each cabinet. The wires shall be terminated to bus bars, terminals on the front of the backpanel, detector panels. or connector as appropriate. The connections shall be with forked spade lugs or otherwise as needed. Each individual wire shall be cut to the length required to reach the point at which it is to be connected.

5.0 TWO CIRCUIT SOLID STATE FLASHER

- 5.1 The solid state, two circuit flasher shall meet the electrical and physical characteristics described in Clause 6.3 of the NEMA Standards Publication TS 2-1992. The flasher shall be Type III (dual circuit rated at 15 Amps per circuit) unit and so constructed that each component may be readily replaced if needed.
- 5.2 The two circuit flasher shall be of solid state design and contain no electro-mechanical devices.

6.0 LOAD SWITCH

- 6.1 The solid state load switches shall meet the requirements set forth in Clause 6.2 of the NEMA Standards Publication TS 2-1992. and shall be "Triple-Signal Load Switch" type.
- 6.2 An indicator light for each circuit shall be provided in each load switch. The indicator light shall be on when a "Low Voltage Active" input to the load switch is present.

ITEM #1108645A - AUXILIARY TERMINATION CABINET

Description:

This item will consist of furnishing and installing an Auxiliary Termination Cabinet (ATC), on a traffic control cabinet at the location shown on the plans and in accordance with the conditions set forth.

Materials:

Each ATC shall be made of type 5052-H32, 3.175 mm sheet aluminum with a finish painted in accordance with the current City of New Haven specifications of Traffic Control Cabinets. The ATC shall be of clean-cut design and appearance. All seams shall be continuously welded and ground smooth. The ATC shall have dimensions as shown on the plans and shall conform to the NEMA 4X enclosure specifications. There shall be a 3.175 mm metal plate mounted on the back wall, spaced approximately 19.05 mm from the back wall, for equipment provided and installed by SNET. The door shall have two quarter-turn latches with a hasp and staple for padlocking. N oil resistant gasket shall seal the door. Door hinge pins shall be stainless steel material. All hardware used in the mounting of these cabinets shall be rust and corrosion resistant

Construction Methods:

The ATC shall be mounted on the left side of the controller cabinet, when facing the door, as indicated on the Typical Installation Detail Sheet. An opening shall be made in the ATC corresponding to the size of the conduit. A 31.75 mm hole shall be made in the back of the ATC and through the side of the controller cabinet. A close nipple with insulated bushings shall be installed through the hole. The Contractor shall confirm the inside of the cabinet wall is clear, so that installation of the ATC will not damage any equipment inside the controller' cabinet. A continuous nylon pull rope of at least 90.72 kg breaking strength, shall be installed in the 31.75 mm conduit from the inside of the ATC to the SNET facilities. 1200 mm of slack shall be coiled and tied at each end to prevent removal until the installation of SNET cable.

Method of Measurement:

This item shall be measured for payment by the actual number of Auxiliary Termination Cabinets installed and accepted on traffic control cabinets.

Basis of Payment:

This item shall be paid for at the contract unit price each for "Auxiliary Termination Cabinet" which price shall include mounting hardware, close nipple, insulated bushings, pull rope, tools, and incidentals.

ITEM # 1108706A - FIBER OPTIC VIDEO/ DATA TRANSMITTER/RECEIVER PAIR

DESCRIPTION:

Under these items, the Contractor shall furnish and install fiber optic video/Data transmitter/receiver, IFS Model VDT/VDR 14130WDM or equal in designated equipment cabinets as specified in the Contract documents and as directed by the Engineer.

The transmitter/receiver pair shall consist of furnishing and installing one (1) fiber optic video transmitter, data transceiver located in the field at a specified camera site and one (1) fiber optic video/data receiver, located in the City of New Havens Traffic Operation Center. to form a complete fiber optic communication link for video and data.

MATERIALS:

All materials furnished, assembled, fabricated or installed shall be new, corrosion resistant and in strict accordance with all the details shown in the Contract Documents.

The transmitters, receivers shall be fully compatible with each other and shall be from the same manufacturer. In addition, they shall be fully compatible with the video camera controllers and other specialty equipment furnished and installed under separate contract items.

Functional Requirements

Fiber Optic Video/Data Transmitters/Receivers.

The fiber optic video/data transmitter/receiver shall provide video links to transmit baseband video signals and bi-directional data from CCTV cameras on one strand of single mode fiber optic cable to the Traffic Operations Center.

The fiber optic video/data transmitter shall generate optical signals modulated by the baseband video signal and bi-directional data from the video camera output in the field in the form of digital video transmission and frequency shift keying data transmission.

The video fiber optic receiver/data transceiver shall detect and demodulate the optical signal and shall convert it to a baseband video signal and bi-directional data at the City of New Haven Operations Center.

Electrical/Optical Requirements

Fiber Optic Video/Data Transmitters/Receivers.

- Video Optical Wavelength: 1300 nm, nominal
- Video Input: 75 Ohm nominal impedance, 1.0 to 1.5 Volt peak-to-peak, typical. NTSC compatible.
- Video Transmitting Device: Injection Laser Diode (ILD), or an approved equivalent.
- Video Transmitter Optical Output: Output power to a single mode glass fiber at a wavelength of 1310nm shall be sufficient to accommodate a link loss budget of 23 dB or more. Once design is test and approved, the optical coupled power value and tolerance will become incorporated as part of this specification for the purposes of acceptance test.
- Video Optical Detector: PIN Diode, Avalanche Photo Diode (APD), or an approved equivalent.
- Video Receiver Optical Input: Receiver input shall have a minimum sensitivity of 23 dB below the transmitter output level and operate within the parameters of this specification. Once design is test and approved, the optical coupled power value and tolerance will become incorporated as part of this specification for the purposes of acceptance test.
- Receiver Video Output: 75-Ohm nominal impedance, 1.0 to 1.5 Volts peak-to-peak output level
- Video Modulation: Digital Modulation only. Amplitude Modulation or Pulse Frequency Modulation Techniques shall not be permitted.

Video Signal to Noise Ratio:	> 67 dB, measured as peak-to-peak white to blanking, to rms noise (ppwb/rms) in a 4.2 MHz
Linearity:	> 1.0%
Tilt:	<1.0%
Differential Phase:	<0.7° @ 10 to 90 % average picture level (APL)
Differential Gain:	<2.0 % @ 10 to 90 % APL
Frequency Response:	±1 dB, from 5Hz to 10MHz
Data Optical Wavelength:	1550 nm, nominal
Data Modulation:	Frequency Shift Keying
Data Transceiver Inputs/Outputs:	RS-232, RS-422, RS-485 2 and 4 wire, compatible with interfacing equipment.
Data Transmitter Optical Output:	Once design is test and approved, the optical coupled power value and tolerance will become incorporated as part of this specification for the purposes of acceptance test.
Data Rate and Bandwidth:	DC to 100kb/s
Bit Error Rate:	> 10 ⁻⁹ at an operating loss budget of 23 dB
Optical Fiber Compatibility:	Single mode glass fiber
Power Consumption:	5 Watts (nominal)
Supply Voltage:	12VDC @ 0.5A
MTBF:	100,000 hours

Additional Requirements

- Power Requirements: The equipment operation shall not be affected by transient voltages, surges and sags normally experienced on commercial power lines. It is the Contractor's responsibility to check the local power service to determine if any special design is needed for the equipment. The extra cost, if required, shall be included in the price bid of this item.
- Power Service Transients: The equipment shall meet the requirements of Sec. 2.1.6, "Transients, Power Service" of the NEMA Standard TS 1.
- Wiring: All wiring shall meet the requirements of the National Electrical Code. All wires shall be cut to proper length before assembly. No wire shall be double back to take up slack. Wires shall be neatly laced into cable with nylon lacing or plastic straps. Cables shall be secured with clamps.
- Transient Suppression: All DC relays, solenoids, and holding coils shall have diodes across the coils for transient suppression.
- Power Service Protection: The equipment shall contain readily accessible, manually resettable or replaceable circuit protection devices (such as circuit breakers or fuses) for equipment and power source protection.
- Fail Safe Provision: The equipment shall be designed such that the failure of the equipment shall not cause the failure of other components in the system.

Mechanical Requirements

Modular Design

The equipment shall be modular in design such that major portions may be readily replaced in the field.

Modules of unlike functions shall be mechanically keyed to prevent insertion into the wrong socket or connector.

All modules and assemblies shall be clearly identified with name, model number, serial number and any other pertinent information required to facilitate equipment maintenance.

Connectors and Harness

All external connections shall be made by means of connectors. The connectors shall be keyed to preclude improper hookups. All wires to and from the connectors shall be color coded/and or appropriately marked.

Optical input and output connectors shall be the ST Type.

Power and data input and output connectors shall be a terminal block with screw clamps.

The video input/output connectors shall be Type BNC female with a gold plated center pin.

Housing

The Fiber Optic Video/Data Transmitter/Receiver shall be a shelf-mounted unit packaged in an enclosed case located in the field and stand alone receiver located at the City of New Havens Department of Traffic & Parking

Environmental Design Requirements

The equipment shall meet or exceed all of the following requirements:

Operating Temp: -40° C (-54° F) to + 74° C (150° F), ambient

Storage Temp: -40° C (-54° F) to + 85° C(150° F), ambient

Relative Humidity: 0% to 95%, non-condensing

CONSTRUCTION DETAILS:

The Contractor shall install the fiber optic video/data transmitters/receivers in there designated equipment cabinets as shown on the plans or directed by the City Engineer.

Documentation Requirements

One (1) complete set of operation and maintenance manuals shall be placed in each field cabinet and two (2) complete sets shall be delivered to the City of New Haven Traffic & Parking The manuals shall, as a minimum, include the following:

- Complete installation procedures.
- Complete performance specifications (Functional, electrical, mechanical and environmental) on the unit.
- Complete maintenance and troubleshooting procedures.

Testing Requirements

Prior to integration of the equipment, the Contractor shall perform operational stand-alone tests to include the following as a minimum:

- Transmitter output power
- Transmission and reception of video signals
- Bit error rate

The Contractor shall also conduct a video transmission subsystem test with the equipment in place and using the fiber optic cable installed. The test shall, at a minimum, demonstrate the video signal reception at the output of the fiber optic receiver.

The contractor shall test the fiber to ensure operation.

Prior to the start of any testing, the Contractor shall submit all proposed test procedures to the City Traffic Engineer for approval. The City Traffic Engineer shall be present for all stand-alone and subsystem tests. Completed test forms shall be submitted to the City Traffic Engineer by the Contractor upon successful completion of all specified testing.

METHOD OF MEASUREMENT:

Payment for Fiber Optic Video/Data Transmitter/Receiver, Pairs will be measured for payment as each pair furnished, installed, tested and accepted by the city Engineer

BASIS OF PAYMENT:

The price bid for each Fiber Optic Video/Data Transmitter/Receiver, Pair shall include the cost of furnishing all labor, materials, tools, equipment, training, testing and documentation necessary to complete the work. All miscellaneous hardware, fiber splices required shall be included under this item

<u>Pay Item</u>	<u>Pay Unit</u>
Fiber Optic Video Transmitter/Receiver, Data Transceiver Pair	Each

ITEM #1108724A - PHASE SELECTOR
ITEM #1112410A - DETECTOR (TYPE A)
ITEM #1112470A - PREEMPTION SYSTEM CHASSIS
ITEM #1113550A - DETECTOR CABLE (OPTICAL)

System Description:

The emergency vehicle traffic signal priority control system shall enable designated vehicles to remotely cause the traffic signal controller to advance to and/or hold a desired traffic signal display by using existing controller functions. The control shall be effective for a range of 40-feet to 1,800-feet along an unobstructed "line of sight" path.

The system shall consist of the following components:

- A. Vehicle Emitter which shall be mounted on the emergency vehicle and shall transmit optical energy signals only in the forward direction.
- B. Phase Selector which shall cause the signal controller to advance to and/or hold the desired traffic signal display for the emergency vehicle. A preemption system chassis shall house two phase selectors,
- C. Optical Detector which shall be mounted on or near a traffic signal and shall receive the optical energy signals generated by the Vehicle Emitter.
 - 1. Detector (Type A) 1 Direction, 1 Channel
 - 2. Detector (Type B) 2 Direction, 1 Channel
 - 3. Detector (Type C) 2 Direction, 2 Channel
- D. Detector Cable (Optical).

System Operation:

- A. The operating sequence shall be initiated when the Optical Detector receives the required optical energy signal from the Emitter.
- B. The Phase Selector shall cause the traffic signal controller to advance to and/or hold the desired traffic signal display for the emergency vehicle.
- C. The Phase Selector shall not alter the predetermined, time dependent sequence of the traffic signal display. This requirement is not applicable to traffic signal controllers not having such a time dependent sequence. Only the duration of the displays may be altered.
- D. The Phase Selector shall cause the controller to advance to and/or hold the desired traffic signal display even if the optical energy signals cease before the desired display is obtained.

92-526

ITEM #1108724A
ITEM #1112410A
ITEM #1112470A
ITEM #1113550A

- E. The Phase Selector shall allow the traffic signal controller to resume normal operation within ten seconds after optical energy signals cease if the optical energy signals cease after the desired traffic signal display is obtained.
- F. The Phase Selector shall not respond to optical energy signals from an emergency vehicle if it is already processing optical energy signals from another emergency vehicle.

System Components:

A. Vehicle Emitter

The Emitter assembly consists of an Emitter and power supply and an Emitter Control Switch assembly. The Emitter assembly is mounted on a vehicle and produces a flashing optical signal when in operation. The Emitter converts 12 VDC vehicle battery voltage to the high voltage required to operate the Xenon gas filled Lube in the lamp assembly. The lamp is partially filled with fluid which acts as a cooling agent and absorbs shock. The assembly operates from a supply voltage between 10 VDC and 15 VDC and draws approximately 12 amperes.

1. Shall operate on ten to fifteen volts DC input voltage, but shall not be damaged by input voltage surges up to twenty-five volts DC.
2. Shall have externally mounted modules housed in noncorrodible material.
3. Shall be controlled by a single on/off switch which requires no other adjustments by the operator.
4. The on/off condition shall be indicated by a light located adjacent to the switch.
5. Shall operate over an ambient temperature range of minus 40 F to plus 126 F.
6. Shall operate in 0 to 95% humidity.
7. Shall be a pulsed optical energy source with a controlled repetition rate.
8. Shall not generate voltage transients on the battery input line which exceed battery voltage by more than four volts.
9. Shall have all solid state logic and timing circuitry.
10. Shall transmit optical energy signals only in a forward direction.

B. Optical Detector

The Optical Detector receives the high intensity optical pulses produced by the Emitter. These optical energy pulses are transformed by the detector into appropriate electrical signals which are transmitted to the Phase Selector. The Optical Detector is mounted at or near the intersection in a location which permits an unobstructed line of sight to vehicular approaches. The units may be mounted on signal span wires, mast arms or other appropriate structures.

1. Shall be of solid state construction.
2. Shall operate over an ambient temperature range of minus 40 F to plus 126 F.
3. Shall have internal circuitry potted in a semi-flexible compound to ensure moisture resistance.
4. Shall operate in 0 to 95% humidity.

C. Phase Selector

The Phase Selector utilizes solid state and relay circuitry to interface between the optical Detector and the traffic signal controller. The Phase Selector supplies power to and receives electrical signals from the Optical Detector. When Detector signals are recognized as a valid call, the Phase Selector causes the signal controller to advance to and/or hold the desired traffic signal display.

This is accomplished by utilizing Phase Selector circuitry in conjunction with normal internal controller functions, such as:

1. Isolating the timing dial and advancing the signal cam on pre-timed controllers.
2. Utilizing stop-time and manual functions in electronic and most solid-state controllers.
3. Utilizing force-off and hold functions in other solid-state controllers.
4. Skip-phase capability is utilized with actuated controllers whenever possible to reduce the time required to obtain the desired green signal indication.
5. Activation of the preempt input to an internal preemption type controller.

The Phase Selector is capable of assigning priority traffic movement to one of two channels on a first-come, first-serve basis. Each channel is connected to select a particular traffic movement from those normally available within the controller. Once a call is recognized, "commit to green" circuitry in the Phase Selector functions so that the desired green indication will be obtained even if optical communication is lost. After serving a priority traffic demand, the Phase Selector will release the controller to follow

normal sequence operation.

1. Shall use primarily solid state electrical components but in no case consist of more than four relays.
2. Shall include an internal power supply to supply power to the Optical Detectors.
3. Shall have two channel operation with the capability of interfacing with an additional Phase Selector for expansion of channels of operation.
4. Shall have a maximum of three "MS" type connectors, one for the main wiring harness to the controller, and one for each channel.
5. Shall have an integral, front panel accessible fuse for input power.
6. Shall have adjustable Detector range controls for each channel of operation.
7. Shall be capable of providing advance or "manual" pulses to manipulate the controller to advance to and/or hold the desired traffic signal display from those normally available.
8. Shall have digital timing controls for each channel which adjust the tune between advance pulses during yellow intervals from at least one to ten seconds in one second intervals,
9. Shall time all red indications not to exceed yellow time.
10. Shall have a control that is capable of multiplying the time settings by two.
11. Shall have solid state indicator lights to indicate power on, signal being received, channel called, and advance circuit operation.
12. Shall be capable of automatically placing a call on a predetermined channel after servicing a call on another channel ("recall").
13. Shall have switches to control system power, activate "recall", test Phase Selector advance operation, and to multiply timing control settings by two.
14. Shall operate over an ambient temperature range of minus 40 F to plus 126 F.
15. Shall operate in 0 to 95% humidity.

D. Detector Cable (Optical)

1. 3 conductor with shield and ground wire.
2. AWG #20 (7x28) stranded.
3. Individually tinned copper strands.
4. Conductor insulation: 600 volt, 150° F.
5. Color - 1 conductor yellow, 1 conductor blue, 1 conductor orange.
6. Aluminized Mylar - shield tape or equivalent.
7. AWG #20 (7x28) stranded uninsulated drain wire.
8. DC resistance shall not exceed 11.0 ohms per foot
9. Capacitance from one conductor to other two conductors and shield shall not exceed 157 pf/m
10. Jacket: 600 volts, 80° C, minimum average wall thickness – 0.05-inch
11. Finished O.D.-0.30-inch max.

System Interface:

System shall be capable of operating in a computerized traffic management system when appropriate interfacing is provided by the computer supplier.

General:

The contractor shall furnish the manufacturer the phasing diagrams indicating controller sequence and timing.

The optical equipment manufacturer shall replace or repair without charge, any component parts that prove to be defective within one year after installation. Manufacturer shall certify upon request that all materials furnished will conform to this specification. The manufacturer or his designated representative shall be responsible for determining and setting all required timing for the emergency vehicle operation.

Construction Methods:

All equipment except the Vehicle Emitter assembly shall be installed and wired in a neat and orderly manner in conformance with the manufacturer's instructions. The vehicle emitter assembly shall be delivered to a designated City representative.

Installation of the Vehicle Emitter assembly shall be the responsibility of the City.

Detector cables shall be installed continuous between the optical detector and the controller cabinet.

Detector locations shown on the plan are for illustration purposes only. Exact location shall be determined by the manufacturer or the designated representative for the best possible line of sight.

If not present in an existing traffic controller cabinet, the following items shall be installed and connected, in conformance with the current Functional Specifications for Traffic Control Equipment, 'D' Cabinet Requirements (Preemption Type):

- Controller 'D' harness and adapter.
- Preemption termination panel with terminal block and relay bases.
- Preemption disconnect switch, mounted on the emergency switch panel (on inside of cabinet door).
- Preemption test buttons, mounted on the preemption termination panel.

All connections from the phase selector to the 'D' harness and to the cabinet wiring shall be made at the termination panel. The termination panel shall have AC+ Lights, AC-, and a switched logic ground. The switched logic ground feeds all the preempt units to the phase selector. When switched off by the preemption disconnect switch, the traffic controller shall not be affected by preempt calls from the optical preemption system. A minimum of two test buttons shall be provided. If there are more than two preempt runs, a button for each shall be installed. A chart or print out, indicating the program steps and settings shall be provided along with the revised cabinet wiring diagrams.

All adjustments such as emitter intensity, phase selector range, sensitivity, detector placement, shall be made at the intersection, by the Contractor so that the optical preemption operates correctly with other major manufacturers' equipment currently owned by the City.

Test the preemption system according to the following guidelines:

1. Notify the system owner/user, such as the City fire chief or public works director, of the scheduled inspection.
2. Request a fire department representative and an emergency vehicle, which has an emitter, to conduct the test. If not available, the Contractor shall provide an emitter.
3. In the presence of the Engineer, and the City representative, test each preempted approach with the emergency vehicle. Test the following items of the system.

92-526

ITEM #1108724A
ITEM #1112410A
ITEM #1112470A
ITEM #1113550A

- Confirm the emitter activates the phase selector and the phase selector activates the correct preemption input to the controller.
 - Confirm adequate range. The traffic signal must be preempted to green sufficiently in advance of the emergency vehicle arrival.
 - Confirm there are no false calls. Keep the emitter active as the emergency vehicle passes through the intersection. No other optical detectors shall sense the strobe.
4. Document the test Provide the Engineer and, upon request, the City copies of the test results.

If a malfunction is found or the system needs adjustment (such as range, emitter intensity, or detector location), schedule a follow-up test. Repeat the above steps for all approaches that did not pass.

Method of Measurement:

Optical Detectors, Phase Selectors, System Chassis will be measured for payment by the number of each supplied, installed and accepted. Detector Cable (Optical) will be measured by the number of linear feet supplied, installed and accepted. Vehicle Emitters will be measured by the number of each supplied to the City and accepted.

Basis of Payment:

Payment for Optical Detectors, Phase Selector, System Chassis and Detector Cable (Optical) will include the item unit cost, including all manufacturer's required mounting hardware and the cost of installation and supervision by the manufacturer or his designated representative, including travel and subsistence, and all materials, equipment and labor incidental thereto. Payment for termination panel, 'D' harness, test buttons, program chart (or print out) and revised cabinet wiring diagrams shall be included in the item "Preemption System Chassis". Vehicle Emitters will include the item unit cost only.

ITEM #1108809A - DOCUMENTATION

General:

The Contractor shall furnish complete documentation on all equipment items provided. The documentation shall contain complete details of how the equipment, signalized locations, and communications network were actually built and how they work, together with complete operating and maintenance information. All data shall be submitted on 22½-inch by 36-inch standard plan sheets or on 8½-inch by 11-inch sheets in loose leaf bound manuals as appropriate. Manuals shall be offset printed unless otherwise approved in writing by the Engineer.

A. Field Test and Hardware

For each type of controller, detector sensor unit, RCU termination panel and harness, and RCUs, the Contractor shall deliver three copies of comprehensive service manuals showing routine maintenance and operation requirements; component and subassembly identification to enable the City to perform operation and maintenance activities after contract acceptance. The controller documentation shall include, but not be limited to, controller, load switch, uniform code flash unit, and conflict monitor wiring and logic diagrams.

Three paper prints of wiring diagrams and electrical schematics shall be supplied for each controller and cabinet. The diagrams shall be non-proprietary and shall show the as-built field wiring. They shall identify all circuits, connections, and components including field hook-ups, detectors, and RCU termination panel connections and wiring, in such a manner as to be readily interpreted and to permit forward and reverse circuit tracing. The cabinet drawing shall show the component layout in an elevation view as viewed from the cabinet door with the left and right cabinet walls shown in their relative positions. Auxiliary equipment drawings and special information shall be completely identified and labeled.

Special pertinent information such as: Conflict Monitor Jumpers Controller Start-Up, Overlap Program, Controller Sequence Prom Numbers and I.C. Socket Locations, RCU termination panel connections. etc., must be clearly shown on Cabinet Wiring Diagrams. The Contractor shall also provide an RCU termination panel wiring diagram for existing controllers.

All equipment shall be identified by manufacturer's model or part number. Relays, timers, etc. shall have voltage rating plug configuration and typical wiring shown on the prints.

Cabinet print wiring diagrams must match the actual cabinet wiring. Markovers or separate corrective lists will not be acceptable.

A comprehensive parts list, detailing all replaceable components as to the manufacturer's part number and commercially available part number, and manufacturer's net price each. This list may be referenced from the drawings supplied with the equipment

One copy of the wiring diagrams shall be placed in a heavy-duty side-opening plastic pouch attached to the cabinet door. The pouch shall be of such design and material that provides adequate storage and protection for the wiring diagrams. The Contractor shall also supply one set of final signal timings and field wiring plans to each of the following:

- Traffic Project Engineer
- Traffic Signal Superintendent

The controller, detector sensor unit, and test equipment manuals and wiring diagrams shall be delivered least 10 days prior to conducting the first Intersection Acceptance Test.

B. As-Built Plans

The Contractor shall advise the Engineer of any change of measurement or layout of the Plans submitted to him. Upon completion of construction, but prior to acceptance of the Contract, the Contractor shall furnish as-built plans on 22½-inch by 36-inch standard plan sheets. All construction changes, with the final location and depth of the conduits, wiring external to the cabinet, etc., shall be shown in detail on sepia or other reproducible format. These plans shall include all field installations. One sepia or other reproducible of the Project Plans will be provided to the Contractor for his use. Any other base maps that may be necessary for the Contractor to comply with this requirement, will be the Contractor's responsibility.

Method of Measurement:

This work shall be measured for payment on a lump sum basis.

Basis of Payment:

The item "Documentation Traffic Signals" shall be paid for at the lump sum price which shall include furnishing all manuals, technical drawings, schematics, as-built drawings, wiring diagrams, and other materials necessary to document the operation of the hardware and the construction performed in accordance with these Special provisions. Work shall include, but not be limited to, furnishing all labor, tools, equipment, transportation, design discussions, draft material, final material, printing, and all other incidentals necessary to complete the work.

ITEM #1111401A - LOOP VEHICLE DETECTOR

Article M.16.12 - Loop Vehicle Detector and Sawcut:

1. Loop Vehicle Detector:

C. Mechanical Requirements:

After the first paragraph add the following:

The cable shall be wired according to the following chart:

Pin	Color	Function
A.	White	110 VAC Neutral
B.	Brown	Output Relay Common (moving contact)
C.	Black	110 VAC(Fused)
D.	Red	Loop
E.	Orange	Loop
F.	Yellow	Out Relay Contact (closes with moving contact when detecting vehicle)
G.	Blue	Out Relay Contact (opens with moving contact when detecting vehicle)
H.	Green	Chassis Ground
J.	Gray	110 VAC Delay/Extend Override
Shell		Ground (shall be connected to pin H in the connector)

ITEM #1111404A - MICROWAVE VEHICLE DETECTOR

Description:

Furnish and install a microwave vehicle detector at the location shown on the plan.

Materials:

- Self tuning.
- 115 (95 to 135) VAC input power.
- Power supply or step down transformer, if other than 115 VAC.
- Light Emitting Diode (LED) visual call indicator.
- Fail safe. A malfunction or damaged detector results in a constant call.
- Operation from -50°F to +150°F.
- Approximate dimensions – 3 ½ -inches H, 4 ½ -inches W, 7 ½ -inches D.
- Weight: 2.9 to 4.9 lbs.
- Water resistant housing.
- Form C relay output.
- Stainless steel mounting hardware.
- Microwave, pulse detection:
 - Continuous with motion.
 - Adjustable range. Up to 200-feet.
 - Conical beam. 50-feet wide at 200-feet.

Construction Methods:

Mount the detector on a fixed structure as recommended by the manufacturer; adjust to provide detection of approaching vehicles only, as shown on plans. Field drill the structure and install grommet for the cable. Connect the detector to the power supply in the controller cabinet with the cable. Insure that cable installed within the fixed structure is protected against weather and damage to cable insulation. Install LED visual call indicator in the traffic signal cabinet near the microwave hook-up terminals.

Method of Measurement:

This work will be measured by the number of Microwave Vehicle Detectors furnished, installed, and operating as shown on the plans and accepted by the engineer

Basis of Payment:

This work will be paid for at the contract unit price each for "Microwave Vehicle Detector". The price will include all materials, parts, power supply, LED visual call indicator and components, tools, labor, and work incidental thereto.

ITEM #1111451A - LOOP DETECTOR SAWCUT

11.11.03 - Construction methods:

Replace the words "Plastic Compound" with "Elastomeric Compound".

M.16.12 - LOOP VEHICLE DETECTOR AND SAWCUT

2. SAWCUT

Replace sub article **B**. The Plastic Compound with the following:

B: Loop Detector Sealant:

The elastomeric compound shall conform to the following specifications which describes the installation, minimum design, and functional performance requirements for flexible traffic loop wire encapsulant.

The compound shall be used in sawcuts 6mm (0.25") to 10mm (0.375") wide by 40mm (1.5") to 65mm (2.5") deep to protect loop detector wires from moisture, penetration, fracture, and shear while providing compressive yield strength to withstand normal vehicular traffic and movement in asphalt/concrete pavements.

1. Elastomeric compound shall be one part urethane which will not require a reactor initiator, or a source of thermal energy prior to or during its installation.
2. Elastomeric compound shall cure only in the presence of moisture.
3. The flow characteristics of the elastomeric compound shall guarantee encapsulation of loop wires.
4. The viscosity of the elastomeric compound shall be such that it does not run out of the sawcut in sloped roadways during and after installations.
5. The Elastomeric compound shall allow vehicular traffic to pass over properly filled sawcuts immediately after installation without a stringing effect. The elastomeric compound shall form a surface skin within 60 minutes at 24 degrees Celsius (75 F).
6. Cured elastomeric compound shall resist: effects of weather, vehicular abrasion, motor oil, gasoline, antifreeze, brake fluid, de-icing chemicals, salt, acid, hydrocarbons, and normal roadway encounters. Cured elastomeric compound shall not interfere with the performance of the loop detector.
7. Cured elastomeric compound shall maintain all it's protective characteristics throughout the ambient temperature ranges experienced within the State of Connecticut.
8. Elastomeric compound shall show no visible signs of shrinkage during or after its installation.

9. The cleaning product to permit the clean-up of the uncured elastomeric compound shall not threaten harm to the workers or the environment. Material Safety Data Sheets must state that the application of the urethane can be applied without the use of a respirator in an open air environment.
10. Packaging shall be available in the following:
 - A. Cartridges: Shall be equipped with a threaded fitting to accommodate a screw on nozzle designed for insertion in a sawcut 6mm to 10mm (0.25 - 0.375) of an inch in width and 40mm to 65mm (1.5 to 2.5) in depth. The cartridge contain a puncture seal on it's nozzle end. All cartridges shall be designed to fit into a manual, electric or pneumatic caulking gun. Cartridges shall contain a minimum of 860ml (29 fl. oz.) of material.
 - B. Five gallon pails: Such pails shall be open head pails with covers that employ tubular neoprene gaskets. These pails shall contain a minimum of 17 liters (4.5 gallons) of material in order to permit direct pumping from the pail. Elastomeric compound shall be ordered in multiples of 17 liters (4.5 gallons).
11. Shelf Life:

Elastomeric compound packaged in cartridges shall have a minimum of 9 months shelf life when stored under conditions specified on the label. Five gallon containers shall have a minimum shelf life of 12 months when stored under specified conditions.
12. Elastomeric compound shall be designed for roadway installation when the surface temperature is between 4 and 38 degree Celsius (40 and 100 F).
13. Uncured elastomeric compound shall have a viscosity of 5,000 CPS to 85,000 CPS.
14. Uncured elastomeric compound shall conform to the following testing requirements: ASTM D-1875, ASTM D-2834, ASTM D-1048B, ASTM D-1640.
15. Cured elastomeric compound shall conform to the following testing requirements: ASTM D-2240, ASTM D-412A.
16. All suppliers shall provide a letter of certification from the manufacturer confirming the physical properties of #'s 14 and 15.
17. All manufactures shall supply documentation including MSDS sheets that state the material is safe for use without the need for a respirator by the workers performing the installation.

City of New Haven
Department of Traffic & Parking

ITEM #1112210A - CAMERA ASSEMBLY

Description:

Work under this item shall consist of furnishing and installing CCTV camera, Pan/Tilt unit, and the weatherized dome housing for the camera at the location and to the dimensions and details shown on plans or as directed by the Engineer and in conformity with these specifications. This item shall also include a maximum of two maintenance calls to adjust and/or replace the camera assembly during the first year from the date of acceptance.

Materials:

1. Camera & Pan/Tilt Zoom Integrated Dome: The out door discreet CCTV dome receiver driver unit shall be a 8" weatherized pressure dome with integrated color and monochrome camera manufactured and supplied by "Kalatel" of Corvallis, Oregon or equivalent and shall be as follows:
 - The design shall consist of the following features:
 - High speed pan tilt drive unit with variable speed control
 - High resolution 1/4" camera with 18X optical zoom and additional 4X programmable electronic zoom
 - Integrated color/monochrome operation in NTSC video signal format.
 - Automatic or manual switching between color and monochrome modes
 - 3 lux color sensitivity and 0.2 lux monochrome sensitivity
 - electronic shutter control
 - automatic and manual focus
 - backlight compensation
 - 360 degree continuous panning
 - optional 180 degree quick spin target tracking
 - 64 programmable presets
 - one two minute learned tour
 - 3 programmable preset tour
 - 16 preset and zone titles
 - programmable NVRAM
 - quick connect upper housing
 - discreet lower dome

2. Pan Tilt Drive Unit

The high-speed pan/tilt drive unit shall meet or exceed the following design and performance specifications:

- 2.1 Shall be microprocessor controlled with keypad-programmable non volatile memory. Each pan tilt drive unit shall operate as an independent unit with exclusive programming and setup data contained on each unit's non-volatile memory.
- 2.2 Shall feature an integral receiver driver with DIP switch selectable addressing.
- 2.3 Shall provide a built in menu system for on screen set up of camera functions.
- 2.4 Shall be capable of 360 degree continuous pan rotation with a vertical unobstructed tilt of 0 to -90 degrees.
- 2.5 Shall pan under manual control from a creep speed of 1.0 degree to 80 degree per second.
- 2.6 Shall operate under preset control at a pan speed of 400 dps (degrees per second) (200 per second average point to point) and a tilt speed of 100 dps.
- 2.7 Shall be capable of up to 64 preset positions.
- 2.8 Shall be capable of up to three individual preset tours consisting of 16 programmed presets each.
- 2.9 Shall be capable of one learned shadow tour that programs a tour from up to two minutes of manual operation by an operator. Shall be a continuous memorized path, panning, tilting, and zooming at any speed, and pausing at selected targets along the way.
- 2.10 Shall feature zone titling for up to 16 camera presets and zones. Each title shall consist of one line of 16 characters.
- 2.11 Shall feature variable speed, continuous-duty stepper motors capable for full operation from 18 to 30 VAC (24 VAC normal).
- 2.12 Shall require a maximum of 10 VA.
- 2.13 Shall provide a programmable limit stop for automatic scanning.
- 2.14 Shall provide an optional quick spin feature that automatically rotates the camera 180 degrees when the bottom pan tilt limit is reached to allow for continuous tracking of a target.

3.0 Cameras:

The high resolution integrated color/monochrome NTSC camera shall meet or exceed the following design and performance specifications:

- 3.1 The camera scanning system shall be 2:1 interlacing.
- 3.2 The camera image sensor shall be ¼" solid state interline CCD imager.
- 3.3 The image sensor shall have a total pixel array of 768 H X 494V .
- 3.4 The camera shall have auto white balance.
- 3.5 The camera shall have auto iris control and manual override.

- 3.6 The camera shall provide back light compensation while in automatic iris control mode.
- 3.7 The camera shall provide electronic shutter speeds of ¼ to 1/1000 second.
- 3.8 The camera shall provide temporary image enhancement in low light conditions via manual override that reduces the shutter speed from 60 fps to 4 fps for a 15X increased camera sensitivity to light.
- 3.9 The camera shall have an internal sync system.
- 3.10 The camera shall provide a signal to noise ratio of 50%dB.
- 3.11 The camera shall provide a sensitivity of 3 lux color and 0.2 lux for mono (AGC on @ f1.6).
- 3.12 The camera shall provide selectable manual via keyboard controller or automatic via user defined parameters switching between color and monochrome.
- 3.13 The camera shall provide automatic switching between color and monochrome via the light level sensor.
- 3.14 The camera shall provide a light level sensor that automatically removes the spot filter during low light conditions based on user defined programmable parameters.
- 3.15 The camera shall provide a composite video output of 1 volt p-p.

4.0 Lens:

The motorized lens shall be an 18X optical zoom: 1mm to 73.8mm f1.4 to f3
The lens shall feature an additional 1X and 4X programmable electronic zoom.

- 4.0 The lens shall provide a horizontal field of view for 48 degrees at 4 mm and 2.7 degrees at 48mm telephoto zoom.
- 4.1 The lens focus length shall be Inf.-0.01m (wide) and -1.0m (tele).
- 4.2 The lens shall feature and automatic focus with manual override.

5.0 Housings:

The camera and pan tilt unit shall be housed in a pressurized dome enclosure as follows:

- 5.1 The housing shall be capable of withstanding a total of 5 psi of nitrogen gas infected through a standard sized Schraeder valve located on the 3/8" machined aluminum retaining ring.
- 5.2 The housing shall utilize the Perma-Seal™ method of retaining pressurization during temperature changes and extended time.
- 5.3 The housing shall have no fastening holes or penetration in the clear acrylic lower dome.
- 5.4 A pressure relief valve shall provide an escape for pressure exceeding 5 psi. Two O ring seals shall be included.

An 18 pin hermetically sealed connector located in the rear of the housing shall provide

power, video and control functions.

- 5.5 A stainless steel retaining cable shall be used to capture and hold the housing top during service.
- 5.6 The lower dome portion shall be 8" diameter distortion free acrylic.
- 5.7 The housing shall have a heater blower, video and power surge protector capable of clamping differential mode voltage between 24 –36 V, voltage from 54-72V.
- 5.8 The housing shall be powered with 24 VAC (60 hz) and have a power
- 5.9 consumption not to exceed a total of 82W: 30W for camera/receiver, 52W for heater blower.
- 5.10 The housing shall support a temperature range of –20 degrees to 120 degrees.

6.0 **Power Supply:**

The unit shall be a Kalatel model number KTA-04-12 compact power supply in a weather-proof enclosure or equal 110 VAC input and 24 VAC output.

7.0 **Keyboard Controller:**

The unit shall be a Kalatel model KTD-304 keypad controller or equal capable of Controlling 512 PTZ domes. One controller shall be provided for two cameras and compatible to the cameras.

- 7.1 The unit shall have an LCD display with programming cues and status.
- 7.2 The controller shall output RS-422 digital data for dome control.

Installation:

- 50 feet of connecting cable (Belden 9262) wired with one end connector to access all the functions of the Cyberdome Pressurized dome.
- 7' plastic coated safety cable with 2 crimps, one safety pin for the dome, and two clips for the safety pin.
- Two (2) BNC connectors for Belden 9262 cable and four (4) BNC connectors for Belden 8281 cable
- 2" Conduit Box fitting to install the Dome on a 2"- schedule 40 pipe. This conduit box fitting between the dome and the supporting bracket shall have an access cover plate, Rubber Stopper, 2" and 1-1/2" Lock Nuts, and 1-1/2"Hex Reducer.
- Video Data Surge Protection: This unit shall include 120 VAC for Heater, 24VAC Power Supply for the camera and pan/tilt and Surge Suppression for video and data lines. It shall be installed inside the camera located junction box

with the fiber module, and power connection. .

CONSTRUCTION METHODS

The Dome shall be installed to the manufacturer's specifications and shall be plumb vertical. This can be achieved by adjusting the supporting bracket and/or the pole at the base. The Dome shall be thoroughly sealed with manufacturer's recommended silicone sealant at both sides of the conduit box, around the conduit box cover plate, around the dome connector, and around the black cover plate on the dome. The dome shall be secured to the bracket by the use of manufacturer supplied safety pin, safety pin clips, safety cable and safety cable crimps. The camera assembly shall be tested and adjusted for all the settings by the Department of Traffic & Parking prior to the installation in the dome. The contractor shall be responsible for a maximum of 2 maintenance calls during the first year from the date of installation for any required adjustments and/or replacement of the camera assembly. These calls do not include any adjustments required due to the faulty or incomplete installation prior to the acceptance of the camera assembly. The single camera controller keypad shall be given to the Traffic Operations Center, City of New Haven. The acceptance test shall include a 30-day error free operational test by the City.

METHOD OF MEASUREMENT

This work will be measured for payment by the number of CCTV camera assembly units installed, tested to the satisfaction of the City of New Haven Traffic Engineer, operating and accepted.

BASIS FOR PAYMENT

This work will be paid for the Contract Unit Price each for "CCTV Camera Assembly," which price shall include Kalatel Cyberdome or equal PAN/TILT assembly, 8" outdoor weatherized pressure dome, heater/blower, all connecting hardware, supporting 2" conduit box fitting, connecting cables from the cabinet to the dome, power supplies to the camera and Pan/Tilt unit, surge protector unit to video and data, necessary fittings for mounting and any and all splices being conventional or fiber splices, two maintenance calls during the first year after the acceptance test, miscellaneous fittings and all materials, equipment, tools and labor incidental thereto.

PAY ITEM

CCTV Camera Assembly

PAY UNIT

Each

ITEM # 1112241A - FIBER OPTIC CABLE SPLICE ENCLOSURE

Description

Work under this item shall consist of furnishing and installing a waterproof and airtight fiber optic cable splice enclosure; splicing the fiber optic cable; installing spliced fibers in a splice tray; and providing the required number of splice trays for each splice enclosure in conformance with this provision at the locations specified on the plans or as directed by the Engineer.

Materials

1.0 General

- 1.1 The splice enclosure and splice trays shall be of the same manufacturer as the Fiber-Optic Cable that is selected to be installed in this project.

2.0 Splice Closure

- 2.1 The splice enclosure shall accommodate a minimum of 144 fiber splices and a minimum of 12 single mode splice trays. The approximate size of the splice enclosure is 725 mm (29-inches) in length and 275 mm (11-inches) in diameter. Each splice enclosure shall have a splice tray organizer capable of holding twelve splice trays. The organizer shall provide access to and removal of individual splice trays.
- 2.2 The splice closure shall protect the splices from mechanical damage, shall provide strain relief for the cable, and shall be resistant to salt corrosion. The closure shall be waterproof and airtight, and shall be manufactured of non-corroding materials. The closure shall be flash-tested at 103 kPa. The fiber optic cable splice enclosure shall be designed for a temperature range of -30° C (-36° F) to +70° C (+145° F). The splice closure shall be capable of performing in a pullbox environment where total and continuous submersion in water is to be expected.
- 2.3 All materials in the enclosures shall be non-reactive and shall not support galvanic cell action. The outer enclosure shall be compatible with the other enclosure components, splice trays, and cables. The end plate shall consist of two sections and shall have the capacity for a minimum of four cable entries on each end.
- 2.4 All splice enclosures shall employ re-usable sealing materials allowing multiple re-entrances without replacing any component. Access to the splice enclosures shall be accomplished without the use of special tools or devices.

- 2.5 All environmentally exposed components of the splice cases shall be UV light resistant.

3.0 Splice Tray

- 3.1 All splice trays shall be lined with felt to cushion optical fibers and provide a contrasting background for splicing colored fibers. The splice trays shall include clear snap-on covers, felt tape for protecting buffer tubes, and tie raps to secure the buffer or transport tubes to the tray. The splice trays shall be of adequate size to prevent induced attenuation due to fiber bending.
- 3.2 The approximate size of the splice tray is 300mm (12-inches) x 10mm (1/2-inch) x 5mm (1/4-inch).
- 3.3 Each splice tray shall be capable of accommodating a minimum of 12 fusion splices for a single mode fiber cable of the type selected. The splice trays shall be compatible with the splice closure and shall be constructed of rigid plastic.
- 3.4 The splice tray shall have features that retain the fiber loops and control the bend radius. The splice tray cover shall be clear plastic to allow for inspection of the fibers without opening the tray.

Construction Methods

1.0 General

- 1.1 The Contractor shall supply all materials, tools, equipment and labor including but not limited to fan out kits, connectors, trays, splice enclosures, cable enclosures, and any other incidentals as necessary to complete the installation of the fiber optic cable splice enclosure.

2.0 Splice Closure

- 2.1 Twelve splice trays shall be provided with each splice enclosure.
- 2.2 The Contractor shall install the fiber optic cable splice enclosure in the pullbox where splicing is required.
- 2.3 The Contractor shall take extreme care to ensure that the minimum ending radius recommended by the manufacturer for the fiber optic cable is not exceeded during the splicing process. After the splice trays are placed inside the closure, the closure shall be sealed using a procedure

recommended by the manufacturer that will provide a waterproof environment for the splices. Encapsulant shall be used to ensure water resistance. The individual fibers shall be looped one full turn within the splice enclosure to avoid micro bending.

- 2.4 Optical fibers shall be spliced as noted on the plans using the fusion type and the average splice loss shall not exceed 0.10 dB per splice. The average splice loss shall be defined as the summation of the summation of the attenuation as measured in both directions through the splice, divided in half. No individual splice loss measured in a single direction shall exceed 0.15 dB. The completed splices shall be placed in a splice tray.
- 2.5 Care shall be taken at the cable entry points to ensure a tight salt resistant and waterproof seal is made which will not leak upon aging. It is acceptable to have multiple cables enter the fiber optic cable splice enclosure through one port as long as all spaces between the cables are adequately sealed.
- 2.6 This item shall require the Contractor to submit the manufacturer's complete specifications for fiber optic splice enclosures.

3.0 Splice Tray

- 3.1 All splicing equipment shall be in good working order, properly calibrated, and meeting all industry standards and safety regulations. Cable preparation, closure installation, and splicing shall be accomplished in accordance with accepted and approved industry standards.
- 3.2 Optical fibers shall be spliced using the fusion method and the loss shall not exceed 0.15 dB per splice. The completed splices shall be placed in a splice tray. The splice tray shall then be placed in the splice enclosure.
- 3.3 Service Drop Cable: The service drop cable fiber shall be spliced into the appropriate main line fiber as prescribed elsewhere in these special provisions and as shown on the plans. Termination splices shall join the fibers in the main line or trunk cable to the fibers in the service drop cables. The termination splices shall be placed in a splice tray and the splice tray(s) shall then be placed in a fiber distribution unit. The individual fibers shall be looped one full turn within the splice tray to avoid macro bending. The Contractor shall ensure that the minimum bending radius recommended by the manufacturer is not exceeded during the splicing process. Each fiber shall be individually restrained in a splice tray. The optical fibers in buffer tubes and the placement of the optical fibers in the splice tray shall be such that there is no discernible tensile force on the optical fiber.

- 3.4 AU splices shall be protected with a thermal shrink sleeve and shall be labeled in the splice tray with permanent vinyl markers. Butt ends shall also be labeled to identify the destination of the fiber.
- 3.5 Upon completion of the splicing operation, all waste material shall be deposited in suitable containers, removed from the job site, and disposed of in an environmentally acceptable manner.

Method of Measurement

This item shall be measured for payment by the actual number of Fiber Optic Splice Enclosures of the type specified, installed, tested and accepted in place.

Basis of Payment

This work will be paid for at the Contract unit price each for "Fiber Optic Cable Splice Enclosure" of the type specified, which shall include furnishing all materials, labor, splices, tools, equipment and incidentals necessary to complete the work.

<u>Pay Item</u>	<u>Pay Unit</u>
Fiber Optic Cable Splice Enclosure	Ea.

ITEM #1113606A OPTICAL FIBER CABLE-SINGLE MODE, LOOSE BUFFER TUBE CABLE , 12 FIBER
ITEM #1113601A OPTICAL FIBER CABLE-SINGLE MODE, LOOSE BUFFER TUBE CABLE , 2 FIBER

Description:

This item shall consist of furnishing and installing optical fiber cables and connectors of the size and type specified at the locations shown on the plans or as indicated by the Engineer, in accordance with these specifications. Cable shall be installed in conduit or inner-duct as shown on the plans by the methods defined in this specification.

Materials:

1.0 General

- 1.1 The cable shall meet all requirements stated in this specification. The cable shall be an accepted product of the United States Department of Agriculture Rural Utilities Service (RUS) 7 CFR 1755.900 and meet the requirements of the ANSI/ICEA Standard for Fiber Optic Outside Plant Communications Cable, ANSI/ICEA S-87-640-1992.
- 1.2 The Contractor shall provide 12 fiber stranded loose tube cable with single-mode fiber that shall be suitable for placement in an underground installation as shown in the plans. Fibers shall be supplied in loose buffer tubes in groups of 6.
- 1.1 The purpose of the optical fiber cable is to support a network application that will provide high speed and broadband communications. The network shall be capable of supporting data communications and NTSC quality color video transmission.
- 1.4 The Contractor shall provide a manufacturer's certification that the offered cable complies with all optical and mechanical requirements set forth in this specification. ***Any deviation of the offered cable from the specifications set forth herein shall be clearly noted in the Contractor's proposal.*** The Contractor shall provide an unconditional warranty on all installed cable for a period of one (1) year following activation of the entire communications system.
- 1.5 All optical fiber cables used on this project shall be from the same manufacturer, who is regularly engaged in the production of this material. Each optical fiber cable for this project shall be all dielectric, duct type, loose tube and shall conform to these Special Provisions.

2.0 Fiber Features

- 2.1 All fibers in the cable must be usable fibers and meet required specifications.

92-526

ITEM #1113601A
ITEM #1113606A

2.2 Each optical fiber shall consist of a doped silica core surrounded by a concentric silica cladding. The fiber shall be matched clad design.

2.3 SINGLE-MODE: The dispersion unshifted single-mode fiber utilized in the cable specified herein shall conform to the following specifications:

2.3.1 Cladding Diameter: $125.0 \pm 1.0 \mu\text{m}$.

2.3.2 Core-to-Cladding Offset: $\leq 0.6 \mu\text{m}$.

2.3.3 Cladding Non-Circularity: $\leq 1.0\%$.

$$\text{Defined as: } \left(1 - \frac{\text{Minimum Cladding Diameter}}{\text{Maximum Cladding Diameter}} \right) \times 100$$

2.3.4 Coating Diameter: $245 \pm 10 \mu\text{m}$.

2.3.5 Colored Fiber Diameter: nominal $250 \mu\text{m}$.

2.3.6 Attenuation Uniformity: No point discontinuity greater than 0.10 dB at either 1310 nm or 1550 nm.

2.3.7 Attenuation at the Water Peak: The attenuation at $1383 \pm 3 \text{ nm}$ shall not exceed 2.1 dB/km.

2.3.8 Cutoff Wavelength: The cabled fiber cutoff wavelength (λ_{cef}) shall be $< 1260 \text{ nm}$.

2.3.9 Mode-Field Diameter: $9.30 \pm 0.50 \mu\text{m}$ at 1310 nm
 $10.50 \pm 1.00 \mu\text{m}$ at 1550 nm.

2.3.10 Zero Dispersion Wavelength (λ_0): $1301.5 \text{ nm} \leq \lambda_0 \leq 1321.5 \text{ nm}$.

2.3.11 Zero Dispersion Slope (S_0): $\leq 0.092 \text{ ps}/(\text{nm}^2 \bullet \text{km})$.

2.3.12 Fiber Polarization Mode Dispersion (PMD): $\leq 0.5 \text{ ps}/\sqrt{\text{km}}$.

2.4 The coating shall be a dual layered, UV-cured acrylate applied by the fiber manufacturer.

2.5 The coating shall be mechanically strippable.

3.0 Fiber Parameters

- 3.1 Required Fiber Grade - Maximum Individual Fiber Attenuation.
- 3.2 The maximum dispersion shall be ≤ 3.2 ps/(nm•km) from 1285 nm to 1330 nm and shall be < 18 ps/(nm•km) at 1550 nm.
- 3.3 All optical fibers shall be proof tested by the fiber manufacturer to a minimum load of 0.7 GN/m².

4.0 Fiber Cable Features - Outside

- 4.1 Optical fibers shall be placed inside a loose buffer tube. The nominal outer diameter of the buffer tube shall be 3.0 mm (1/8 inch).
- 4.2 Each buffer tube shall contain up to 6 fibers.
- 4.3 The fibers shall not adhere to the inside of the buffer tube.
- 4.4 Each fiber shall be distinguishable by means of color coding in accordance with TIA/EIA-598-A, "Optical Fiber Cable Color Coding."
- 4.5 The fibers shall be colored with ultraviolet (UV) curable inks.
- 4.6 Buffer tubes containing fibers shall be color coded with distinct and recognizable colors in accordance with TIA/EIA-598-A, "Optical Fiber Cable Color Coding."
- 4.7 In buffer tubes containing multiple fibers, the colors shall be stable across the specified storage and operating temperature range and not subject to fading or smearing onto each other or into the gel filling material. Colors shall not cause fibers to stick together.
- 4.8 The buffer tubes shall be resistant to external forces and shall meet the buffer tube cold bend and shrinkback requirements of 7 CFR 1755.900.
- 4.9 Fillers may be included in the cable core to lend symmetry to the cable cross-section where needed. Fillers shall be placed so that they do not interrupt the consecutive positioning of the buffer tubes. Fillers shall be nominally 3.0 mm (1/8 inch) in outer diameter.
- 4.10 The central anti-buckling member shall consist of a dielectric, glass reinforced plastic (GRP) rod. The purpose of the central member is to prevent buckling of the cable. The GRP rod shall be overcoated with a black colored thermoplastic when required to achieve dimensional sizing to accommodate buffer tubes/fillers.
- 4.11 Each buffer tube shall be filled with a non-hygroscopic, non-nutritive to fungus, electrically non-conductive, homogenous gel. The gel shall be free from dirt and foreign matter. The gel shall be readily removable with conventional nontoxic

solvents.

- 4.12 Buffer tubes shall be stranded around the dielectric central member using the reverse oscillation, or "S-Z", stranding process. Water blocking yarn(s) shall be applied longitudinally along the central member during stranding.
- 4.13 Two polyester yarn binders shall be applied contrahelically with sufficient tension to secure each buffer tube layer to the dielectric central member without crushing the buffer tubes. The binders shall be non-hygroscopic, non-wicking and dielectric with low shrinkage.
- 4.14 A water blocking tape shall be applied longitudinally around the outside of the stranded tubes/fillers. The tape shall be held in place by a single polyester binder yarn. The water blocking tape shall be non-nutritive to fungus, electrically non-conductive and homogenous. It shall also be free from dirt and foreign matter.
- 4.15 The cable shall contain at least one ripcord under the sheath for easy sheath removal of all-dielectric cable. The cable shall contain at least one ripcord under the inner sheath and under the steel armor for armored cable. The ripcord color shall be orange for non-armored sheaths and red for armored sheaths.
- 4.16 Tensile strength shall be provided by dielectric yarns.
- 4.17 The high tensile strength dielectric yarns shall be helically stranded evenly around the cable core.
- 4.18 The dielectric cables shall be sheathed with medium density polyethylene (MDPE). The minimum nominal jacket thickness shall be 1.4 mm (1/16 inch). Jacketing material shall be applied directly over the tensile strength members and water blocking tape. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus.
- 4.19 The MDPE jacket material shall be as defined by ASTM D1248, Type II, Class C and Grades J4, E7 and E8.
- 4.20 The jacket or sheath shall be free of holes, splits, and blisters.
- 4.21 The cable jacket shall contain no metal elements and shall be of a consistent thickness.
- 4.22 Cable jackets shall be marked with manufacturer's name, sequential meter or foot markings, month and year, or quarter and year of manufacture, and a telecommunication handset symbol, as required by Section 350G of the National Electrical Safety Code (NESC).

The actual length of the cable shall be within -0/+1% of the length markings. The print color shall be white, with the exception that cable jackets containing one or more coextruded white stripes shall be printed in light blue. The height of the

marking shall be approximately 2.5 mm (1/10 inch).

- 4.23 The maximum pulling tension shall be 2700 N during installation (short term) and 890 N long term installed.
- 4.24 The shipping, storage, and operating temperature range of the cable shall be -40°C (-54°F) to +70°C (+144°F). The installation temperature range of the cable shall be -30°C (-36°F) to +70°C (+144°F).

5.0 Cable Performance

- 5.1 When tested in accordance with FOTP-3, "Procedure to Measure Temperature Cycling Effects on Optical Fibers, Optical Cable, and Other Passive Fiber Optic Components," the change in attenuation at extreme operational temperatures, -40°C (-54°F) to +70°C (+144°F), shall not exceed 0.2 dB/km at 1550 nm for single-mode fiber.
- 5.2 When tested in accordance with FOTP-82, "Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable," a one meter length of unaged cable shall withstand a one meter static head or equivalent continuous pressure of water for one hour without leakage through the open cable end.
- 5.3 When tested in accordance with FOTP-81, "Compound Flow (Drip) Test for Filled Fiber Optic Cable", the cable shall exhibit no flow (drip or leak) of filling and/or flooding material at 65°C (135°F).
- 5.4 When tested in accordance with FOTP-41, "Compressive Loading Resistance of Fiber Optic Cables," the cable shall withstand a minimum compressive load of 220 N/cm (125 lbf/in) applied uniformly over the length of the sample. The load shall be applied at the rate of 3 mm (1/8 inch) to 20 mm (3/4 inch) per minute and maintained for ten minutes. The change in attenuation shall not exceed 0.4 dB during loading and 0.2 dB after loading at 1550 nm for single-mode fiber.
- 5.5 When tested in accordance with FOTP-104, "Fiber Optic Cable Cyclic Flexing Test," the cable shall withstand 25 mechanical flexing cycles around a sheave diameter not greater than 20 times the cable diameter. The change in attenuation shall not exceed 0.1 dB at 1550 nm for single-mode fiber.
- 5.6 When tested in accordance with FOTP-25, "Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies," the cable shall withstand 25 impact cycles. The change in attenuation shall not exceed 0.2 dB at 1550 nm for single-mode fiber.
- 5.7 When tested in accordance with FOTP-33, "Fiber Optic Cable Tensile Loading and Bending Test," using a maximum mandrel and sheave diameter of 560 mm, (22-inches) the cable shall withstand a tensile load of 2700 N (608 lbf). The change in attenuation shall not exceed 0.2 dB during loading and 0.1 dB after

loading at 1550 nm for single-mode fiber.

- 5.8 When tested in accordance with FOTP-85, "Fiber Optic Cable Twist Test," a length of cable no greater than 4 meters (13 feet) shall withstand 10 cycles of mechanical twisting. The change in attenuation shall not exceed 0.1 dB at 1550 nm for single-mode fiber.
- 5.9 When tested in accordance with FOTP-181, "Lightning Damage Susceptibility Test for Optic Cables with Metallic Components," the cable shall withstand a simulated lightning strike with a peak value of the current pulse equal to 105 kA without loss of fiber continuity. A damped oscillatory test current shall be used with a maximum time-to-peak value of 15 μ s (which corresponds to a minimum frequency of 16.7 kHz) and a maximum frequency of 30 kHz. The time to half-value of the waveform envelope shall be from 40 - 70 μ s.
- 5.10 When tested in accordance with FOTP-37, "Low or High Temperature Bend Test for Fiber Optic Cable", the cable shall withstand four full turns around a mandrel of ≤ 10 times the cable diameter for non-armored cables and ≤ 20 times the cable diameter for armored cables after conditioning for four hours at test temperatures of -30°C (-54°F) and +60°C (+126°F). Neither the inner or outer surfaces of the jacket shall exhibit visible cracks, splits, tears or other openings. Optical continuity shall be maintained throughout the test.

6.0 Quality Assurance Provision

- 6.1 All cabled optical fibers > 1000 meters (3280 feet) in length shall be 100% attenuation tested. The attenuation of each fiber shall be provided with each cable reel.
- 6.2 The cable manufacturer shall be ISO 9001 registered.

7.0 Packaging

- 7.1 The completed cable shall be packaged for shipment on non-returnable wooden reels. Required cable lengths shall be stated in the purchase order.
- 7.2 1.8m of cable length on each end of the cable shall be available for testing.
- 7.3 Both ends of the cable shall be sealed to prevent the ingress of moisture.
- 7.4 The minimum diameter of the reel shall be at least thirty times the diameter of the cable. The optical fiber cable shall be in one continuous length per reel with no factory splices in the fiber. Each reel shall be marked to indicate the direction the reel should be rolled to prevent loosening of the cable. Installation procedures and technical support information shall be furnished upon request.
- 7.5 Each reel shall have a weather resistant reel tag attached identifying the reel and

cable.

The reel tag shall include the following information:

Cable number	Gross weight
Shipped cable length in meters	Job order number
Manufacturer product number	Customer order number
Date cable was tested	Manufacturer order number
Cable length markings	Item number
a: Top (inside end of cable)	Cable manufacture date
b: Bottom (outside end of cable)	

The reel (one flange) marking shall include:

"Manufacturer Name"
Country of origin (i.e. USA)
An arrow indicating proper direction of roll when handling
Ship to address
Ship to "attention of" notice (when available)
Manufacturer cable number
Cable length in meters and/or feet
Gross package weight inclusive of cable, reel and protective covering
Customer purchase order (when available)
Fork lift handling illustration
"DO NOT SHIP REEL ON SIDE"

7.6 Each cable shall be accompanied by a cable data sheet.

The cable data sheet shall include the following information:

Manufacturer Cable Number	Manufacturer Product Number
Manufacturer Factory Order Number	Customer Name
Alternate Customer	Customer Cable Number
Customer Purchase Order Number	Alternate Code
Mark for Information	Ordered Length
Maximum Billable Length	Actual Shipped Length
Measured Attenuation of Each Fiber (for lengths > 1000 m (3280 feet))	

8.0 Optical Fiber Connectors

- 8.1 Optical fiber cables shall be provided with industry standard factory pre-connectorized single mode fiber connectors of the FC Ultra PC type. The optical fiber connectors shall be of the same manufacturer of the optical fiber cable.
- 8.2 Optical fiber connectors shall satisfy all of the interface parameters of equipment components as may be defined by the transmission equipment specification requirements.

92-526

ITEM #1113601A
ITEM #1113606A

- 8.3 Each connector shall have a maximum insertion loss of 0.5 dB for a mated pair.
- 8.4 Each connector shall have a maximum back-reflection loss equal or better than \leq -55 dB.
- 8.5 Each connector shall be capable of 100 repeated matings with maximum insertion loss increase of 0.25 dB.
- 8.6 All optical fiber connector assemblies shall be machine polished for low back-reflection
- 8.7 Unused single-mode fibers shall be terminated with a connector and protected by a suitable cap for preventing the intrusion of foreign material.

9.0 Miscellaneous

- 9.1 At the request of the Contractor, the cable manufacturer shall provide installation procedures and technical support concerning the items contained in this specification.

Construction Methods:

1.0 General

- 1.1 The cables specified herein shall be placed in conduit, as specified in the Plans. Optical fiber cables shall be installed in continuous lengths without intermediate splices throughout the project, except at the locations specified in the Plans
 - 1.1.1 The fibers shall not have any factory splices.
- 1.2 When ordering optical fiber cable the Contractor shall exercise extreme caution so as to ensure that no additional splicing, beyond that indicated in the Plans, shall be required. Should the Contractor believe additional splices are required, this matter shall be immediately brought to the attention of the Engineer for resolution.
- 1.3 The Contractor shall provide a thermalshrink sleeve dam or other appropriate wrapping at the beginning of the desheathed area so as to prevent loss of the aqueous gel filling from the remainder of the service drop cable.
- 1.4 Optical fiber cables shall be secured in racked positions with plastic ties. Water proof identification tags shall be securely attached to the cables in at least two locations in each cable termination point.
- 1.5 The Contractor's equipment, materials and installation procedures shall conform to all applicable codes and accepted industry standards and practices.

92-526

ITEM #1113601A
ITEM #1113606A

2.0 Cable Installation

- 2.1 Cable installation personnel shall be familiar with the cable manufacturer's recommended procedures including but not limited to the following:
 - 2.1.1 Proper attachment to the cable strength elements for pulling installation.
 - 2.1.2 Cable tensile limitations and the tension monitoring procedures.
 - 2.1.3 Cable bending radius limitations.
- 2.2 The Contractor shall comply with the cable manufacturer's installation specifications at all times.
- 2.3 The Engineer's approval of any submitted documentation shall in no way relieve the Contractor from compliance with the safety and performance requirements as specified herein.
- 2.4 Submittals required by this item shall include, but not be limited to, the following:
 - 2.4.1 A detailed optical fiber cable installation procedure including but not limited to the following:
 - A. Optical fiber cutting lengths reflecting the cable order and reel allocations.
 - B. Cable pulling plan which shall state the exact operational procedures to be utilized and which identifies the physical locations for the equipment placement, proposed equipment setup at each location, staffing, and pulling methodology for each type of cable.
 - C. Manpower proposed for all operations.
- 2.5 The Contractor shall use extreme care with the cables especially with regard to the minimum bending limitations.

3.0 Optical Fiber Cable Testing

- 3.1 The installed optical fiber cable shall be tested for compliance with the transmission requirements of this specification, the cable and hardware manufacturer's specifications, and prescribed industry standards and practices. The following tests shall be performed upon completion of the optical fiber cable installation and splicing. The Contractor shall notify the Engineer in writing 10 working days in advance, prior to commencing these tests.

- 3.1.1 The test recordings for all fiber cables shall be provided on documentation sheets in a form to be determined by the Engineer and submitted to the Engineer within two (2) weeks after termination of the fiber strands.
- 3.2 The types of acceptance test procedures recommended for the optical fiber cable system certification procedure are:
 - 3.2.1 Optical Time Domain Reflectometer (OTDR) Testing
 - 3.2.3 Insertion Loss Testing
- 3.3 The Contractor shall use *Optical Time Domain Reflectometer (OTDR) Testing* to insure that each fiber is one continuous length and meets the specifications of the manufacturer and cognizant industry standards.
 - 3.3.1 The OTDR test shall provide test measurements and documentation for the installed system. The OTDR test shall be generated into a hard copy report and an electronic file on a floppy disk for the purpose of developing historical "as-build" documentation regarding the cable's condition as installed. The OTDR test report and floppy disk documentation shall be provided to the Engineer in an organized and acceptable format as approved by the Engineer.
 - 3.3.2 Upon installation and connectorization of optical fiber cables, all optical fiber cable and connectors shall be tested by the Contractor using OTDR. Fiber strands failing this test shall be reterminated and retested.
 - 3.3.3 The Contractor shall provide the Engineer with information regarding OTDR test equipment type, manufacturer and model number with the equipment calibration procedures prior to conducting the test routine.
 - 3.3.4 The Contractor shall perform an end-to-end transmission quality test for each optical fiber utilizing and OTDR with recording capability. The test shall be performed to record both attenuation and discontinuities. The OTDR shall be equipped with a 1310nm and 1550 nm light source for single mode optical fibers. The OTDR shall be capable of writing to a floppy disk or configured with an X-Y plotter to provide a hard copy record of each test measurement. The OTDR shall be equipped with sufficient internal masking to allow the entire cable section to be tested.
 - 3.3.5 Each single mode splice shall be tested for optical loss using and OTDR. Each splice shall be tested in both directions at 1550 nm. An OTDR X-Y plot shall be provided for each splice measurement. The splice loss shall meet or exceed the requirements described in ITEM #1112241A - Fiber Optic Splice Enclosure. Splice enclosures failing this test shall be reterminated and retested. The OTDR shall be calibrated for the correct index of refraction to provide proper length measurement for the known length of referenced fiber.

- 3.3.6 Each single mode fiber shall be tested for end-to-end optical loss using a precision light source and optical power meter. Each single mode fiber shall be measured at 1550 nm in both directions subsequent to field and pigtail splicing.
- 3.4 The Contractor shall conduct *Insertion Loss Testing* of all installed and terminated optical fiber strands. Testing shall be conducted at 1550nm for single mode fiber cable. The insertion loss test measurement for each fiber on each fiber cable shall be documented by the Contractor and provided to the Engineer. Total end-to-end loss for each fiber on each cable shall be within the cable manufacturer's specifications. If the total end-to-end loss is not within the manufacturer's specifications, then the Contractor shall take corrective measures to bring the cable's insertion loss into compliance with the manufacturer's specifications, including replacement of the cable.
- 3.5 The Contractor shall provide the Engineer with information regarding *Insertion Loss Testing* equipment type, manufacturer and model number with the equipment calibration procedures prior to conducting the test routine.

Method of Measurement:

This item shall be measured for payment by the actual number of feet of "Optical Fiber Cable" of the type and size specified, installed, tested and accepted in place with all necessary appurtenances.

Basis of Payment:

This item will be paid at the contract unit price per foot for "Optical Fiber Cable" of the type and size specified which shall include all material, labor, tools, equipment, test equipment, optical fiber connectors and work incidental thereto required to furnish and install fully functioning optical fiber cable as specified.

ITEM # 1114201A – AUXILIARY EQUIPMENT CABINET

Description:

Furnish and install an Auxiliary Equipment Cabinet (AEC), at the location shown on the plans and in accordance with the conditions set forth.

Materials:

Conform to NEMA 3R enclosure specifications
Type 5052-H32, 3.175mm (0.125) sheet aluminum
Finish painted in accordance with the current DOT specifications of Traffic Control Cabinets
Seams continuously welded and ground smooth
Dimensions; 16" Hx14"Wx13"D w/appropriately sized aluminum back panel
Door secured with Corbin lock #2
Continuous door hinge, 2.4mm (.093") thick aluminum with 0.64mm (0.125") stainless steel hinge pin
Door sealed with oil resistant gasket
Rust and corrosion resistant mounting hardware
Screened vent

Construction Methods:

Mount the AEC on the side of pole indicated on the plans using a pole mounting plate

Method of Measurement:

This item shall be measured for payment by the actual number of Auxiliary Equipment Cabinets installed and accepted.

Basis of Payment:

This item shall be paid for at the contract unit price each for "Auxiliary Equipment Cabinet" which price shall include mounting hardware, close nipple, insulated bushings, tools and incidentals.

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

Work under this item shall conform to Section 11.18 supplemented and amended as follows:

Article 11.18.03 - Construction Methods:

Delete the first sentence of paragraph six (6). Add the following paragraphs:

All salvage material shall be delivered to the City of New Haven. Contact at least 24 hours prior to delivery.

The Contractor shall dispose of all traffic signal appurtenances not designated as salvage.

The Contractor is to supply all necessary manpower and equipment to load, transport and unload, per the Materials Manager's direction. The condition of the material shall be determined by the State Inspector.

The following is a list of items that are designated as salvage:

FORM 815 SEC. NO.	DESCRIPTION	QTY	STOCK NO.
Route	Description		INT. #00-000
	Aluminum Pedestal		
	Steel Span Pole		
	Traffic Signals		
	Traffic Controller		
	Cabinet (complete)		
	Cable		
	Pedestrian Signals		
	Pedestrian Push Buttons & Signs		

ITEM #1118101A - TEMPORARY SIGNALIZATION

Description:

This item shall consist of furnishing, installing, maintaining, relocation and removal of existing, temporary and proposed traffic signal equipment, interconnect and its necessary hardware in conformance with these and applicable specifications and with Department standards.

Materials:

All materials used for temporary signalization shall conform to the pertinent articles of the Standard Specifications Form 814A and the special provisions contained in this contract.

Construction Methods:

The Contractor shall submit to the Engineer for approval, a simplified plan, outlining the temporary signalization. In no case will the Contractor be allowed to revise an installation without prior knowledge and approval by the Division of Traffic Engineering.

Temporary signalization shall be in effect starting when the Contractor relocates traffic signal equipment for any reason, such as road construction or installation of new traffic signal equipment. The Contractor shall be responsible for maintenance on all equipment during Temporary Signalization. The Engineer shall record the date Temporary Signalization begins for each site and shall notify the City of New Haven, D.O.T. District Electrical Maintenance Office and the Local Police Department that maintenance responsibility has been transferred to the Contractor.

The Contractor shall be billed for all maintenance calls to the traffic signal performed by D.O.T. technicians and electricians during Temporary Signalization. D.O.T. personnel will be called to repair the traffic signal only when by the judgement of the Engineer the nature of the malfunction requires immediate attention which the Contractor cannot support.

Temporary signalization shall terminate at the time the new installation is in a permanent condition (successful completion of the 30-day test period or the revision has been completed) and has been accepted by the Engineer.

All equipment shall be removed in such a manner as to cause hazard to pedestrians, traffic or property. If necessary, flagmen shall be used to halt traffic briefly while work is in progress. When the revision requires the relocation of existing equipment, the work shall be accomplished as expeditiously as practical.

During Temporary Signalization, all existing equipment shall remain the property of the owner prior to Temporary Signalization. Temporary equipment supplied by the Contractor will remain his property at the completion of the project unless noted on the plan. All existing equipment that is removed and is designated as salvage, shall be returned to the previous owner.

The Contract shall be responsible for obtaining secondary service required for continuous operation of the temporary traffic control signals. The party previously responsible for payment of electrical energy shall continue to be responsible during Temporary Signalization, unless otherwise directed by the Engineer.

Intersections that receive temporary signalization as a result of a detour or other construction activities, and will have the temporary signal equipment removed when no longer needed, shall have a metered service. The electrical energy shall be the responsibility of the Contractor.

The Contractor shall provide to the Engineer and the local Police Department, a list of telephone numbers of personnel who will be responsible for the maintenance of the temporary traffic signals during normal working hours and after normal working hours. Traffic signal malfunctions must be responded to within a maximum of three hours. The intersection must be back in operation within a maximum of 24 hours.

Method of Measurement:

Temporary signalization shall be paid for on a percentage of the contract **Lump Sum** price per intersection. Fifty percent (50%) shall be paid when temporary signalization starts and fifty percent (50%) shall be paid when temporary signalization terminates.

Basis of Payment:

Established contract items, such as Trenching and Backfilling, Rigid Metal Conduit (Type), Loop Detector Sawcut and Cable, which are required to maintain detection, shall be paid for at the contract unit price. All other items required shall be included in the contract **Lump Sum** price for "Temporary Signalization (Site No.)" for each site.

ITEM #1204122A – INSTALL CITY FURNISHED SIGNS

Description:

This item shall consist of installing signs of the type specified, furnished by the City of New Haven locations indicated on the plans or as ordered and in conformance with the plans and these specifications. The Contractor shall furnish metal sign posts, span-mounted sign brackets, mast arm-mounted sign brackets or parapet mounted sign supports.

Material:

All signs shall be furnished by the State. Metal sign posts and parapet mounted sign supports shall conform to the requirements of Article 18.14. Sign mounting bolts shall conform to the requirements of Article 18.15.

Construction Method:

The Contractor shall arrange a schedule to pick-up the sheet aluminum signs from the City of New Haven 45 days in advance to schedule a pick-up of signs. In addition, the Contractor shall telephone 24 hours prior to the scheduled date to confirm the location and time of pick-up. Telephone. A storage fee of ten dollars per day per sign shall be charged to the Contractor for any signs not picked-up on the scheduled date.

The Contractor shall sign a receipt listing all signs furnished by the City. All signs provided by the City shall be transported and stored if necessary with care. It shall be the Contractor's responsibility from the time of pick-up until the signs are installed and accepted to repair or replace any signs damaged during delivery or during installation.

Metal sign posts shall be driven, level and plumb. Parapet-mount sign supports shall be installed as shown on the plans and shall be level and plumb. Augered holes for the installation of sign posts will not be allowed.

Basis of Payment:

This work will be paid for at the contract lump sum price for "Install City Furnished Signs" of the type specified complete in place which price shall include transportation from the pick-up source to the location, storage, metal sign post(s), span-mounted sign brackets and mast arm-mounted sign brackets, mounting hardware, including reinforcing plates and all materials, equipment, labor and work incidental thereto. Excepted therefrom will be the price for parapet-mounted sign supports which will be paid for as structural steel.

ITEM #1206023A - REMOVAL AND RELOCATION OF EXISTING SIGNING

Section 12.06 is supplemented as follows:

Description:

Work under this item shall consist of the removal and/or relocation of designated signs, sign supports and foundations where indicated on the plans or as directed by the Engineer.

Construction Method:

An existing sign and its support(s) designated for removal shall be removed the same day that the replacement sign is installed.

All sheet aluminum signs designated for removal are to be salvaged. The Contractor shall sort all sheet aluminum signs by size and shall stack ten signs to a bundle. Each bundle shall be bound by tape or metal strap. The bundles shall be stacked on pallets and returned to the City of New Haven.

The Contractor shall confirm intended delivery at least two days in advance.

Any signs, sign supports or foundations designated for removal which are not to be salvaged or relocated shall be removed and disposed of by the Contractor as directed by the Engineer and in accordance with existing standards for removal of signing.

Relocation of designated signs shall be accomplished in such a manner that voids in signing are held to a minimum.

An existing sign and its support(s) designated for relocation shall be carefully removed and reinstalled at the new location where indicated on the plans or as directed by the Engineer and in accordance with existing standards for sign installation.

Method of Measurement:

Payment shall be at the contract lump sum price, which shall include all signs and sign supports designated for relocation, all signs and sign supports designated for salvage, all signs and sign supports and foundations designated for removal and disposal and all work and equipment required.

Basis of Payment:

This work will be paid for at the contract lump sum price for "Removal and Relocation of Existing Signing" which price shall include relocating designated signs and sign supports and removing and disposing of designated signs, sign supports and foundations, salvage of sheet aluminum signs, and all equipment, materials, tools and labor incidental thereto.

Any sign, sign support(s) and hardware used for attachment that becomes damaged or defaced so that it is not effective, in the opinion of the Engineer, shall be replaced by the Contractor at no cost to the State.

<u>Pay Item</u>	<u>Pay Unit</u>
Removal and Relocation of Existing Signing	L.S.

ITEM #1301081A - 6" DUCTILE IRON PIPE (WATER MAIN)
ITEM #1301082A - 8" DUCTILE IRON PIPE (WATER MAIN)
ITEM #1301084A - 12" DUCTILE IRON PIPE (WATER MAIN)
ITEM #1302003A - 6" GATE VALE
ITEM #1302004A - 8" GATE VALVE
ITEM #1302006A -12" GATE VALVE
ITEM #1302159A - 12" CAP (WATER MAIN)
ITEM #1302174A - 8" CAP (WATER MAIN)
ITEM #1303198A - HYDRANT (WATER MAIN)
ITEM #1305000A - VAULT

DESCRIPTION:

Work under this item shall include domestic and fire protection mains, hydrants, vaults, backflow preventers, meters and meter pits, valve insertions, plugging pipes and tapping of existing mains.

Ductile iron pipe shall include the fittings.

Hydrants shall include; hydrant, gate valve, valve box and cover, concrete collar, connector piece, thrust blocks and bedding.

Gate valves shall include valve, thrust block, valve box and cover and polyethylene tube.

Vaults will include all work to furnish and install the precast vaults. Excavation will be paid as trench excavation.

Work to tie into existing city water mains and all work to install pipe up to and inside the vault off of Church Street South Extension will be performed by the Regional Water Authority and will not be included in this item.

Coordinate work for plugging water mains at property line and vault at Church Street South Extension with the New Haven Regional Water Authority, 90 Sargent Drive, New Haven, CT 06511, Attn.: Mr. David Johnson (Tel. No. 203-401-2580).

Cap pipe includes cutting existing pipe and installing mechanical joint cap and restraint at the locations shown on the plans or as directed by the Engineer.

Submittals:

Product data for pipe, hydrant, valves and identification devices.

Shop drawings for precast concrete meter and valve pit including frames and covers. Include structural calculations stamped by a Connecticut Registered Professional Engineer.

Contractor shall field verify water main profiles and crossings and submit as-built drawings at end of job.

Quality Assurance:

Comply with requirements of Engineer supplying water to the project

Delivery, Storage and Handling:

Preparation for Transport: Prepare valves for shipping as follows:

1. Ensure valves are dry and internally protected against rust and corrosion.
2. Protect valves against damage to threaded ends, flange faces, and weld ends.
3. Set valves in best position for handling. Set gate valves closed to prevent rattling.

Storage: Use the following precautions for valves during storage:

1. Do not remove end protectors unless necessary for inspection then reinstall for storage.
2. Protect valves from weather. Store valves indoors. Maintain valve temperature higher than the ambient dew point temperature. If outdoor storage is necessary, support valves off the ground or pavement in watertight enclosures.

Handling: Use a sling to handle valves whose size requires handling by crane lift. Rig valves to avoid damage to exposed valve parts. Do not use handwheels or stems as lifting or rigging points.

Project Conditions:

Site information: Perform site survey, research Engineer's utility records, and verify existing utility locations. Verify that water service piping may be installed in compliance with the original design and referenced standards.

Sequencing and Scheduling:

Coordinate connection to water main with the Engineer and Water Resources Authority.

Coordinate with interior water distribution piping.

Coordinate with other utility work.

MATERIALS:

Pipe and Related Items:

Ductile Iron Pipe 4" and Larger: Shall be AWWA C151, Class 56.

Ductile Iron Pipe shall be mechanical joint, flanged or push-on as stated on plans and in these specifications.

Lining: AWWA C104, cement mortar, sealcoated.

Gaskets: AWWA C111.

Ductile Iron and Cast Iron Fittings: AWWA C110, ductile iron or cast iron, 250-psi pressure rating; or AWWA C153, ductile iron compact fittings, 350-psi pressure rating.

Fittings shall be mechanical joint.

Lining: AWWA C104, cement mortar.

Gaskets: AWWA C111, rubber.

Encasement: AWWA C105, polyethylene film tube.

Concrete for thrust blocks shall be Class 'A' Concrete and conform to M.03.01 of the Standard Specification Form 814A.

Identification:

Plastic Underground Warning Tapes: Polyethylene plastic tape, 6 inches wide by 4 mils thick, solid blue in color with continuously primed caption in black letter "CAUTION - WATER LINE BURIED BELOW".

Granular Fill shall conform to requirements of Section M.02.01.

Ductile Iron Fittings:

AWWA C110, ductile iron, 250-psi pressure rating; or AWWA C153, ductile iron compact fittings, 350-psi pressure rating; of dimension to match pipe outside diameter, mechanical joint.

Lining: AWWA C104, cement mortar.

Gaskets: AWWA C111, rubber.

Encasement: AWWA C105 Polyethylene film tube for ductile iron fittings.

Valves:

Rising Stem Gate Valves 3" and Larger AWWA C509, resilient seated; cast Iron or ductile iron body and bonnet, OS&Y, bronze stem, 250 psi working pressure, mechanical joint.

Cast Iron Valve Boxes shall be of the slide type with five inch shaft. Covers shall be cast iron and shall have the word "WATER" cast on them.

Encasement: AWWA C105 Polyethylene film tube for ductile iron or cast iron fittings.

Vault:

Precast concrete. Design vault for AASHTO HS-20 Loading water tight and with sufficient bottom slab ballast to overcome groundwater buoyancy. Coordinate with the Regional Water Authority.

Cap Pipe:

Cap Pipe shall be a mechanical joint cap and conform to ANSI/AWWA C10/A21.10. The mechanical joint restraint shall be a wedge action retainer. The mechanical joint restraining device shall have a water working pressure rating of 350 psi minimum (in sizes 4" thru 16") with a safety factor of at least 2:1 against separation when tested in a dead end situation. The restraint shall have wedges that tighten against the pipe by a screw.

Hydrants:

Hydrants shall be 5¼" hydrants with two 2 ½" hose nozzles and one 4 ½" pumper nozzle.

Hydrants shall open left. Operating nut shall be pentagonal shape 1 5/8" point to flat. Threading of hose and pumper nozzles shall be "National Standard". Connection to main shall be 6" mechanical joint.

The hydrant shall be Metropolitan 250, Model 94 manufactured by U.S. Pipe and Foundry Co. or approved equal. It must comply with AWWA standard C-502 of latest revision.

Concrete for thrust blocks shall be Class "A" Concrete as specified in Article M.03.01.

CONSTRUCTION METHODS:**Preparation of Buried Pipe Foundation:**

Grade trench bottom to provide a smooth, firm, stable and rock free foundation throughout the length of the piping.

Remove unstable, soft and unsuitable materials at the surface upon which pipes are to be laid and backfill with granular fill to indicated level. Compact fill in 6" lifts.

Shape bottom of trench to fit bottom of piping. Fill unevenness with tamped granular backfill. Dig bell holes at each pipe joint to relieve the bells of all loads and to ensure continuous bearing of the pipe barrel on the foundation.

Installation of Pipe and Pipe Fittings:

Ductile Iron Pipe: Install with cement mortar lined, ductile iron or cast iron, mechanical joint and rubber gaskets in accordance with AWWA C600.

1. Polyethylene Encasement Install in accordance with AWWA C105 (open trench only).

Depth of Cover: Provide minimum cover over piping of 12 inches below average local frost depth or 36 inches below finished grade, whichever is greater.

Installation of Valves:

General Application: Use mechanical joint and valves for 3" and larger buried installation. Use threaded and flanged end valves for installation in pits.

AWWA Type Gate Valves: Comply with AWWA C600. Install buried valves with stem pointing up and with cast iron valve box.

Bronze Corporation Stops and Curb Stops: Comply with manufacturer's installation instructions. Install buried curb stops with head pointed up and with cast iron curb box.

Installation of Anchorages:

Anchorage's: Provide anchorages for tees, plugs and caps, bends, crosses, valves and hydrant branches.

Application of Protective Coatings: Install polyethylene film tube per manufacturer's instructions.

Apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of installed ferrous anchorage devices.

Installation of Hydrants:

Install hydrants in pavement or with concrete anchor, and provision for drainage into dry well, as indicated.

Installation of Identification:

Install continuous plastic underground warning tape during backfilling of trench for underground water service piping. Locate 6 to 8 inches below finished grade, directly over piping.

Installation of Vaults:

Install precast vaults at locations shown on plans.. Water piping, valves and meters in vault will be installed by WRA.

Installation of Pipe Cap:

Install pipe cap after pressure has been relieved. Cut existing pipe, clean pipe outer surface and install mechanical joint cap and restrainer. Tighten the screws on the restrainer which seats the wedges against the pipe. Tighten the screws per manufacturers instructions.

Installation of Thrust Blocks:

Thrust Block will be poured against undisturbed soil Concrete will be poured to the dimensions shown on the plans and in accordance with Article 6.01.02 of the Standard Specifications Form 814A.

Field Quality Control:

Piping Tests: Conduct piping tests before joints are covered and after thrust blocks have sufficiently hardened. Fill pipeline 24 hours prior to testing and apply test pressure to stabilize system. Use only potable water.

Hydrostatic Tests: Test at not less than 1 times working pressure for 2 hours.

Increase pressure in 50 psi increments and inspect each joint between increments. Hold at test pressure for one hour; decrease to 0 psi. Slowly increase again to test pressure and hold for one more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within above limits.

Due to the stage construction of the water piping, testing will be done in sections.

Cleaning and Disinfection:

Clean and disinfect water distribution piping as follows:

1. Purge all new water distribution piping systems and parts of existing systems that have been altered, extended or repaired, prior to use.
2. Use the purging and disinfecting procedure prescribed by the authority having jurisdiction or, case a method is not prescribed by that authority, use the procedure described in AWWA C651 or as described below:
 - a. Fill the system or part of thereof with a water/chlorine solution containing at least 50 parts per million of chlorine. Isolate (valve off) the system or part thereof and allow to stand for 24 hours.

- b. Drain the system or part thereof of the previous solution and refill with a water/chlorine solution containing at least 200 parts per million of chlorine and isolate and allow to stand for 3 hours.
- c. Following the allowed standing time, flush the system with clean, potable water until chlorine does not remain in the water coming from the system.
- d. Submit water samples in sterile bottles to the authority having jurisdiction. Repeat the procedure if the biological examination made by the authority shows evidence of contamination.

Prepare report for all purging and disinfecting activities.

METHOD OF MEASUREMENT:

Ductile Iron Pipe: This work shall be measured for payment by the actual linear feet of pipe including fittings installed and approved by the Engineer.

Hydrants: This work shall be measured for payment by the actual number of hydrants installed and approved by the Engineer.

Gate Valves: This work shall be measured for payment by the actual number of gate valves installed and approved by the Engineer. Not included shall be gate valves covered under "Hydrants" item.

Vault: This work shall be measured for payment by the actual number of vaults installed and approved by the Engineer.

Cap (Water Main): This work shall be measured for payment by the actual number of caps installed and approved by the Engineer.

BASIS OF PAYMENT:

Ductile Iron Pipe: This work shall be paid for at the contract unit price per linear foot of "(Size) Ductile Iron Pipe (Water Main)" successfully installed. This payment shall include pipe, connections, fittings, tape, concrete thrust blocks, polyethylene wrap, air vents, testing, cleaning, materials, equipment and labor. Excavation will be paid under item "Trench Excavation". Granular material shall be paid for as "Granular Fill".

Hydrants: This work shall be paid for at the contract unit price per each for "Hydrant (Water Main)" successfully installed. Payment shall include hydrant, gate valve, valve box and cover, concrete, connector piece, thrust blocks, bedding, all materials, equipment and labor.

Gate Valves: This work shall be paid for at the contract unit price per each "(Size) Gate Valve" successfully installed. Payment shall include valves, curb boxes and covers and concrete collars and all materials, equipment and labor.

Vaults: This work shall be paid for at the contract unit price per each "Vault" successfully installed. Payment includes precast vault, all interior accessories and all materials, equipment and labor.

Cap (Water Main): This work shall be paid at the contract unit price per each "(Size) Cap (Water Main)" successfully installed. Payment shall include cap, bolts, restrainer gland and all material, labor and equipment. Excavation shall be paid as "Trench Excavation".

Excavation will be paid under the item "Trench Excavation (0'-X)".

<u>Pay Item</u>	<u>Pay Unit</u>
6" Ductile Iron Pipe (Water Main)	Linear Foot
8" Ductile Iron Pipe (Water Main)	Linear Foot
12" Ductile Iron Pipe (Water Main)	Linear Foot
6" Gate Valve	Each
8" Gate Valve	Each
12" Gate Valve	Each
8" Cap (Water Main)	Each
12" Cap (water Main)	Each
Hydrant (Water Main)	Each
Vault	Each

ITEM #1303230A - FIRE SUPPRESSION STANDPIPE SYSTEM

Description:

This work shall consist of furnishing, fabricating, transporting and installing a dry standpipe and all appurtenances for fire protection at the location shown on the plans and in accordance with this specification.

All work shall conform to the requirements of the National Fire Protection Association's "NFPA 14 - Installation of Standpipe and Hose Systems", 1986 edition, and the AASHTO "Standard Specifications for Highway Bridges".

Materials:

Pipe Supports

Structural steel for support members and anchorage plates shall conform to the requirements of ASTM A709, Grade 36 and shall be galvanized after fabrication to meet the requirements of ASTM A123.

Threaded rods, anchor bolts, bolts and nuts shall conform to the requirements of ASTM A325 and shall be galvanized to meet the requirements of ASTM A153.

Threaded concrete inserts shall be compatible with the threaded rods and capable of developing the required loads as shown on the plans.

A Certified Test Report will be required in accordance with Article 1.06.07, certifying the conformance of the materials to the requirements set forth in this specification. Should the consignee noted on a Certified Test Report be other than the Prime Contractor, the Materials Certificates shall be required to identify the shipment.

Inlets and Outlets

The top of each standpipe shall have a 3-way roof manifold consisting of a cast brass 6" inlet and three 2 1/2" outlets. Three 2 1/2" dia. hose valves shall be mounted on these outlets. The outlets of the hose valves shall be 2 1/2" male National Standard Fire Hose Thread. The inlet shall have threads to match the standpipe. Provide chained caps for the 2 1/2" hose valve outlets.

The bottom of each standpipe system shall have a three-way, size 6" x 2 1/2" x 2 1/2" x 2 1/2" manifold with female National Standard Fire Hose Thread on the 2 1/2" dia. inlets and threads to match the stand pipe on the 6" outlets. The 2 1/2" inlets shall have furnished with chained plugs. The inlets shall be equipped with clapper valves.

Provide at the bottom of each standpipe as shown on the plans, a 3/4" drain outlet with a 3/4" normally open drain valve to spill on grade. Provide a sign at each inlet fitting "DRY STANDPIPE: OPEN DRAIN VALVE AFTER USE".

All cast brass units shall be painted an approved yellow.

Steel Pipe, Fittings and Couplings

Pipe shall be mild steel, seamless or welded, Schedule 40, galvanized, ASTM A53, with threaded or cut grooved connections, as indicated on the plans. No rolled groove connections will be permitted. Fittings shall be malleable iron threaded Class 150, galvanized, ANSI/ASTM B16.3, and ductile iron fittings for grooved connections, galvanized.

Pipe couplings shall be ductile iron, galvanized, at least 500 psi maximum working pressure and 24,000 psi maximum end pressure, flexible or rigid type, as indicated on the Contract Drawings. Flexible couplings shall be Victualic Style 77 or approved equal, rigid couplings shall be Victualic Style 07 Zero-Flex or approved equal. Gaskets for grooved connections must be as recommended by the couplings manufacturer for the required service.

Other acceptable manufacturers of fittings and couplings for grooved connections are: ITT Grinnell Co. and Gustin-Bacon Corp. All fittings, couplings and gaskets for grooved connections must be from one manufacturer.

Expansion Joints

Expansion Joints shall be of a multiple cut grooved couplings type as manufactured by Victaulic Co., Style 155 or approved equal.

Expansion Joints shall be provided where indicated on the drawings to provide compensation for pipe expansion and contraction due to the changes of the ambient temperature. Number and arrangement of the expansion joint element shall be as indicated on the Contract Drawings and as recommended by the manufacturer of the joints.

Expansion joints shall be galvanized and provided with gaskets suitable for the required service.

Pipe Guides

Pipe Guides shall be as shown on the drawings. All elements of the guide shall be galvanized.

Pipe Anchors

Pipe Anchors shall be as shown on the drawings, or as manufactured by ITT Grinnell Co., Fig. 198, or approved equal. All elements of the anchor shall be galvanized. U-bolts shall be tightened securely to provide reliable anchoring of the pipe.

Galvanizing

Areas in which galvanizing has been damaged shall be given two (2) coats of zinc paint conforming to the requirements of the Federal Specification TT-P-641b or Military Specification MIL-P-21035.

Construction Methods:

Shop Drawings: Prior to the commencement of work and fabrication of any materials, the Contractor shall take all field measurements necessary to assure proper fit of the finished standpipe assemblies, and shall submit shop drawings to the Engineer for approval in accordance with Article 1.05.02-3. These drawings shall include, but not be limited to the following information:

- a. A layout plan and elevation indicating pipe lengths for vertical and horizontal standpipe runs including location, type and number of fittings, couplings, supports and appurtenances for each location.
- b. Commercial items shall be identified by manufacturer, trade name and catalog number. Catalog sheets, including pertinent specifications, shall be included with the submission.
- c. All pipe supports, as shown on the plans, shall be detailed.
- d. All field measurements shall be submitted for reference.

Welding of pipe joints and welding of piping to supports shall not be permitted.

All pipe, fittings and such other items shall be carefully examined for defects immediately prior to installation and no pipe or fittings shall be laid which is known to be defective in any way. Any pipe or fittings discovered as defective after laying shall be promptly removed and replaced at no additional cost to the State. Proper and suitable tools and equipment for the safe and convenient handling and laying of the pipe, fittings and appurtenances shall be used, and great care shall be taken to prevent damage to the pipe coating and lining.

Pipe and fittings shall be thoroughly cleaned before being installed and shall be kept clean until accepted in the completed work. Open ends shall be closed with wooden or other suitable bulkheads at all times when pipe laying is not actually in progress.

Jointing of pipe or fittings shall be made only by persons thoroughly skilled in this work. All adjoining parts shall be thoroughly cleaned and inspected and the jointing done in strict accordance with the manufacturer's recommendations.

Testing: Upon completion of the installations, each standpipe system shall be tested by the City of New Haven Fire Department in accordance with NFPA-14 - "Installation of Standpipe and Hose Systems".

At the completion and acceptance of the test, the standpipe system shall be drained.

All visible leaks in the joints shall be stopped and any cracked or defective pipe, or fittings shall be removed and replaced.

Method of Measurement:

This work will be paid for at the contract unit price per each "Fire Suppression Standpipe System" installed and approved by the Engineer.

Basis of Payment:

This work will be paid for at the contract unit price per each "Fire Suppression Standpipe System", complete and accepted in place, which price shall include furnishing, fabricating, transporting, installing, surface preparation, galvanizing, and all materials, equipment, tools and labor incidental thereto.

ITEM #1400104A - 12" POLYVINYL CHLORIDE PIPE FOR SANITARY SEWERS
ITEM #1400108A - 24" POLYVINYL CHLORIDE PIPE FOR SANITARY SEWERS
ITEM #1401984A - 18" POLYVINYL CHLORIDE PIPE FOR SANITARY SEWERS

Description:

These items shall consist of furnishing and installing polyvinyl chloride pipe for sanitary sewers where shown of the plans.

Materials:

The pipe shall conform to the requirements of Subarticle M.08.01-28 and the following:

The pipe shall have pipe diameter to wall thickness ratio (SDR) of a maximum of 35, unless otherwise indicated and/or approved by the Authority. Closed profile pipe shall have a minimum stiffness of 46 psi for 18 inch to 27 inch PVC sewer pipe and minimum stiffness of 50 psi for 30-inch diameter PVC pipe.

Joints shall conform to ASTM D3212. Provide push-on bell and spigot joints with elastomeric ring gaskets.

Provide gaskets conforming to ASTM F477; resistant to common ingredients of sewage and industrial wastes, including oils and groundwater; and capable of enduring permanently under conditions of proposed use. Fix gaskets into place in bell to avoid dislodging during joint assembly.

Construction Methods:

The pipe shall be installed in accordance with Section 6.51 and the following:

The pipe shall be installed in a bedding of sand or screened gravel.

For the section of pipe under the box culvert, encase the pipe in concrete as shown on the plans.

Follow directions of joint material and pipe manufacturers when installing gaskets and joints to render them watertight and flexible.

After bedding pipe, place and compact bedding material between pipe and sides of trench. Use extra care to compact bedding material under lower half of pipe. Fill bell holes with bedding material and compact. Places compact bedding material as indicated on the Drawings.

Perform a low pressure air test as follows:

1. Testing shall be by low pressure air test after installation of service fittings and leads, and after completing backfill of the sanitary sewer trench. The Engineer will be present during all testing.

2. The low pressure air test shall be conducted in compliance with the following:
 - a. After completing backfill of the sewer line, the Contractor shall, at his expense, conduct a Line Acceptance Test using low pressure air.
 - b. The test shall be performed under the supervision of an inspector of the sewer district.
3. Equipment used shall meet the following minimum requirements:
 - a. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.
 - b. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.
 - c. All air used shall pass through a single control panel.
 - d. Three individual hoses shall be used for the following connections:
 - 1) From control panel to pneumatic plugs for inflation.
 - 2) From control panel to sealed line for introducing the low pressure air.
 - 3) From sealed line to control panel for continually monitoring the air pressure rise in the sealed line.
 - 4) Procedures: All pneumatic plugs shall be seal tested before being used in the actual test installation. One length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. Air shall be introduced into the plugs to 25 psi. The sealed pipe shall be pressurized to 5 psi. The plugs shall hold against the pressure without bracing and with movement of the plugs out of the pipe.
 - 5) After a reach of pipe has been backfilled and cleaned, and the pneumatic plugs are checked as specified, the plugs shall be placed in the line and inflated to 25 psi. Low pressure reaches 4 psi greater than the average back pressure of ground water that may be over the pipe. Two minutes minimum shall be allowed for the air pressure to stabilize.
 - 6) After the stabilization period (3.5 psi minimum pressure in the pipe), the air hose from the control panel to the air supply shall be disconnected. The portion of line being tested shall be termed "acceptable" if the time required in minutes for the pressure to decrease from 3.5 to 2.5 psi (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than the time shown for the given diameters in the following table:

Pipe Diameter (in inches)	Minutes
4	2.0
6	3.0
8	4.0
10	5.0
12	5.5
15	7.5
18	8.5
21	10.0
24	11.5

In areas where ground water is known to exist, the Contractor shall install a 1/2 inch diameter capped pipe nipple, approximately 10 inches long, through the manhole wall on top of one of the lines entering the manhole. This shall be done at the time the line is installed. Immediately prior to the performance of the Line Acceptance Test, the ground water shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the nipple. The hose shall be held vertically and a measurement of the height in feet shall be divided by 2.3 to establish the pounds of pressure that will be added to all readings. (For example, if the height of water is 11 feet, then the added pressure will be 5 psi, and the 2.5 psi increased to 7.5 psi. The allowable drop of one pound and the timing remain the same.)

- 7) If installation fails to meet the above requirements for the air test, the Contractor shall correct the pipeline until an acceptable test is achieved.
- 8) The Contractor shall provide as required the proper plugs, weirs, and other equipment required to perform all tests.
- 9) The tests shall be conducted at all times in the presence of the Engineer and the sewer district's inspecting engineer. Should a line which has previously been tested indicate any water infiltration, or otherwise appear suspect to the Engineer, the Contractor shall conduct confirmation air tests on the line, at no additional cost to the Department.

Method of Measurement:

Pipe will be measured for payment by the actual linear feet of pipe completed and accepted and measured in place along the invert.

Basis of Payment:

Pipe will be paid for at the contract unit price per linear foot of pipe, complete in place, including all materials, equipment, tools and labor incidental thereto.

ITEM #1403001A – MANHOLE (SANITARY SEWER)

ITEM #1403002A – MANHOLE OVER 10' DEEP (SANITARY SEWER)

ITEM #1403085A – MANHOLE WITH 6' DIAMETER – OVER 10' DEEP (SANITARY)

Materials:

Materials shall conform to the applicable requirements of Article M.08.02 and the following:

Cast iron catch basin frame & manhole frames & covers – Cast iron shall conform to American Society of Testing Materials (ASTM) Standard Specification for grey iron castings, ASTM Designation A 48 Class 25 B for frames & 30 B for covers.

Castings shall be boldly filleted at angles and the arrises shall be sharp and perfect. They shall be true to pattern in form and dimensions, free from pouring faults, spongness, cracks blowholes and other defects in positions affecting their strength and value for the service intended.

Castings shall be sand blasted or otherwise effectively cleaned of sand and scale, so as to present a smooth, clean and uniform surface before inspection.

The following portions of the covers and frames shall be machined:

Frame - Horizontal surface to receive the cover:

Cover - Under surface which rests on frame.

After machining, it shall not be possible to rock any cover when it is sealed in any position in its associated frame.

Manufacturer's name and catalog number must be cast on each frame and cover.

No frame and cover shall weigh less than 90% of weight indicated below.

Catch basin frames shall be cast in substantial permanent steel forms, so constructed that no overall dimension of a casting shall vary more than one-quarter inch over or under the specified dimension, and so that the frame for the inlet grate is in the desired position in the completed unit. Suitable provision shall be made in precasting the units for convenient handling of the completed unit and additional reinforcement steel shall be provided to allow for such handling.

Precast units shall be cured in accordance with AASHO M-170. Steel grates shall be galvanized in accordance with Connecticut Department of Transportation Specification 814A, Section M.06.03.

Weight:

Frame	360 lbs.
Cover	160 lbs.
<u>Total (Min.)</u>	<u>520 lbs.</u>

Catch basin and manhole frames, grates and covers shall be as manufactured by Campbell Foundry Co., or approved equal.

ITEM #1403501A - RESET MANHOLE (SANITARY SEWER)

Description:

The Contractor shall reset to final grade the manhole frames and covers on manholes on the sanitary sewer main, all as shown, specified or directed. Also included is furnishing and installing additional manhole riser sections, if necessary.

Materials:

BRICK UNITS - Shall conform to ASTM C-32, Grade MS

MANHOLE RISER SECTIONS - Shall conform to ASTM C-478

MANHOLE RUNGS (STEPS) - Shall be 12 in. x 10 in. forged aluminum safety rung fabricated from 6061-T6 aluminum alloy as manufactured by ALCOA, or equal or colypolymer polypolymer steps in conformance with Paragraph II, ASTM A-615, Grade 400 for steel reinforcing rod. The steps shall be either Model PS-1B or PS2-PFSL as manufactured by M.A. Industries, Inc. Peach Tree City, GA, or equal.

MANHOLE EXTENSION RINGS - Shall conform to Article 08.02-5 metal for drainage structures. The type of manhole extension will be designed so that the existing manhole cover when set in place, will have substantially the same bearing, fitness and load carrying capacity as existed in the existing manhole frame. The extension shall be designed to fit into the original manhole frame resting specifically on the flange area that originally supported the manhole cover.

Construction Methods:

The Contractor shall carefully excavate the sanitary sewer main manhole frame and cover and reset them to final grade.

The Contractor may be required to "unstack" the existing cone section so that riser sections can be added or deleted, where the change in grade is greater than 12 inches.

Any material damaged by the Contractor shall be repaired or replaced by the Contractor at no cost to the District.

Method of Measurement:

The work of resetting sanitary sewer manholes will be measured for payment by the number of manholes reset to grade and accepted by the Engineer.

Basis of Payment:

The work of resetting sanitary sewer manholes will be paid for at the contract unit price each bid for "Reset Manhole (Sanitary Sewer)" complete in place, which price shall include all labor and equipment to incorporate the manhole into the work. It shall also include the clearing, trenching, excavation and disposal of excavated materials, refilling trenches, furnishing additional material for refilling, grading, sheeting, bracing, pumping, and temporary and permanent resurfacing of disturbed areas.

ITEM #1500024A – 4" FIBERGLASS CONDUIT FASTENED TO BRIDGE

Description:

This work shall consist of installing in bridge structures, conduits, fittings, hanger assemblies, junction boxes and appurtenances of the type, size and kind indicated on the plans and in the specifications, or as ordered by the Engineer. This item shall also include the installation of all hardware, materials and the performance of all work required for the complete conduit installation. The Southern New England Telephone Company (SNET) will furnish all materials to be incorporated in the work except for the threaded concrete inserts in the concrete deck and the threaded steel rods and structural steel angles for the support of the fiberglass junction boxes and the grout for the abutments.

Materials:

The Contractor shall make arrangements with SNET to accept delivery of the materials to be furnished by SNET to them at the project location. Upon delivery, the materials shall be jointly inspected by the Contractor and a representative of SNET. Upon acceptance by the Contractor, it shall become his responsibility to unload, store, and protect the materials until they have been incorporated and accepted in the work.

The materials for this work shall conform to the following requirements: All conduit and appurtenances shall be of the materials listed below as indicated on the plans.

1. Conduit:

4" Fiberglass conduit: Minimum wall thickness 0.066", 4.5" O.D. IPS, minimum 4.0" I.D., 20' or 30' standard lengths as supplied by one of the following manufacturers or approved equal:

Condux Int'l, Inc.
P.O. Box 247
Mankato, MN 56001

George-Ingraham Corp.
P.O. Box 1869
Stone Mountain, GA 30086-1869

Power & Communication Supply Co.
4838 355th Street
Willoughby, OH 44094

or SNET approved equivalent.

4" Rigid Steel Conduit: (Schedule 40) Galvanized, Underwriters Laboratories listed, 10' standard lengths.

2. Fittings:

4" Rigid Steel Conduit to Fiberglass Conduit Straight Adapter as manufactured by conduit supplier.

4" Fiberglass Conduit Expansion Joint as manufactured by conduit supplier.

4" Standard Galvanized Malleable Iron or PVC Banded Pipe Cap (Threaded).

4" Split Stop Rings as manufactured by conduit supplier.

3. Hardware:

Hanger assemblies as manufactured or recommended by fiberglass conduit supplier.

Plastic Duct Seal Permagem #7760, General Machine Products, Co.

1 bolt guy clamp galvanized, to fit 3/16" galvanized strand.

Malleable Adjustable Insert: #US 406 (for 3/4" bolt), Richmond Screw Anchor Co.

3/16" Galvanized Strand 2,000 lb. minimum breaking strength.

Non-Shrink Grout: Portland Cement grout conforming to the requirements of subarticle M.03.01-12 of Form 814A.

All Steel conduits, fittings, and hardware shall be 3 mil zinc plated or hot-dip galvanized after drilling and/or cutting to size. Any substitution of materials must be approved by the Engineer.

4. Junction Boxes and Supports:

Fiberglass NEMA Type 4X. Enclosure with quick-release latches as manufactured by Hoffman Engineering Company, 900 Ehlen Drive, Anoka, MN 55303 or SNET approved equal.

All seams sealed with no hole or knockouts.

Hinges and quick-release latches – fiberglass-reinforced polyester.

Hasp for padlocking – Type 316L stainless steel.

Enclosure color – grey.

The number and size of the Junction boxes shall be as determined by SNET.

3/4" threaded rods shall conform to ASTM A449 and shall be mechanically galvanized according to ASTM B695 Class 50. The threaded concrete inserts shall be stainless steel. Heavy Hex Nuts shall conform to ASTM A563 Grade DH. Washers shall conform to ASTM F436. The nuts and washers shall be galvanized according to ASTM B695 Class 50

Structural steel support angles shall conform to ASTM A709 Grade 36 and shall be hot-dip galvanized according to ASTM A123 after fabrication.

Construction Methods:

Conduit shall be placed as shown on the plans. Exposed ends shall be capped as shown on the plans and as determined by SNET. Fiberglass conduit shall be placed so as to have a reasonably straight bore throughout the run and with no deflection exceeding three degrees (3°) at any coupling. The number of conduit couplings shall be limited by using as many standard lengths of conduit as practical. All joints shall be tight and free from burrs. Inside diameter of ducts at any point shall not be less than (4 inches). All work shall be strictly in accordance with

the requirements of the National Electrical Safety Code and applicable O.S.H.A. standards. Sleeves in the abutment backwalls shall be grouted in the "window" opening with non-shrink grout after the ducts are placed in the bridge and aligned into their permanent locations through the abutment backwalls.

Supports for the Junction boxes shall conform to the following:

Two L3X3X1/2 angles placed perpendicular to the centerline of the telephone conduits shall be used to support each fiberglass junction box.

Each angle shall be supported by two 3/4" threaded rods which are attached to the concrete bridge deck with threaded concrete inserts.

The angles shall be firmly secured to each hanger rod by the use of one nut and one washer placed above and below the angle leg.

The Contractor shall coordinate, with the manufacturer of the junction boxes and SNET, the fabrication details of the support angles including the length of the angles, the number, size and location of the holes for bolting the junction boxes to the angles and location of the holes to accept the threaded hanger rods.

Method of Measurement:

This work will be measured for payment by the actual number of linear feet of 8-4" conduits, complete and accepted, and measured in place along the centerline of the conduits. The measured length shall be from end-to-end through all fittings, junction boxes and joints. The rigid steel conduit extending outside of structure to the limits shown on the plans shall be included and measured as part of this item.

Basis of Payment:

This work will be paid at the contract unit price per linear feet for "4" Fiberglass Conduit Fastened to Bridge," complete in place, which price shall include all materials (except materials to be furnished by the Southern New England Telephone Company), equipment, tools, labor and work incidental thereto, including the supports for the junction boxes and all work required to grout the conduit sleeves in the "window" openings in the abutment backwalls.

ITEM #1500123A - CONCRETE DUCTBANKS

Description

The work under this Section includes the design, supply and installation of concrete encased ductbanks, and buried PVC conduit as indicated on the plans

Applicable Standards

Pertinent provisions of the following listed standards shall apply to the work of this Section, except as they may be modified herein, and are hereby made a part of this Specification to the extent required:

<u>Organi- zation</u>	<u>Number</u>	<u>Title</u>
NFPA	70	National Electrical Code (NEC)

Submittals

Contractor shall submit the following:

Catalog data on rigid steel and non-metallic conduit, metallic to non-metallic conduit couplings, cable support material, water-proofing sealer, concrete during compound, and concrete dye additive.

Material/procurement specifications of all assemblies and components supplied.

Materials

Concrete-Encased Ductbank

Form 814A, Section M.03. Concrete Class "F" shall apply, with 4,000psi minimum strength after 28 days.

Form 814A, Section M.06.01 Reinforcing Steel Grade 60 shall apply. Reinforcing steel shall be epoxy coated.

Conduits and fittings shall be as specified in section on Basic Electrical Materials and Methods. Asbestos cement conduit or fittings are prohibited. Conduit separators or spacers shall be non-metallic and of the type recommended by the conduit manufacturer.

Marker tape shall be Greenlee No. 435, or equal.

Construction Methods

Excavation and Backfill

Excavation and backfill shall be done in accordance with the provisions of Form 814A, Section 2.03.03. Spoil material shall be disposed at Church Street stock pile

Sheeting shall be required on all excavations where the side of the excavation is intercepted by the Railroad live load influence line. The live load influence line is defined as a line originating at the bottom edge of the tie and extending downward at a slope of 1 (vertical) on 1½ (horizontal). Such excavations must be designed to withstand, in addition to all common loads such as a soil pressure and hydrostatic pressure, a railroad live load of Cooper E-80 or other loading magnitudes as may be directed by the Engineer.

Installation of Conduits and Ductbanks

Conduits shall be installed as shown on the plans. PVC ductbanks shall be buried below finished grade as indicated on the plans

Steel conduit and PVC ductbank positions indicated for new cable installations are based on available information. If field conditions necessitate changing the routing, the Contractor shall install the ductbank to the alternate route as approved by the Engineer at no additional cost. Where new ductbank crosses existing utilities, work shall be accomplished without disturbing the existing items. The arrangement of conduits shown on the plans may have to be modified at no additional cost in order to allow new ductbanks to cross existing obstructions.

The manufacturer's directions shall be followed in placing all conditions, fittings, conduit spacers, and in compensating for temperature effects.

Spacers shall be placed at five feet intervals on center. Use of metallic spacers will not be permitted.

The concrete shall completely encase the PVC ductbank without disturbing its alignment or damaging the conduits.

The surface of PVC duct encasement concrete shall be floated smooth after placement, and an approved curing compound shall be applied in conformance with the manufacturer's recommendations.

At all stages of the work, the Contractor shall exercise care to prevent foreign materials from entering the ducts. Following installation, each conduit shall be cleaned and tested by pulling a mandrel.

All spare conduit ducts shall be plugged, using approved removable plugs.

Method of Measurement

The work of this Section shall be measured based on the length in feet of duct bank installed.

Disposal of controlled and hazardous materials, handling of contaminated ground water and transportation of contaminated materials will be paid for under other Sections of these specifications.

Basis for Payment

The work of this Section will be paid for at the contract unit price for the following pay item which price shall include all excavation transportation, materials, equipment, tools and labor incidental hereto.

Pay Item

Pay Unit

CONCRETE DUCTBANKS

LF

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 bid 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: The work will be paid as Extra Work.

<u>Pay Item</u>	<u>Pay Unit</u>
Service Connections (Estimated Cost)	Estimated Cost

ITEM #2999999A - TRAINING

This Training Special Provision supersedes Section 7b of the Required Contract Provision entitled "Specific Equal Employment Opportunity Responsibilities", as amended, and is included in this contract in implementation of Title 23 U.S.C. Section 140(a) as established by Section 22 of the Federal-Aid Highway Act of 1968.

As part of the Contractor's equal employment opportunity affirmative action program, training shall be provided as follows:

The Contractor shall provide on-the-job training aimed at developing full journeymen in the type of trade involved. The number of trainees to be trained under this contract will be the number assigned in the proposal form. In the event the Contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this provision. The Contractor shall also ensure that this Training Special Provision is made applicable to such subcontract.

The Contractor will select the categories in which he will provide training in accordance with a training outline.

No more than twenty percent (20%) of the trainees proposed shall be in the laborer classification (applicable only when five (5) or more trainees are required).

After award of the contract and prior to the order to start the physical construction of the project, the Contractor shall, in conjunction with the required schedule of progress or time chart, submit and, obtain approval for, the number of trainees for each classification selected, the training outline for each classification and an explanation of the start time of each trainee as it relates to the schedule of progress or time chart.

If the Contractor is participating in a bona fide apprenticeship program approved by the Connecticut State Labor Department Apprentice Training Division, identification of such apprentice program shall be submitted.

Training and upgrading of members of minority groups is a primary objective of this Training Special Provision. Accordingly, the Contractor shall make use of the supportive services consultant or other such recruitment sources (public and private) likely to yield minority trainees to the extent such persons are available within a reasonable area of recruitment. The Contractor will be given an opportunity and will be responsible for demonstrating the steps that he has taken in pursuance thereof; prior to a determination as to whether the Contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate any applicant for training, whether a member of a minority group or not.

Rev. Date 03/21/00

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

The minimum length and type of training for each classification will be as established in the training program selected by the Contractor and approved by the Connecticut Department of Transportation and the Federal Highway Administration. The Connecticut Department of Transportation and the Federal Highway Administration shall approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, programs approved by the U.S. Department of Labor or the Connecticut State Labor Department shall be considered acceptable under this Training Special Provision, except in those cases where the Secretary of Transportation, the Federal Highway Administrator, or the Connecticut Department of Transportation, has determined that the program is not administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts.

Except as otherwise noted below, the Contractor will be reimbursed 80 cents per hour of training given an employee in accordance with an approved training program. As approved by the engineer, reimbursement will be made for training of persons in excess of the number specified. This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the Contractor from receiving other reimbursement.

Payment for training is made upon completion of the training program and not on a monthly basis.

No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the Contractor. It is normally expected that a trainee will remain on the project as long as training opportunities exist in his work classification or until he has completed his training program. It is not required that all trainees be on board for the entire length of the contract. A Contractor will have fulfilled his responsibilities, under this Training Special Provision, if he has provided acceptable training to the number of trainees specified.

Trainees will be paid at least 60 percent of the appropriate minimum journeyman's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on this project. In that case, the appropriate rates approved by the Department of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this Training Special Provision.

The Contractor shall furnish the trainee a copy of the program he will follow in providing the training. The Contractor shall provide each trainee with a certification showing the type and

length of training satisfactorily completed. The Contractor will provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.

The amount of money shown on the proposal form for Item #2999999A Training 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 amount bid for the contract.



STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF LONG ISLAND SOUND PROGRAMS



May 17, 2000

Mr. Edgar T. Hurle, Director
Environmental Planning
CT Department of Transportation
2800 Berlin Turnpike
Newington, CT

Subject: Application for State Coastal Consistency Concurrence for Church Street
Extension and Related Road Improvements, DOT Project No. 92-520

Finding: Consistent

Dear Mr. Hurle:

Thank you for submitting the Coastal Management Consistency Review Worksheet and related design plans dated October 13, 1999 and August 23, 1999 respectively, for the above-referenced project. Based upon our review of the proposed project for consistency with the goals and policies of the Connecticut Coastal Management Act (CCMA), we offer the following comments on the subject application pursuant to Section 22a-100 of the Connecticut General Statutes (CGS).

The Department of Transportation (DOT) proposes to construct approximately 1,638 linear feet of roadway connecting Union Avenue and Sargent Drive over the New Haven Rail Yard to improve access to the Long Wharf area from the City center, increase the capacity of existing stormwater conveyance system in the area and modify two existing intersections.

We find the proposed project consistent with the goals and policies of the now that that project's catch basins will be use hooded outlet to trap floatables prior to discharge of stormwater from the project area.

We appreciate your cooperation and coordination of the review of this proposed project with this office. If we can be of any further assistance to you in this or any other coastal management or Long Island Sound related matter, please contact Dave Kozak of my staff.

Sincerely,

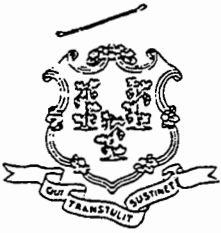
David J. Kozak
Senior Environmental Analyst

Cc: Stephen Scholz, CT DOT

Phone: (Printed on Recycled Paper) 860-424-3034 FAX: 860-424-4054
79 Elm Street • Hartford, CT 06106-3127
<http://dep.state.ct.us>

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STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER MANAGEMENT



March 29, 2000

Department of Transportation
2800 Berlin Turnpike
Newington, CT 06131
Attn: Edgar Hurle

RE: FM -99-158
Project # 92-520
Reconstruction of Church Street Extension
New Haven

Dear Mr. Hurle:

The Inland Water Resources Division of the Department of Environmental Protection has reviewed the flood management certification application package dated October 12, 1999, prepared by Stephen Scholz for the Department of Transportation. The certification document states that the proposed activity has been designed in compliance with the requirements of Section 13a-94 and Section 25-68b-h of the Connecticut General Statutes (CGS) and Section 25-68h-1 through 25-68h-3 of the Regulations of Connecticut State Agencies (RCSA).

The project consists of the reconstruction of Church Street South Extension as shown on plans entitled "Construction of Church Street South Extension over New Haven Interlocking and railyard, New Haven dated August 23, 1999 revised date February 14, 2000. The reconstruction includes a proposed seven span bridge over the New Haven Rail Yard, approximately 1650 feet of reconstructed roadway, modifications to two intersections and the installation of a new stormwater drainage system.

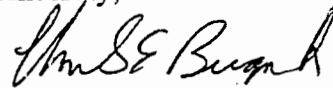
The project is within the floodplain of Long Island Sound. There are no adverse flooding impacts caused by the new bridge and reconstructed roadway. The stormwater drainage system has been properly designed. Therefore, the certification submitted on October 20, 1999 inclusive of all revisions and the latest submittal on February 23, 2000 is approved.

March 29, 2000

Page 2

No revisions or alterations to the approved plans including the approved water-handling plan are allowed without first obtaining written approval from this Division of such alterations. If there are any questions, contact Sharon Yurasevecz of the Inland Water Resources Division at 424-3019.

Sincerely,



Charles E. Berger, Jr.

Director

Inland Water Resources Division

cc: Michael Masayda, Hydraulics and Drainage Unit, DOT
Stephen Scholz, Consultant Design, DOT

Part III: Registrant Information (cont.)

2. List primary contact for departmental correspondence and inquiries, if different than the registrant.

Name: Edgar T. Hurle, Director of Environmental Planning

Mailing Address: ConnDOT, 2800 Berlin Turnpike, Box 317546

City/Town: Newington State: CT Zip Code: 06131 -7546

Business Phone: (860)594-2920 ext: Fax: ()

Site Phone: () Emergency phone: ()

Contact Person: Title:

Association (e.g. developer, general or site contractor, etc.):

3. List developer, if different from registrant or primary contact:

Name:

Mailing Address:

City/Town: State: Zip Code: -

Business Phone: () ext: Fax: ()

Contact Person: Title:

4. Name and address of general contractor:

Name:

Mailing Address:

City/Town: State: Zip Code: -

Business Phone: () ext: Fax: ()

Site Phone: () Off-hours phone: ()

Contact Person: Title:

5. List any engineer(s) or other consultant(s) employed or retained to assist in preparing the registration and Stormwater Pollution Control Plan. Please enter a check mark if additional sheets are necessary, and label and attach them to this sheet. ____

Name: Parsons Brinckerhoff, Inc

Mailing Address: 148 Eastern Blvd

City/Town: Glastonbury State: CT Zip Code: 06033-4321

Business Phone: (860)659-0444 ext: Fax: (860)633-8117

Contact Person: Anthony A. Moretti Title: Project Manager

Service Provided: Design Consultant

Part IV: Site Information

1. Site or Project Name (if any): State Project No. 92-520

2. Street Address or Description of Location: Church Street South Extension over New Haven Interlocking and Rail Yard
City/Town: New Haven Zip:

3. Brief description of construction activity: Construction of seven-span bridge over the New Haven Interlocking and Rail Yard. Construction begins at the intersection of Church Street South and Union and ends where it touches down on the existing Church Street Extension (at Sargeant Drive). Project construction includes temporary cofferdams around all support structures including support piers and an abutment at the eastern end of the bridge.

4. Start Date: 11/15/00 Anticipated Completion Date: 1/03

5. Estimated number of acres to be disturbed: 5.1 acres

Part V: Stormwater Discharge Information

1. Where does stormwater discharge to:

- Municipal Separate Storm System? No Yes Name:
- Surface water body or wetlands? No Yes Name: New Haven Harbor

Note: Stormwater from the western half of the proposed bridge project will discharge into an existing New Haven municipal separate storm system, while stormwater from the eastern half will discharge into the New Haven Harbor through an existing stormwater outlet.

- Is discharge located less than 500 feet from a tidal wetland which is not a fresh-tidal wetland? No Yes

2. Name of the watershed where the site is located OR nearest waterbody to which it discharges:
New Haven Harbor/Long Island Sound

3. Is construction in accordance with the Guidelines established under Section 22a-329 of the Soil Erosion and Sedimentation Act? Yes No

4. Is construction in accordance with local soil erosion and sediment ordinances? Yes No

Note: A copy of this registration and the Stormwater Pollution Control Plan must be available to the town wetlands enforcement officials, wetlands commission, or their equivalent.

5. Will the construction project disturb over ten acres at one time? Yes No
(If yes, enclose a copy of the Stormwater Pollution Control Plan and plan review fee.)

Part VI: Supporting Documents

Please enter a check mark by the attachments as verification that *all* applicable attachments have been submitted with this registration form. When submitting any supporting documents, please label the documents as indicated in this part (e.g., Attachment A, etc.) And be sure to include the registrant's name as indicated on the *Permit Application Transmittal Form*.

<input checked="" type="checkbox"/>	Attachment A:	An 8 1/2" x 11" copy of the relevant portion or a full-sized original of a USGS Quadrangle Map indicating the exact location of the site and the area within a one mile radius of the site.
<input type="checkbox"/>	Attachment B:	If the construction project disturbs over 10 acres at any one time, a copy of the Stormwater Pollution Control Plan and plan review fee of \$250.00. The plan and fee must be submitted at least 30 days prior to the initiation of the construction activity.

Part VII: Certifications

The registrant *and* the individual(s) responsible for actually preparing the registration must sign this part. In addition, the second certification must be signed by a professional engineer licensed to practice in Connecticut. If the engineer and preparer are the same person, that person must sign *both* certifications. A registration will be considered incomplete unless all required signatures are provided.

Professional Engineer Certification

"I certify that I have thoroughly and completely reviewed the Stormwater Pollution Control Plan for the site. I further certify based on such review and on my professional judgment, that the Stormwater Pollution Control Plan has been prepared in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, and the conditions for the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities issued on October 1, 1997, and the controls required for such plan are appropriate for the site. I am aware that there are significant penalties for false statements in this certification, including the possibility of fine and imprisonment for knowingly making false statements."

Anthony A. Moretti
Signature of Professional Engineer

6/13/00
Date

15858
P.E. Number

ANTHONY A. MORETTI
Name of Professional Engineer (print or type)

PROJECT MANAGER
Title (if applicable)

Registrant Certification

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in the submitted information may be punishable as a criminal offense, in accordance with Section 22a-6 of the General Statutes, pursuant to Section 53a-157b of the General Statutes, and in accordance with any other applicable statute.

I certify that this general permit registration is on complete and accurate forms as prescribed by the commissioner without alteration of the text.

I also certify under penalty of law that I have read and understand all conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities issued on October 1, 1997, that all conditions for eligibility for authorization under the general permit are met, all terms and conditions of the general permit are being met for all discharges which have been initiated and are the subject of this registration, and that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the site. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowingly making false statements."

Signature of Registrant

Date

Name of Registrant (print or type)

Title (if applicable)

Signature of Preparer

Date

Name of Preparer (print or type)

Title (if applicable)

___ Please enter a check mark if additional signatures are necessary.
If so, please reproduce this sheet and attach signed copies to this sheet.

Note: Please submit the Permit Application Transmittal Form, Registration Form, Fee, Stormwater Pollution Control Plan if required, and USGS Quadrangle Map to:

CENTRAL PERMIT PROCESSING UNIT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

Note: If discharging to municipal separate storm sewer, send a copy of this completed registration form to the owner or operator of that system.

If discharging to a public drinking water supply watershed or aquifer area, send a copy of this completed registration form to the appropriate water company.

EXECUTIVE SUMMARY

STATE PROJECT NO. 92-520 CHURCH STREET SOUTH EXTENSION OVER NEW HAVEN INTERLOCKING AND RAIL YARD

Project No. 92-520, Church Street South Extension over the New Haven Interlocking and Rail Yard, consists of a proposed seven-span bridge, approximately 1,650 linear feet of reconstructed roadway, modification to two intersections and the installation of a conduit along Church Street Extension to replace an existing substandard storm drainage system. The proposed bridge is 1,280 feet long and 53 feet wide to provide for two 11-foot wide traffic lanes, an 11-foot wide median, one 9-foot wide sidewalk, one 5 feet wide bike lane/shoulder and one 6-foot bike lane/shoulder. The proposed bridge provides a roadway connection between Union Avenue and Sargent Drive in the City of New Haven, Connecticut. The completion of this transportation facility will provide a direct link between downtown New Haven and the Long Wharf and waterfront area.

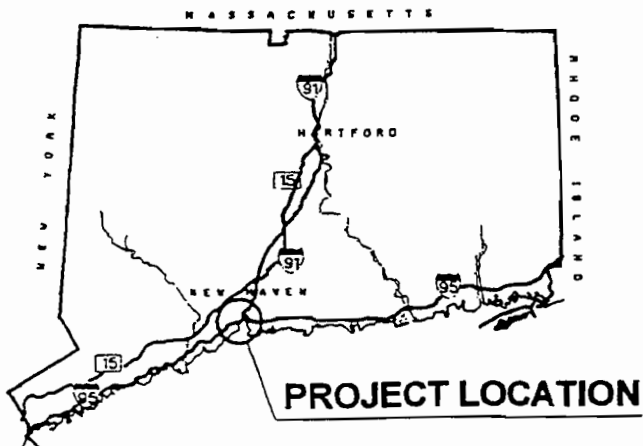
The proposed project begins at the intersection of Church Street South and Union Avenue. In an effort to square up the proposed intersection, approximately 200 feet of Church Street South will be reconstructed on a 450-foot radius curve. From the Union Street/Church Street South intersection, the bridge will extend south over the rail yard, supported by seven piers, before touching down on the existing Church Street Extension. An embankment will be constructed at the south end of the bridge to transition the roadway from the bridge to the existing Church Street Extension. The proposed roadway will then follow the existing alignment of Church Street Extension and will terminate at Sargent Drive. Also included as part of this project is the construction of approximately 1,150 linear feet of a 4 foot x 12 foot reinforced concrete conduit along the proposed centerline of Church Street Extension to completely replace the existing twin 60" corrugated metal pipes. The existing storm drainage system is substandard and not capable of carrying more than approximately a 4-year storm, while the replacement system has been designed for a 10-year storm.

Construction of this project will involve work within the 100-year floodplain. The majority of the project area is located below the 100-year floodplain elevation of New Haven Harbor of 11 feet NGVD. Work in the floodplain involves excavation and fill associated with construction of the bridge piers and abutment on the south end, and associated with the trenching of the replacement conduit.

Construction of all project elements will take place in the dry within the temporary sheetpile cofferdam enclosures. Sheetpile enclosures will be dewatered during construction, and all water will be handled as contaminated and transported off-site for treatment in accordance with local, state, and federal regulations. Bridge support piles will be driven to approximately 60-80 feet below grade. The embankment at the south end of the bridge will have retaining walls to minimize impacts to adjacent properties. Due to the poor soils in the area, the base of the embankment will be entirely excavated to allow the placement of a layer of supporting concrete similar to the retaining walls. Temporary disturbance within the 100-year floodplain as a result of excavation within the sheetpile enclosures of Piers 3 to 6 will total approximately 69,311 cubic feet. Construction of the piers will entail fill of approximately 3,038 cubic feet in the 100-year floodplain.

The footprint of the permanent above-ground structures to be constructed within the 100-year floodplain (Piers 3-6) will total 1,325 square feet. After construction of the bridge support structures and the conduit is laid, the area will be returned to pre-construction grades as much as possible. The design of the bridge will not result in an increase to the size of the upstream 100-year floodplain. The project is anticipated to be completed in two and a half years.

To minimize temporary construction-related impacts upon New Haven Harbor and Long Island Sound, best management practices for the protection of the environment will be specified and closely adhered to throughout the period of active construction. This will include implementation and maintenance of an erosion and sedimentation plan specifically designed for the subject proposed project, and adherence to a flood contingency plan (Attachment L).



**CHURCH STREET SOUTH EXTENSION BRIDGE
OVER NEW HAVEN INTERLOCKING & RAIL YARD**

VICINITY MAP

**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

	Page
I. General	1
II. Nondiscrimination	1
III. Nonsegregated Facilities	3
IV. Payment of Predetermined Minimum Wage	3
V. Statements and Payrolls	6
VI. Record of Materials, Supplies, and Labor	6
VII. Subletting or Assigning the Contract	7
VIII. Safety: Accident Prevention	7
IX. False Statements Concerning Highway Projects	7
X. Implementation of Clean Air Act and Federal Water Pollution Control Act	8
XI. Certification Regarding Debarment, Suspension, Ineligibility, and Voluntary Exclusion	8
XII. Certification Regarding Use of Contract Funds for Lobbying	9

ATTACHMENTS

**A. Employment Preference for Appalachian Contracts
(included in Appalachian contracts only)**

I. GENERAL

1. 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.

2. Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.

3. A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.

4. A breach of the following clauses of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

Section I, paragraph 2;

Section IV, paragraphs 1, 2, 3, 4, and 7;

Section V, paragraphs 1 and 2a through 2g.

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 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 DOL, or the contractor's employees or their representatives.

6. **Selection of Labor:** During the performance of this contract,

the contractor shall not

a. discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attachment A), or

b. employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

II. NONDISCRIMINATION

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

1. **Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630 and 41 CFR 60) 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 Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 *et seq.*) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.

b. The contractor will accept as his operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job training."

2. **EEO Officer:** The contractor will designate and make known to the SHA contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of EEO and who must be assigned adequate authority and responsibility to do so.

3. **Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minority group employees.

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 minority groups 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 minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group 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, he 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 DOL has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)

c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his 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 his avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.

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. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.

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 minority group and women employees 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 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 contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:

a. The contractor 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.

b. The contractor will use best efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the SHA 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 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 without regard to race, color, religion, sex, national origin, age or disability, making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The DOL 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 pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the SHA.

8. **Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.

b. Disadvantaged business enterprises (DBE), as defined in 49 CFR 23, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of DBE construction firms from SHA personnel.

c. The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.

9. **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 completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the SHA and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number 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;

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and

(4) The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.

b. The contractors will submit an annual report to the SHA 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. If on-the-

job training is being required by special provision, the contractor will be required to collect and report training data.

III. NONSEGREGATED FACILITIES

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

a. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.

b. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).

c. The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of \$10,000 or more and that it will retain such certifications in its files.

IV. PAYMENT OF PREDETERMINED MINIMUM WAGE

(Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural minor collectors, which are exempt.)

1. General:

a. All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account [except such payroll deductions as are permitted by regulations (29 CFR 3) issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c)] the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determination") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on

behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraphs 4 and 5 of this Section IV.

b. 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.

c. All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1, 3, and 5 are herein incorporated by reference in this contract.

2. Classification:

a. The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.

b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:

(1) the work to be performed by the additional classification requested is not performed by a classification in the wage determination;

(2) the additional classification is utilized in the area by the construction industry;

(3) the proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

(4) with respect to helpers, when such a classification prevails in the area in which the work is performed.

c. If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the DOL, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour 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.

d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting

officer, to the Wage and Hour Administrator for determination. Said 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.

e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

3. Payment of Fringe Benefits:

a. 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 or subcontractors, as appropriate, shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.

b. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

4. Apprentices and Trainees (Programs of the U.S. DOL) and Helpers:

a. Apprentices:

(1) Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.

(2) The allowable ratio of apprentices to journeyman-level employees on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate listed in the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor or subcontractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

(3) Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator for the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

(4) In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.

b. Trainees:

(1) Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the DOL, Employment and Training Administration.

(2) The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(3) Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which case such trainees shall receive the same fringe benefits as apprentices.

(4) In the event the Employment and Training Administration withdraws approval of a training program, the contractor or subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Helpers:

Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV.2. Any worker listed on a payroll at a

helper wage rate, who is not a helper under an approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

5. Apprentices and Trainees (Programs of the U.S. DOT):

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

6. Withholding:

The SHA shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, as much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the SHA contracting officer may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

7. Overtime Requirements:

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

8. Violation:

Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of \$10 for each calendar day on which such employee was required or permitted to work in excess of the standard work week of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

9. Withholding for Unpaid Wages and Liquidated Damages:

The SHA shall upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 8 above.

V. STATEMENTS AND PAYROLLS

(Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

1. Compliance with Copeland Regulations (29 CFR 3):

The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

2. Payrolls and Payroll Records:

a. Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.

b. The payroll records shall contain the name, social security number, and address of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof of the types described in Section 1(b)(2)(B) of the Davis Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis Bacon Act, the contractor and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.

c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices, trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely all of the information required to be maintained under paragraph 2b of this Section V.

This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

d. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V and that such information is correct and complete;

(2) that such laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR 3;

(3) that each laborer or mechanic has been paid not less than the applicable wage rate and fringe benefits or cash equivalent for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

e. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 2d of this Section V.

f. The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

g. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the SHA, the FHWA, the DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR

1. On all Federal-aid contracts on the National Highway System, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than \$1,000,000 (23 CFR 635) the contractor shall:

a. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds," prior to the commencement of work under this contract.

b. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.

c. Furnish, upon the completion of the contract, to the SHA resident engineer on Form FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.

2. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

VII. SUBLETTING OR ASSIGNING THE CONTRACT

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 State. 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).

a. "Its own organization" shall be construed to include only workers employed and paid directly 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, assignee, or agent of the prime contractor.

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 on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph 1 of Section VII is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the SHA 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 SHA 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 SHA has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

VIII. SAFETY: ACCIDENT PREVENTION

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide

all safeguards, safety devices and protective equipment; and take any other needed actions as it determines, or as the SHA contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

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. 333).

IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

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, the following notice shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

NOTICE TO ALL PERSONNEL ENGAGED ON FEDERAL-AID HIGHWAY PROJECTS

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supple-

mented;

Shall be fined not more than \$10,000 or imprisoned not more than 5 years or both."

X. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$100,000 or more.)

By submission of this bid or the execution of this contract or subcontract, as appropriate, the bidder, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 *et seq.*, as amended by Pub.L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 *et seq.*, as amended by Pub.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.

2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.

3. That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.

4. That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

1. Instructions for Certification - Primary Covered Transactions:

(Applicable to all Federal-aid contracts - 49 CFR 29)

a. By signing and submitting this proposal, the prospective primary 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 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 primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly

rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.

d. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations.

f. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective primary 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 Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded From Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.

i. 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.

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.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion—Primary Covered Transactions

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgement 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;

c. 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 1b of this certification; and

d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

2. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Covered Transactions:

(Applicable to all subcontracts, purchase orders and other lower tier transactions of \$25,000 or more - 49 CFR 29)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion—Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

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 may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion—Lower Tier Covered Transactions:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

XII CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

(Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 - 49 CFR 20)

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

**ATTACHMENT A - EMPLOYMENT PREFERENCE FOR
APPALACHIAN CONTRACTS**
(Applicable to Appalachian contracts only.)

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 he 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, he 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 1 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 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.

SWORN STATEMENT BY SUCCESSFUL BIDDER

Title 23, United State Code, Section 112(f)

Each bidder shall file a statement executed by, or on behalf of the person, firm, association, or corporation submitting the bid certifying that such person, firm, association, or corporation has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action, in restraint of free competitive bidding in connection with the submitted bid. Failure to submit the executed statement as part of the bidding documents will make the bid nonresponsive and not eligible for award consideration.

Specific Equal Employment Opportunity Responsibilities

1. General

- A. Equal Employment Opportunity Requirements not to discriminate and to take affirmative action to assure equal employment opportunity as required by Executive Order 11246, Executive Order 11375, the Railroad Revitalization and Regulatory Reform Act of 1976 and other U.S. Department of Transportation nondiscrimination legislation are set forth in this Required Contract/Agreement Provision. The requirements set forth in these special provisions shall constitute the specific affirmative action requirements for project activities under this contract (or agreement) and supplement the equal employment opportunity requirements set forth in other related contract provisions.
- B. "Company" refers to any entity doing business with the Connecticut Department of Transportation and includes but is not limited to the following:
- | | |
|----------------|---|
| Contractors | Vendors (where applicable) |
| Subcontractors | Suppliers of Materials (where applicable) |
| Consultants | Municipalities (where applicable) |
| Subconsultants | Utilities (where applicable) |
- C. The Company will work with the Connecticut Department of Transportation and the federal government in carrying out equal employment opportunity obligations and in their review of his/her activities under the contract or agreement.
- D. The Company and all their subcontractors or subconsultants holding subcontracts or subagreements of \$10,000 or more on federally-assisted projects and \$5,000 or more on state funded projects, will comply with the following minimum specific requirement activities of equal employment opportunity. The Company will physically include these requirements in every subcontract or subagreement meeting the monetary criteria above with such modification of language as is necessary to make them binding on the subcontractor or subconsultant.
- E. These Required Contract Provisions apply to all state funded and/or federally-assisted projects, activities and programs in all facets of the Connecticut Department of Transportation operations resulting in contracts or agreements.

2. Equal Employment Opportunity Policy

The Company will develop, accept and adopt as its operating policy an Affirmative Action Plan utilizing as a guide the Connecticut Department of Transportation Affirmative Action Plan Guideline.

3. Equal Employment Opportunity Officer

The Company will designate and make known to the State Department of Transportation contracting officers an equal employment opportunity officer (hereinafter referred to as the EEO Officer) who will have the responsibility for and must be capable of effectively administering and promoting an active program of equal employment opportunity and who must be assigned adequate authority and responsibility to do so.

4. Dissemination of Policy

- A. All members of the Company's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the Company's equal employment opportunity policy and contractual responsibilities to provide equal employment opportunity 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:
- (1) Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less than once every six (6) months thereafter, at which time the Company's equal employment opportunity policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable Company official.

- (2) New supervisory or personnel office employees will be given a indoctrination by the EEO Officer or other designeeable Company official covering all major aspects of the Company's equal employment opportunity obligations within thirty (30) days following their reporting for duty with the Company.
- (3) All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer or appropriate Company official in the Company's procedures for locating and hiring protected class group employee.

B. In order to make the Company's equal employment opportunity policy known to all employees, prospective employees and potential sources of employees, i.e., schools, employment agencies, labor unions (where appropriate), college placement officers, etc., the Company will take the following actions:

- (1) Notices and posters setting forth the Company's equal employment opportunity policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.
- (2) The Company's equal employment opportunity 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.

5. Recruitment

A. When advertising for employees, the Company will include in all advertisements for employees the notation: "An Equal Opportunity Employer". All such advertisements will be published in newspapers or other publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

B. The Company 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 group applicants, including, but not limited to, State employment agencies, schools, colleges and minority group organizations. To meet this requirement, the Company will, through its EEO Officer, identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the Company for employment consideration.

In the event the Company has a valid bargaining agreement providing for exclusive hiring hall referrals, the Company is expected to observe the provisions of that agreement to the extent that the system permits the Company's compliance with equal employment opportunity contract provisions. (The U.S. Department of Labor has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the Company to do the same, such implementation violates Executive Order 11246, as amended.)

C. The Company will encourage its present employees to refer minority group applicants for employment by posting appropriate notices or bulletins in the areas accessible to all such employees. In addition, information and procedures with regard to referring minority group applicants will be discussed with employees.

6. 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, layoffs, and termination, shall be taken without regard to race, color, religion, sex, or national origin, etc. The following procedures shall be followed:

- A. The Company will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.
- B. The Company will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

- C. The Company will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. When evidence is found, the Company will promptly take corrective action. If a review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.
- D. The Company will promptly investigate all complaints of alleged discrimination made to the Company in connection with his 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 Company will inform every complainant of all of his avenues of appeal.
- E. The general contract provision entitled A(76) Affirmative Action Requirements is made part of this document by reference. In conjunction with this contract provision, only the job categories will change in order to be comparable with the job categories utilized by the Company proposing to do business with the Connecticut Department of Transportation. The goals and time tables will remain the same throughout the contract provision.

7. Training and Promotion

- A. The Company will assist in locating, qualifying, and increasing the skills of minority group and woman employees, and applicants for employment.
- B. Consistent with the Company's work force requirements and as permissible under Federal and State regulations, the Company shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event the Training Special Provision is provided under this contract, this subparagraph will be superseded.
- C. The Company will advise employees and applicants for employment of available training programs and entrance requirements for each.
- D. The Company will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.

8. Unions

If the Company relies in whole or in part upon unions as a source of employees, it will use its 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 Company either directly or through an association acting as agent will include the procedures set forth below:

- A. The Company will use its 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.
- B. The Company will use its best efforts to incorporate an equal employment opportunity 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, or national origin, etc.
- C. The Company 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 Company, the Company shall so certify to the Connecticut Department of Transportation and shall set forth what efforts have been made to obtain such information.
- D. In the event the union is unable to provide the Company with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the Company will, through independent recruitment efforts, fill the employment vacancies without regard to race,

color, religion, sex or national origin, etc. making full efforts to obtain qualified or qualifiable minority group persons and women in the U.S. Department of Labor has held that it shall be no excuse that the union with which the Company has a collective bargaining agreement providing for exclusive referral failed to refer minority employees). In the event the union referral practice prevents the Company from meeting the obligations pursuant to Executive Order 11246, as amended, and these provisions, such Company shall immediately notify the Connecticut Department of Transportation.

9. Subcontracting

- A. The Company will use its best efforts to solicit bids from and to utilize minority group subcontractors, or subcontractors with meaningful minority group and female representation among their employees. Companies shall obtain a list of applicable Disadvantaged Business Enterprises firms from the Division of Contract Compliance.
- B. The Company will use its best efforts to ensure subcontractor compliance with their equal employment opportunity obligations.
- C. The General Contract Provisions entitled "Minority Business Enterprises as Subcontractors" is made part of this document by reference and its requirements are applicable to all entities proposing to do business with the Connecticut Department of Transportation.

10. Records and Reports

For the duration of the project, the company will maintain records as are necessary to determine compliance with the Company's equal employment opportunity obligations and Affirmative Action requirements. Additionally, the company will submit all requested reports in the manner required by the contracting agency.

- A. The number of minority and nonminority group members and woman employed in each work classification on the project.
- B. The progress and efforts being made in cooperation with unions to increase employment opportunities for minorities and women (applicable only to Companies which rely on whole or in part on unions as a source of their work force).
- C. The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees, and
- D. The progress and efforts being made in securing the services of minority and female owned businesses.
 - (1) All such records must be retained for a period of three (3) years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the State Department of Transportation and the U.S. Department of Transportation including consultant firms.
 - (2) If on-the-job training is being required by the "Training Special Provision", the Company will be required to furnish a Monthly Training Report and Supplement Report (1409) for each trainee.

11. Affirmative Action Plan

- A. Contractors, subcontractors, vendors, suppliers, and all other Companies with contracts, agreements or purchase orders completely state funded will submit an Affirmative Action Plan if the contract value is \$5,000 or over.
- B. Contractors, subcontractors, vendors, suppliers, and all other Companies with federally-assisted contracts, agreements, or purchase orders valued at \$10,000 or more will submit an Affirmative Action Plan.
- C. Companies with contracts, agreements, or purchase orders with total dollar value under that which is stipulated in A and B above shall be exempt from the required submission of an Affirmative Action Plan unless otherwise directed by the Division of Contract Compliance.

JOB NO.: TMP.
DISK: F-25
LABEL: FRCF1-FRCF4

FEDERAL

February 1988

CONNECTICUT

REQUIRED CONTRACT PROVISIONS

STATE OF CONNECTICUT

PROVISIONS REQUIRED BY GENERAL STATUTES TO BE INCLUDED IN CONTRACT

SUBSTITUTION OF SECURITIES FOR RETAINAGES

The contractor is advised of the provisions of Section 3-112a of the General Statutes of the State of Connecticut, as revised which is quoted as follows:

SECTION 3-112a. Substitution of securities for retainages on State contracts and subcontracts.

(a) Under any contract made or awarded by the State, or by any public department or official thereof, or under any subcontract made directly thereunder with the contractor, the contractor and any subcontractor may, from time to time, withdraw the whole or any portion of the amount retained for payments to the contractor or subcontractors, as the case may be, pursuant to the terms of the contract or subcontracts, upon depositing with the comptroller (1) United States Treasury bonds, United States Treasury notes, United States Treasury certificates of indebtedness or United States Treasury bills, or (2) bonds or notes of the state of Connecticut or (3) bonds of any political subdivision in the state of Connecticut.

No amount shall be withdrawn in excess of the market value of the securities at the time of deposit or of the par value of such securities, whichever is lower.

(b) The comptroller shall, on a regular basis, collect all interest or income on the obligations so deposited and shall pay the same, when and as collected, to the contractor and the subcontractors who deposited the obligations. If the deposit is in the form of coupon bonds, the comptroller shall deliver each coupon as it matures to the contractor and the subcontractors.

(c) Any amount deducted by the State, or by any public department or official thereof, pursuant to the terms of the contract and subcontracts made directly thereunder with the contractor, from the retainages due the contractor and said subcontractors, shall be deducted, first from that portion of the retainages for which no security has been substituted, then from the proceeds of any deposited security. In the latter case, the contractor and the subcontractors shall be entitled to receive interest, coupons or income only from those securities which remain after such amount has been deducted.

I. NONDISCRIMINATION

"(a) For the purposes of this section, "minority business enterprise" means any small contractor or supplier of materials fifty-one percent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise and (3) who are members of a minority, as such term is defined in subsection (a) of Conn. Gen. Stat. §32-9n; and "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations. "Good faith efforts" shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements.

For purposes of this section, "Commission" means the Commission on Human Rights and Opportunities.

(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, mental retardation 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. The Contractor further agrees to take affirmative action to

insure that applicants with job related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, 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; (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 such Contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such Contractor has a contract or understanding, a notice to be provided by the Commission 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 Conn. Gen. Stat. §§ 46a-68e and 46a-68f and with each regulation or relevant order issued by said Commission pursuant to Conn. Gen. Stat. §§ 46a-56, 46a-68e and 46a-68f; (5) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor as relate to the provisions of this section and Section 46a-56. If the contract is a public works contract, the Contractor agrees and warrants that he will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works project."

(c) Determination of the Contractor's good faith efforts shall include but shall not be limited to the following factors: The Contractor's employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the Commission may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.

(d) The Contractor shall develop and maintain adequate documentation, in a manner prescribed by the Commission, of its good faith efforts.

(e) The Contractor shall include the provisions of subsection (b) of this section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Conn. Gen. Stat. § 46a-56, as amended by Section 5 of Public Act 89-253; 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."

II. NONDISCRIMINATION (SEXUAL ORIENTATION)

(a) Pursuant to Section 4a-60a of the Connecticut General Statutes, (1) The Contractor agrees and warrants that in the performance of the contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or of the State of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) the Contractor agrees to provide each labor union or representative of workers with which such Contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such Contractor has a contract or understanding, a notice to be provided by the commission on human rights and opportunities advising the labor union or workers' representative of the Contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (3) the Contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said commission pursuant to section 46a-56 of the general statutes; (4) the Contractor agrees to provide the commission on human rights and opportunities with such information requested by the

commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor which relate to the provisions of this section and section 46a-56 of the general statutes.

(b) The Contractor shall include the provisions of subsection (a) of this section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the state and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with section 46a-56 of the general statutes; 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.

"AMERICAN WITH DISABILITIES ACT OF 1990"

This clause applies to those contractors who are or will be responsible for compliance with the terms of the Americans with Disabilities Act of 1990, (42 U.S.C. 12101 et seq.), (Act), during the term of the contract. The contractor represents that it is familiar with the terms of this Act and that it is in compliance with the Act. Failure of the contractor to satisfy this standard as the same applies to performance under this contract, either now or during the term of the contract as it may be amended, will render the contract voidable at the option of the State upon notice to the contractor. The contractor warrants that it will hold the state harmless and indemnify the State from any liability which may be imposed upon the State as a result of any failure of the contractor to be in compliance with this Act, as the same applies to performance under this contract.

This contract is subject to the provisions of Executive Order No. Three of Governor Thomas J. Meskill promulgated June 16, 1971 and, as such, this contract may be cancelled, terminated or suspended by the State Labor Commissioner for violation of, or noncompliance with said Executive Order No. Three, or any states of federal law concerning nondiscrimination, notwithstanding that the Labor Commissioner is not a party to this contract.

DISK: M-25
LABEL: FRCP3

The parties to this contract as part of the consideration hereof, agree that Executive Order No. Three is incorporated herein by reference and made a part hereof. The parties agree to abide by said Executive Order and agree that the State Labor Commissioner shall have continuing jurisdiction in respect to contract performance in regard to nondiscrimination, until the contract is completed or terminated prior to completion.

The (contractor), (subcontractor), (bidder), (vendor), agrees, as part consideration hereof, that this (order) (contract) is subject to the Guidelines and Rules issued by the State Labor Commissioner to implement Executive Order No. Three, and that he will not discriminate in his employment or practices or policies, will file all reports as required, and will fully cooperate with the State of Connecticut and the State Labor Commissioner.

The Governor's Executive Order No. Three and the Guidelines and Rules implementing the Governor's Executive Order No. Three are included elsewhere herein.

CONSTRUCTION, ALTERATION OR REPAIR OF PUBLIC WORKS PROJECTS
BY THE STATE OR POLITICAL SUBDIVISION

The contractor shall comply with the provisions of Section 31-53 of the General Statutes of the State of Connecticut, as revised, a part of which is quoted as follows:

(a) Each contract for the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project by the state or any of its agents, or by any political subdivision of the state or any of its agents, shall contain the following provision: "The wages paid on an hourly basis to any mechanic, laborer or workman employed upon the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such employee to any employee welfare fund, as defined in subsection (h) of section 31-53 of the General Statutes shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the town in which such public works project is being constructed. Any contractor who is not obligated by agreement to make payment or contribution on behalf of such employees to any such employee welfare fund shall pay to each employee as part of his wages the amount of payment or contribution for his classification on each pay day."

DISK: K-25
LABEL: 78194

SERVICE OF PROCESS

The successful bidder, 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.

LISTING ALL EMPLOYMENT OPENINGS WITH THE OFFICE OF THE CONNECTICUT STATE EMPLOYMENT SERVICE

This contract is subject to the provisions of Executive Order No. Seventeen of Governor Thomas J. Meskill promulgated February 15, 1973, and, as such, this contract may be cancelled, terminated or suspended by the contracting agency or the State Labor Commissioner for violation of or noncompliance with said Executive Order No. Seventeen, notwithstanding that the Labor Commissioner may not be a party to this contract. The parties to this contract, as part of the consideration hereof, agree that Executive Order No. Seventeen is incorporated herein by reference and made a part hereof. The parties agree to abide by said Executive Order and agree that the contracting agency and the State Labor Commissioner shall have joint and several continuing jurisdiction in respect to contract performance in regard to listing all employment openings with the Connecticut State Employment Service.

LABOR ON STATE BRIDGES

The contractor shall comply with the provisions of Section 31-56 of the General Statutes of the State of Connecticut as revised, which is quoted as follows:

Section 31-56. Hours of labor on state bridges. Each contract entered into by the commissioner of transportation for the construction, alteration or repair of a state bridge shall contain a provision to the effect that no person shall be employed to work or be permitted to work more than forty-eight hours in any week on any work provided for in such contract. The operation of such limitation of hours of work may be suspended during an emergency, upon approval of the commissioner of transportation.

Violence in the Workplace Prevention

This contract is subject to the provisions of Executive Order No. 16 of Governor John G. Rowland promulgated August 4, 1999 and, as such, the contract may be canceled, terminated or suspended by the state for violation of or noncompliance with said Executive Order No. 16. The parties to this contract, as part of the consideration hereof, agree that said Executive Order No. 16 is incorporated herein by reference and made a part hereof. The parties agree to abide by such Executive Order.

RATE OF WAGES FOR WORK ON STATE HIGHWAYS

The contractor shall comply with the provisions of Section 31-54 of the General Statutes of the State of Connecticut, as revised, a part of which is quoted as follows:

The labor commissioner shall hold a hearing at any required time to determine the prevailing rate of wages upon any highway contract within any specified area on an hourly basis and the amount of payment or contributions paid or payable on behalf of each employee to any employee welfare fund, as defined in section 31-53, upon any classifications of skilled, semiskilled and ordinary labor. Said commissioner shall determine the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each employee to any employee welfare fund, as defined in section 31-53, in each locality where any highway or bridge is to be constructed, and the commissioner of transportation shall include such rate of wage on an hourly basis and the amount of payment or contributions paid or payable on behalf of each employee to any employee welfare fund, as defined in section 31-53, or in lieu thereof, in cash as part of wages each pay day, for each classification of labor in the proposal for the contract and in the contract. The rate and the amount so established shall, at all times, be considered as the minimum rate of wage on an hourly basis and the amount of payment or contributions to an employee welfare fund, or cash in lieu thereof, for the classification for which it was established. Any contractor who pays any person at a lower rate of wage on an hourly basis or the amount of payment or contributions paid or payable on behalf of each employee to any employee welfare fund, as defined in section 31-53, or where he is not obligated by any agreement to make payment or contributions to the employee welfare funds, as defined in section 31-53, and fails to pay the amount of such payment or contributions directly to the employee as part of his wages each pay day, than that so established for the classifications of work specified in any such contract shall be fined not more than one hundred dollars for each offense. The provisions of this section shall apply only to state highways and bridges on state highways.

AWARDING OF CONTRACTS TO OCCUPATIONAL SAFETY AND HEALTH LAW VIOLATORS PROHIBITED

The contractor shall comply with the provisions of Section 31-57b of the General Statutes of the State of Connecticut, as revised, a part of which is quoted as follows:

No contract shall be awarded by the state or any of its political subdivisions to any person or firm or any firm, corporation, partnership or association in which such persons or firms have an interest (1) which has been cited for three or more willful or serious violations of any occupational safety and health act or of any standard, order or regulation promulgated pursuant to such act, during the three-year period preceding the bid, provided such violations were cited in accordance with the provisions of any state occupational safety and health act or the occupational safety and health act of 1970, and not abated within the time fixed by the citation and such citation has not been set aside following appeal to the appropriate agency or court having jurisdiction or (2) which has received one or more criminal convictions related to the injury or death of any employee in the three-year period preceding the bid. Any person who knowingly provides false information concerning the information required pursuant to this section shall be assessed a civil penalty of not less than five hundred dollars nor more than five thousand dollars and shall be disqualified from bidding on or participating in a contract with the state or any of its political subdivisions for five years from the date of the final determination that the information is false. Any political subdivision or any state agency receiving false information pursuant to this section shall notify the commissioner of administrative services and, upon receipt of such notice, the commissioner shall conduct a hearing in accordance with the provisions of chapter 54. Upon a determination that false information was provided, the commissioner shall impose a civil penalty in accordance with the provisions of this section. Such civil penalty shall be paid to the treasurer or to an official of the political subdivision, as the case may be. Any civil penalty imposed pursuant to this section may be collected in a civil proceeding by any official of a political subdivision authorized to institute civil actions or, in the case of the state, by the attorney general, upon complaint of the commissioner of administrative services.

STATE OF CONNECTICUT

BY HIS EXCELLENCY

THOMAS J. MESKILL

GOVERNOR

EXECUTIVE ORDER NO. THREE

WHEREAS, sections 4-61d (b) and 4-114a of the 1969 supplement to the general statutes require nondiscrimination clauses in state contracts and subcontracts for construction on public buildings, other public works and goods and services and

WHEREAS, section 4-61e (c) of the 1969 supplement to the general statutes requires the labor department to encourage and enforce compliance with this policy by both employers and labor unions, and to promote equal employment opportunities, and

WHEREAS, the government of this state recognizes the duty and desirability of its leadership in providing equal employment opportunity, by implementing these laws,

NOW, THEREFORE, I, THOMAS J. MESKILL, Governor of the State of Connecticut, acting by virtue of the authority vested in me under section twelve of article fourth of the constitution of the state, as supplemented by section 3-1 of the general statutes, do hereby ORDER and DIRECT, as follows, by this Executive Order:

I

The labor commissioner shall be responsible for the administration of this Order and shall adopt such regulations as he deems necessary and appropriate to achieve the purposes of this Order. Upon the promulgation of this Order, the commissioner of finance and control shall issue a directive forthwith to all state agencies, that henceforth all state contracts and subcontracts for construction on public buildings, other public works and goods and services shall contain a provision rendering such contract or subcontract subject to this Order, and that such contract or subcontract may be cancelled, terminated or suspended by the labor commissioner for violation of or noncompliance with this Order or state or federal laws concerning nondiscrimination, notwithstanding that the labor commissioner is not a party to such contract or subcontract.

II

Each contractor having a contract containing the provisions prescribed in section 4-114a of the 1969 supplement to the general statutes, shall file, and shall cause each of his subcontractors to file, compliance reports with the contracting agency or the labor commissioner, as may be directed. Such reports shall be filed within such times and shall contain such information as to employment policies and statistics of the contractor and each subcontractor, and shall be in such form as the labor commissioner may prescribe. Bidders or prospective

contractors or subcontractors may be required to state whether they have participated in any previous contract subject to the provisions of this Order or any preceding similar Order, and in that event to submit on behalf of themselves and their proposed subcontractors compliance reports prior to or as an initial part of their bid or negotiation of a contract.

III

Whenever the contractor or subcontractor has a collective bargaining agreement or other contract or understanding with a labor organization or employment agency as defined in section 31-122 of the general statutes, the compliance report shall identify the said organization or agency and the contracting agency or the labor commissioner may require a compliance report to be filed with the contracting agency or the labor commissioner, as may be directed, by such organization or agency, signed by an authorized officer or agent of such organization or agency, with supporting information, to the effect that the signer's practices and policies, including but not limited to matters concerning personnel, training, apprenticeship, membership, grievance and representation, and working, do not discriminate on grounds of race, color, religious creed, age, sex or national origin, or ancestry of any individual, and that the signer will either affirmatively cooperate in the implementation of the policy and provisions of this Order, or that it consents and agrees that recruitment, employment and the terms and conditions of employment under the proposed contract shall be in accordance with the purposes and provisions of the Order.

IV

The labor commissioner may by regulation exempt certain classes of contracts, subcontracts or purchase order from the implementation of this Order, for standard commercial supplies or raw materials, for less than specified amounts of money or numbers of workers or for subcontractors below a specified tier. The labor commissioner may also provide by regulation for the exemption of facilities of a contractor which are in all respects separate and distinct from activities of the contractor related to the performance of the state contract, provided only that such exemption will not interfere with or impede the implementation of this Order, and, provided further, that in the absence of such an exemption, all facilities shall be covered by the provisions of this Order.

V

Each contracting agency shall be primarily responsible for obtaining compliance with the regulations of the labor commissioner with respect to contracts entered into by such agency or its contractors. All contracting agencies shall comply with the regulations of the labor commissioner in discharging their primary responsibility for securing compliance with the provisions of contracts and otherwise with the terms of this Order and of the regulations of the labor commissioner issued pursuant to this Order. They are directed to cooperate with the labor commissioner and to furnish the labor commissioner such information and assistance as he may require in the performance of his functions under this Order. They are further directed to appoint or designate from among the personnel of each agency, compliance officers, whose duty shall be to seek compliance with the objectives of this Order by conference, conciliation, mediation, or persuasion.

VI

The labor commissioner may investigate the employment practices and procedures of any state contractor or subcontractor and the practices and policies of any labor organization or employment agency hereinabove described, relating to employment under the state contract, as concerns nondiscrimination by such organization or agency as hereinabove described, or the labor commissioner may initiate such investigation by the appropriate contract agency, to determine whether or not the contractual provisions hereinabove specified or statutes of the state respecting them have been violated. Such investigation shall be conducted in accordance with the procedures established by the labor commissioner and the investigating agency shall report to the labor commissioner any action taken or recommended.

VII

The labor commissioner shall receive and investigate or cause to be investigated complaints by employees or prospective employees of a state contractor or subcontractor or members or applicants for membership or apprenticeship or training in a labor organization or employment agency hereinabove described, which allege discrimination contrary to the contractual provisions specified hereinabove or state statutes requiring nondiscrimination in employment opportunity. If this investigation is conducted for the labor commissioner by a contracting agency, that agency shall report to the labor commissioner what action has been taken or is recommended with regard to such complaints.

VIII

The labor commissioner shall use his best efforts, directly and through contracting agencies, other interested federal, state and local agencies, contractors and all other available instrumentalities, including the commission on human rights and opportunities, the executive committee on human rights and opportunities, and the apprenticeship council under its mandate to provide advice and counsel to the labor commissioner in providing equal employment opportunities to all apprentices and to provide training, employment and upgrading opportunities for disadvantaged workers, in accordance with section 31-51(d) of the 1969 supplement to the general statutes, to cause any labor organization or any employment agency whose members are engaged in work under government contracts or referring workers or providing or supervising apprenticeship or training for or in the course of work under a state contract or subcontract to cooperate in the implementation of the purposes of this Order. The labor commissioner shall in appropriate cases notify the commission on human rights and opportunities or other appropriate state or federal agencies whenever it has reason to believe that the practices of any such organization or agency violate equal employment opportunity requirements or state or federal law.

IX

The labor commissioner or any agency officer or employee in the executive branch designated by regulation of the labor commissioner may hold such hearings, public or private, as the labor commissioner may deem advisable for compliance, enforcement or educational purposes under this Order.

(a) *The labor commissioner may hold or cause to be held hearings, prior to imposing ordering or recommending the imposition of penalties and sanctions under this Order. No order for disbarment of any contractor from further state contracts shall be made without affording the contractor an opportunity for a hearing. In accordance with such regulations as the labor commissioner may adopt, the commissioner or the appropriate contracting agency may*

- (1) *Publish or cause to be published the names of contractors or labor organizations or employment agencies as hereinabove described which it has concluded have complied or failed to comply with the provisions of this Order or the regulations of the labor commissioner in implementing this Order.*
- (2) *Recommend to the commission on human rights and opportunities that in cases in which there is substantial or material violation or threat thereof of the contractual provision or related state statutes concerned herein, appropriate proceedings be brought to enforce them, including proceedings by the commission on its own motion under chapter 553 of the general statutes and the enjoining, within the limitations of applicable law, of organizations, individuals or groups who prevent directly or indirectly or seek to prevent directly or indirectly compliance with the provisions of this Order.*
- (3) *Recommend that criminal proceedings be brought under chapter 939 of the general statutes.*
- (4) *Cancel, terminate, suspend or cause to be cancelled, terminated, or suspended in accordance with law any contract or any portion or portions thereof for failure of the contractor or subcontractor to comply with the nondiscrimination provisions of the contract. Contracts may be cancelled, terminated, suspended absolutely or their continuance conditioned upon a program for future compliance approved by the contracting agency.*
- (5) *Provide that any contracting agency shall refrain from entering into any further contracts or extensions or modifications of existing contracts with any contractor until he has satisfied the labor commissioner that he has established and will carry out personnel and employment policies compliant with this Order.*
- (6) *Under regulations prescribed by the labor commissioner each contracting agency shall make reasonable efforts within a reasonable period of time to secure compliance with the contract provisions of this Order by methods of conference, conciliation, mediation or persuasion, before other proceedings shall be instituted under this Order or before a state contract shall be cancelled or terminated in whole or in part for failure of the contractor or subcontractor to comply with the contract provisions of state statute and this Order.*

(b) Any contracting agency taking any action authorized by this Order, whether on its own motion or as directed by the labor commissioner or pursuant to his regulations shall promptly notify him of such action. Whenever the labor commissioner makes a determination under this Order, he shall promptly notify the appropriate contracting agency and other interested federal, state and local agencies of the action recommended. The state and local agency or agencies shall take such action and shall report the results thereof to the labor commissioner within such time as he shall specify.

XI

If the labor commissioner shall so direct, contracting agencies shall not enter into contracts with any bidder or prospective contractor unless he has satisfactorily complied with the provisions of this Order, or submits a program for compliance acceptable to the labor commissioner, or if the labor commissioner so authorizes, to the contracting agency.

XII

Whenever a contracting agency cancels or terminates a contract, or a contractor has been disbarred from further government contracts because of noncompliance with the contract provisions with regard to nondiscrimination, the labor commissioner or the contracting agency shall rescind such disbarment, upon the satisfaction of the labor commissioner that the contractor has purged himself of such noncompliance and will thenceforth carry out personnel and employment policies of nondiscrimination in compliance with the provision of this Order.

XIII

The labor commissioner may delegate to any officer, agency or employee in the executive branch any function or duty of the labor commissioner under this Order except authority to promulgate regulations of a general nature.

XIV

This Executive Order supplements the Executive Order issued on September 28, 1967. All regulations, orders, instructions, designations and other directives issued heretofore in these premises, including those issued by the heads of various departments or agencies under or pursuant to prior order or statute, shall remain in full force and effect, unless and until revoked or superseded by appropriate authority, to the extent that they are not inconsistent with this Order.

This Order shall become effective thirty days after the date of this Order.

Dated at Hartford, Connecticut, this 16th day of June, 1971.


GOVERNOR

GUIDELINES AND RULES
OF STATE LABOR COMMISSIONER
IMPLEMENTING GOVERNOR'S EXECUTIVE
ORDER NO. THREE

SEC. 1. PERSONS AND FIRMS SUBJECT TO EXECUTIVE ORDER NO. THREE AND GUIDELINES AND RULES.

a. Every contractor, or subcontractor as defined in Sec. 2 hereof, supplier of goods or services, vendor, bidder and prospective contractor or subcontractor, having ten or more employees as defined in Sec. 3 of these Guidelines, having or entering into or bidding to enter into any type of contractual relationship with the State of Connecticut or any of its agencies, boards, commissions, departments or officers, and if the consideration, cost, subject matter or value of the goods or services exceeds \$5,000.00, shall be subject to the Governor's Executive Order No. Three and these Guidelines and Rules.

b. A copy of the Governor's Executive Order No. Three and of these Guidelines and Rules shall be available to each said contractor, subcontractor, supplier, vendor, bidder and prospective contractor and subcontractor, and the said Executive Order No. Three and these Guidelines and Rules shall be incorporated by reference and made a part of the contract, purchase order, agreement or document concerned. A copy of the Executive Order and of these Guidelines and Rules shall be furnished to a contracting party or bidder on request.

c. All persons, partnerships, associations, firms, corporations and other entities having less than ten employees as defined in Sec. 3 at the time of the bid and execution of the contract and continuing through the performance of the contract are exempt from the provisions of the said Executive Order and these Guidelines and Rules. All contracts, subcontracts, purchase orders and agreements wherein the consideration is \$5,000.00 or less shall be exempt from Executive Order No. Three and from these Guidelines and Rules.

SEC. 2. SUBCONTRACTORS.

As used herein, subcontractors are persons, partnerships, associations, firms or corporations or other entities having contractual relationship with a contractor who in turn has a contract with the State of Connecticut or any of its agencies, boards, commissions or departments. Subcontractors below this tier are exempt from the Executive Order and from these Guidelines and Rules.

SEC. 3. EMPLOYEES.

As used herein, employees are persons working full or part-time irrespective of personnel classification whose wages, salaries, or earnings are subject to the Federal Insurance Contribution Act and/or to Federal Withholding Tax as a matter of law (whether in fact or not any actual withholding

occurs in a given case), in an employee-employer relationship at the time of bid, contract execution, or offer or acceptance, and/or during any time thereafter during the existence of the performance period of the contract to the conclusion thereof.

SEC. 4. REPORTS.

a. Prior to the execution of the contract or prior to acceptance of a bid, as the case may be, the contractor, subcontractor, bidder or vendor shall file a report with the State Labor Commissioner, which report shall be complete and contain all of the information therein prescribed. The report shall be on Form E.O. 3-1, a facsimile of which is attached hereto and made a part hereof, or in lieu thereof the contractor, subcontractor, bidder or vendor shall submit a detailed report containing all of the information required in Form E.O. 3-1.

b. The Labor Commissioner may require the filing of additional reports prior to final payment or prior to any renewal or extension of the contract and during the duration of the contract at such times as the Commissioner may, in his discretion, from time to time deem necessary. The Labor Commissioner may require the filing of additional information or reports, and the contractor, subcontractor, bidder or vendor shall furnish said information or reports within the times prescribed by the Labor Commissioner.

c. The Labor Commissioner may, at his discretion, also require timely statistical reports on the number of minority employees employed or to be employed in the performance of the contract, and the Labor Commissioner may define such minority groups or persons.

d. Reports filed pursuant to these Guidelines and Rules in implementation of Executive Order No. Three are not public records subject to public inspection, but may be inspected only by federal and state officials having jurisdiction and authority to investigate matters of this type. All federal and state agencies empowered by law to investigate matters relating to Executive Order No. Three shall have access to these reports for inspection or copying during regular business hours.

e. Any person who wilfully, wantonly or through negligence destroys or permits to be destroyed, alters or allows to be altered after filing, any reports submitted in compliance herewith shall be subject to penalties as prescribed by law.

SEC. 5. MANDATORY CLAUSES IN DOCUMENTS.

a. All contracts shall contain the following provisions verbatim:

This contract is subject to the provisions of Executive Order No. Three of Governor Thomas J. Maskill promulgated June 16, 1971 and, as such, this contract may be cancelled, terminated or suspended by the state labor commissioner for violation of or noncompliance with said Executive Order No. Three, or any state or federal law concerning

nondiscrimination, notwithstanding that the labor commissioner is not a party to this contract. The parties to this contract, as part of the consideration hereof, agree that said Executive Order No. Three is incorporated herein by reference and made a part hereof. The parties agree to abide by said Executive Order and agree that the state labor commissioner shall have continuing jurisdiction in respect to contract performance in regard to nondiscrimination, until the contract is completed or terminated prior to completion.

The (contractor), (subcontractor), (bidder), (vendor) agrees, as part consideration hereof, that this (order) (contract) is subject to the Guidelines and Rules issued by the state labor commissioner to implement Executive Order No. Three, and that he will not discriminate in his employment practices or policies, will file all reports as required, and will fully cooperate with the State of Connecticut and the state labor commissioner.

These provisions are in addition to and not in lieu of other clauses required by law.*

* N.B. The above paragraphs contain requirements additional to those set forth in the July 16, 1971 directive to state agencies.

b. Every purchase order or like form submitted by a vendor or bidder, as applicable, shall contain the following clause verbatim:

Vendor agrees, as part of the consideration hereof, that this order is subject to the provisions of Executive Order No. Three and the Guidelines and Rules issued by the Labor Commissioner implementing said Order as to nondiscrimination, and vendor agrees to comply therewith.

c. Where preprinted contract forms have been prescribed by federal authority and the rules of the federal agency prohibit the alteration thereof, the compliance officer of the State agency concerned shall submit to the Labor Commissioner a suggested short form or addendum acceptable to the federal agency, and in such cases, after approval by the Labor Commissioner, said clause may be substituted.

SEC. 6. COOPERATION OF STATE AGENCIES, BOARDS AND COMMISSIONS.

Every agency, board, commission and department of the State of Connecticut shall cooperate with the Labor Commissioner in the implementation of Executive Order No. Three and shall furnish such information and assistance as the Labor Commissioner may from time to time request.

SEC. 7 INVESTIGATIONS, COMPLAINTS.

The Labor Commissioner may initiate an investigation upon receipt

of a complaint alleging discrimination. The Labor Commissioner may request that an investigation be conducted by the State agency which is the party to the contract in question. Investigations shall be conducted in accordance with acceptable legal standards, safeguarding the rights of all parties involved, and obtaining all of the relevant facts necessary for a complete determination of the issues. If the Labor Commissioner is not satisfied with the investigation or any part thereof he may order it to continue or to proceed further.

SEC. 8. HEARINGS.

The Labor Commissioner or officers designated by the heads of the State agencies, boards and commissions may conduct hearings on complaints filed. Hearings shall be held only after a report of the complaint has been filed with the Labor Commissioner and after a hearing on the complaint has been authorized or directed by the Labor Commissioner. Hearings shall be conducted in accordance with the accepted principles of administrative law. All parties shall be afforded the opportunity to a full, fair, impartial and complete hearing, the opportunity to examine and cross examine witnesses and to be present at all sessions of the hearing. If any party is vulnerable to a charge of a violation of the law, he shall be afforded the opportunity to procure counsel who may be present at the hearing.

SEC. 9. EQUAL EMPLOYMENT OPPORTUNITIES.

All State contracting agencies, employers, and labor unions shall use their best efforts to provide equal employment opportunities to all apprentices and to provide training, employment and upgrading opportunities for disadvantaged workers in accordance with section 31-51(d) of the General Statutes.

SEC. 10. DUTIES OF CONTRACTING AGENCIES.

All State contracting agencies shall be responsible for compliance with said Executive Order and with all state and federal laws relating to equal employment opportunities. All contracting agencies conducting investigations for the Labor Commissioner pursuant to Executive Order No. Three and these Guidelines and Rules shall report to the Labor Commissioner the action taken or recommended with regard to each complaint filed. Each officer of the executive department, every commissioner, and each executive head of each State agency, board and commission in the executive branch of the State government is expected to assume the responsibility of seeing to complete compliance with the Governor's Executive Order No. Three and shall forthwith take steps to assure and guarantee that there shall be no discrimination within their departments, agencies, boards or commissions in the performance of any state contract or sub-contract on the basis of race, creed, color, sex, age, national origin or national ancestry, or in any way in violation of any state or federal law relating thereto.

BY VIRTUE OF THE AUTHORITY VESTED IN ME PURSUANT TO EXECUTIVE ORDER NO. THREE EFFECTIVE JULY 16, 1971, AND THE GENERAL STATUTES OF CONNECTICUT.

Dated at Wethersfield, Connecticut this 19th day of Nov., 1971.

-4-

Jack A. Fusari

JACK A. FUSARI

John G. Rowland

Executive Order No. 16

WHEREAS, the State of Connecticut recognizes that workplace violence is a growing problem that must be addressed; and

WHEREAS, the State is committed to providing its employees a reasonably safe and healthy working environment, free from intimidation, harassment, threats, and /or violent acts; and

WHEREAS, violence or the threat of violence by or against any employee of the State of Connecticut or member of the public in the workplace is unacceptable and will subject the perpetrator to serious disciplinary action up to and including discharge and criminal penalties.

NOW, THEREFORE, I, John G. Rowland, Governor of the State of Connecticut, acting by virtue of the authority vested in me by the Constitution and by the statutes of this state, do hereby ORDER and DIRECT:

1. That all state agency personnel, contractors, subcontractors, and vendors comply with the following **Violence in the Workplace Prevention Policy**:

The State of Connecticut adopts a statewide zero tolerance policy for workplace violence.

Therefore, except as may be required as a condition of employment —

- No employee shall bring into any state worksite any weapon or dangerous instrument as defined herein.
- No employee shall use, attempt to use, or threaten to use any such weapon or dangerous instrument in a state worksite.
- No employee shall cause or threaten to cause death or physical injury to any individual in a state worksite.

Weapon means any firearm, including a BB gun, whether loaded or unloaded, any knife (excluding a small pen or pocket knife), including a switchblade or other knife having an automatic spring release device, a stiletto, any police baton or nightstick or any martial arts weapon or electronic defense weapon.

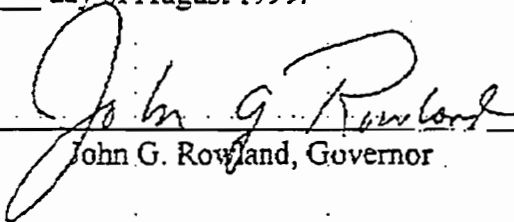
Dangerous instrument means any instrument, article, or substance that, under the circumstances, is capable of causing death or serious physical injury.

Violation of the above reasonable work rules shall subject the employee to disciplinary action up to and including discharge.

2. That each agency must prominently post this policy and that all managers and supervisors must clearly communicate this policy to all state employees.

3. That all managers and supervisors are expected to enforce this and uniformly.
4. That any employee who feels subjected to or witnesses violent, threatening, harassing, or intimidating behavior in the workplace immediately report the incident or statement to their supervisor, manager, or human resources office.
5. That any employee who believes that there is a serious threat to their safety or the safety of others that requires immediate attention notify proper law enforcement authorities and his or her manager or supervisor.
6. That any manager or supervisor receiving such a report shall immediately contact their human resources office to evaluate, investigate and take appropriate action.
7. That all parties must cooperate fully when questioned regarding violations of this policy.
8. That all parties be advised that any weapon or dangerous instrument at the worksite will be confiscated and that there is no reasonable expectation of privacy with respect to such items in the workplace.
9. That this order applies to all state employees in the executive branch.
10. That each agency will monitor the effective implementation of this policy.
11. That this order shall take effect immediately.

Dated in Hartford, Connecticut this 4th day of August 1999.


John G. Rowland, Governor

Filed this 4th day of August 1999




Susan Bysiewicz, Secretary of the State

STATE OF CONNECTICUT

BY HIS EXCELLENCY

THOMAS J. MESKILL

GOVERNOR

EXECUTIVE ORDER NO. SEVENTEEN

WHEREAS, Section 31-237 of the General Statutes of Connecticut as amended requires the maintaining of the established free services of the Connecticut State Employment Service to both employers and prospective employees and

WHEREAS, Section 31-5 of the General Statutes of Connecticut requires that no compensation or fee shall be charged or received directly or indirectly for the services of the Connecticut State Employment Service and

WHEREAS, large numbers of our citizens who have served in the Armed Forces of our nation are returning to civilian life in our state and seeking employment in civilian occupations and

WHEREAS, we owe a duty as well as gratitude to these returning veterans including the duty to find suitable employment for them and

WHEREAS, many of our handicapped citizens are fully capable of employment and are entitled to be placed in suitable employment and

WHEREAS, many of the citizens of our state who are unemployed are unaware of the job openings and employment opportunities which do in fact exist in our state and

WHEREAS, notwithstanding the free services of the Connecticut State Employment Service, many of our Connecticut employers do not use its free services or do not avail themselves fully of all of the services offered.

NOW, THEREFORE, I, THOMAS J. MESKILL, Governor of the State of Connecticut, acting by virtue of the authority vested in me under the fourth article of the Constitution of the State and in accordance with Section 3-1 of the General Statutes, do hereby ORDER and DIRECT, as follows, by this Executive Order:

I

The Labor Commissioner shall be responsible for the administration of this Order and shall do all acts necessary and appropriate to achieve its purpose. Upon promulgation of this Order, the Commissioner of Finance and Control shall issue a directive forthwith to all state agencies that henceforth all state contracts and subcontracts for construction on public buildings, other public works and goods and services shall contain a provision

rendering such contract or subcontract subject to this Order, and that such contract or subcontract may be cancelled, terminated or suspended by the Labor Commissioner for violation of or noncompliance with this Order, notwithstanding that the Labor Commissioner is not a party to such contract or subcontract.

II

Every contractor and subcontractor having a contract with the state or any of its agencies, boards, commissions, or departments, every individual partnership, corporation, or business entity having business with the state or who or which seeks to do business with the state, and every bidder or prospective bidder who submits a bid or replies to an invitation to bid on any state contract shall list all employment openings with the office of the Connecticut State Employment Service in the area where the work is to be performed or where the services are to be rendered.

III

All state contracts shall contain a clause which shall be a condition of the contract that the contractor and any subcontractor holding a contract directly under the contractor shall list all employment openings with the Connecticut State Employment Service. The Labor Commissioner may allow exceptions to listings of employment openings which the contractor proposes to fill from within its organization from employees on the rolls of the contractor on the date of publication of the invitation to bid or the date on which the public announcement was published or promulgated advising of the program concerned.

IV

Each contracting agency of the state shall be primarily responsible for obtaining compliance with this Executive Order. Each contracting agency shall appoint or designate from among its personnel one or more persons who shall be responsible for compliance with the objectives of this Order.

V

The Labor Commissioner shall be and is hereby empowered to inspect the books, records, payroll and personnel data of each individual or business entity subject to this Executive Order and may hold hearings or conferences, formal or informal, in pursuance of the duties and responsibilities hereunto delegated to the Labor Commissioner.

VI

The Labor Commissioner or any agency officer or employee in the executive branch designated by regulation of the Labor Commissioner may hold such hearings, public or private, as the Labor Commissioner may deem advisable for compliance, enforcement or educational purposes under this Order.

VII

(a) The Labor Commissioner may hold or cause to be held hearings, prior to imposing, ordering, or recommending the imposition of penalties and sanctions under this Order. In accordance herewith, the Commissioner or the appropriate contracting agency may suspend, cancel, terminate, or cause to be suspended, cancelled, or terminated in accordance with law any contract or any portion or portions thereof for failure of the contractor or subcontractor to comply with the listing provisions of the contract. Contracts may be cancelled, terminated, suspended absolutely or their continuance conditioned upon a program for future compliance approved by the contracting agency.

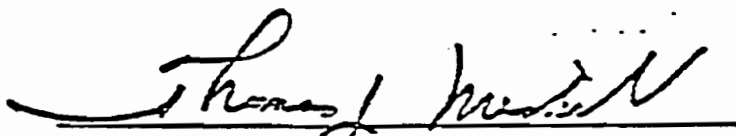
(b) Any contracting agency taking any action authorized by this Order, whether on its own motion or as directed by the Labor Commissioner, shall promptly notify him of such action. Whenever the Labor Commissioner makes a determination under this Order, he shall promptly notify the appropriate contracting agency of the action recommended. The agency shall report the results to the Labor Commissioner promptly.

VIII

If the Labor Commissioner shall so direct, contracting agencies shall not enter into contracts with any bidder or prospective contractor unless he has satisfactorily complied with the provisions of this Order.

This Order shall become effective sixty days after the date of this Order.

Dated at Hartford, Connecticut, this 15th day of February, 1973.


GOVERNOR

**AFFIRMATIVE ACTION REQUIREMENTS
A(76)**

It is the intent of these Affirmative Action Requirements to provide compliance standards for employee-hours in each craft utilized in the transportation construction industry on transportation construction projects. This provision affects contractors and their subcontractors while under contract with the Connecticut Department of Transportation. It is not the intent of these Affirmative Action Requirements to cause personnel displacement in order to hire qualified minorities and women. They are however designed to ensure that equal employment opportunity is being provided and discriminatory employment practices are not being exercised. The actual number of minority and female employee hours worked in each craft, compared to the labor market goals, will determine project compliance.

General Contract Provision

The contractor or subcontractor shall comply with this provision or provide adequate documentation of "good faith efforts" in attempting to comply with this provision.

The employee hours for minorities and females should be substantially uniform throughout the length of the contract for each of the trades. The time-table for meeting the project goals extends through the duration of the contract.

For the purpose of this provision, "minority" is defined as; Blacks, includes all persons having origins in any of the black racial groups; Hispanics, includes all persons of Mexican, Puerto Rican, Cuban, Central or South American, or Spanish Culture, except Portuguese; Asians, includes all persons having origins in any of the original peoples of the Far East, Southeast Asia, or Pacific Islands; and American Indians, all persons having origins in any of the original peoples of North America.

The percentage goals for minority employee-hour utilization and female employee hour utilization are based on Connecticut Labor Market statistics. The labor market goals for minorities and females are separate goals. Employees should not be counted in both the minority and female categories. The goal requirements are listed in Appendix A of this provision. The employee-hour percentages are expressed in terms of training and employment hours in proportion to the total employee-hours worked by the contractor's and/or subcontractor's entire work force in that trade or craft. The transfer of minorities, females or trainees from employer to employer, or from project to project, for the sole purpose of meeting the labor market goal, is a violation of this contract provision.

In no event may a contractor or subcontractor utilize the goals, time-tables, or affirmative action steps, required by these provisions in such a manner as to cause or result in discrimination against any person on the basis of race, color, religion, sex,

age, marital status, national origin, ancestry, present or past history of mental disorder, mental retardation, learning disability or physical disability, including, but not limited to, blindness.

Compliance and Enforcement

Contractors are responsible for informing their subcontractor(s) (regardless of tier) as to their respective obligations under these provisions. Any contractor or subcontractor who fails to meet the stipulation(s) prescribed in this provision, and/or fails to provide adequate documentation of affirmative actions and "good faith efforts", shall be deemed to be in noncompliance with this provision, as well as; Presidential Executive Order 11246 as amended, the Governor's Executive Order #3, Connecticut's EEO Special Provisions and Equal Opportunity Clause of its contract.

If the contractor and/or subcontractor is deemed to be in non-compliance, then he shall be subject to sanctions and penalties for violation of Connecticut's Specific Equal Employment Opportunity Responsibilities Contract Provision (April 1994), Presidential Executive Order 11246 as amended and/or the Governor's Executive Order #3. These sanctions and penalties shall include but not be limited to suspension, termination, and/or cancellation of existing contracts and/or subcontracts (subcontract agreements).

Procedures

In determining whether a contractor or subcontractor has met the goals, the agency will consider the contractor's and/or subcontractor's utilization of minority and female participation per craft (hourly). If the contractor or subcontractor meets the goals, or can demonstrate and document that every good faith effort was made to meet the goals, the contractor or subcontractor shall be presumed to be in compliance with this contract provision. Formal sanctions or proceedings will not be instituted unless the agency otherwise determines that the contractor or subcontractor is in violation of this provision.

In the event a noncompliance finding is made, the contractor shall receive an informal letter informing him/her of the noncompliance finding and a request for corrective action relative to this finding. If no response is received, or if the response is unsatisfactory, the contractor shall receive a registered show-cause notice requesting specific action to be taken by the contractor, and an explanation of what actions may be taken against the contractor if a satisfactory solution is not reached.

If a show cause notice is issued, then the formal process begins, and proceeds with such formal actions as prescribed by the sanctions and penalties described herein; the burden of proving the noncompliance of these provisions lies with the agency. However, the contractor's or subcontractor's failure to meet his goals shall shift to him to present evidence to show that he has met the "good faith effort" requirement of these provisions.

In respect to matters not covered in this provision, nothing herein is intended to relieve any contractor or subcontractor from compliance with all applicable federal and state laws, regulations, Executive Orders and/or Special Provisions concerning equal employment opportunity, affirmative action, nondiscrimination and related subjects during the term of its contract on this project.

Records and Reports

It is required of the successful bidder and each approved subcontractor to submit to the Division of Contract Compliance for review and approval an affirmative action plan. *On federal-aid projects, this requirement (Affirmative Action Plan) is waived if the contract or subcontract is under \$10,000 (unless an Affirmative Action Plan is determined necessary by the contracting agency). *On completely state-funded projects, the Affirmative Action Plan requirement is waived on contracts or subcontracts under \$5,000 (unless an Affirmative Action Plan is determined necessary by the contracting agency).

This provision will supplement Connecticut's Required Contract Provision, entitled "Specific Equal Employment Opportunity Responsibilities" in all contracts including federally-aided contracts as applicable.

**APPENDIX A
(LABOR MARKET GOALS)**

<u>LABOR MARKET AREA</u>	<u>% MINORITY GOAL</u>	<u>% FEMALE GOAL</u>
Bridgeport Ansonia-Beacon Falls-Bridgeport- Derby-Easton-Fairfield-Milford- Monroe-Oxford-Seymour-Shelton- Stratford-Trumbull	14	6.9
Danbury Bethel-Bridgewater-Brookfield Danbury-Kent-New Fairfield- New Milford-Newtown-Redding- Ridgefield-Roxbury-Sherman- Washington	4	6.9
Danielson Brooklyn-Eastford-Hampton- Killingly-Pomfret-Putnam- Scotland-Sterling-Thompson- Voluntown-Union-Woodstock	2	6.9
Hartford Andover-Ashford-Avon-Barkhamsted- Berlin-Bloomfield-Bolton-Bristol- Burlington-Canton-Chaplin- Colchester-Columbia-Coventry- Cromwell-Durham-East Granby- East Haddam-East Hampton- East Hartford-East Windsor- Ellington-Enfield-Farmington- Glastonbury-Granby-Haddam- Hartford-Harwington-Hebron- Lebanon-Manchester-Mansfield- Marlborough-Middlefield-Middletown- Newington-Plainville-Plymouth- Portland-Rocky Hill-Simsbury-Somers- South Windsor-Southington-Stafford- Suffield-Tolland-Vernon- West Hartford-Wethersfield-Willington- Winchester-Windham-Windsor- Windsor Locks	15	6.9

<ul style="list-style-type: none"> • Lower River <li style="padding-left: 20px;">Chester-Deep River-Essex-Lyme- Westbrook 	2	6.9
<ul style="list-style-type: none"> • New Haven <li style="padding-left: 20px;">Bethany-Branford-Cheshire- Clinton-East Haven-Guilford- Hamden-Killingworth-Madison- Meriden-New Haven-No. Branford- North Haven-Orange-Wallingford- West Haven-Woodbridge 	14	6.9
<ul style="list-style-type: none"> • New London <li style="padding-left: 20px;">Bozrah-Canterbury-East Lyme- Franklin-Griswold-Groton- Ledyard-Lisbon-Montville- New London-North Stonington- Norwich-Old Lyme-Old Saybrook- Plainfield-Preston-Salem- Sprague-Stonington-Waterford- Hopkinton RI-Westerly RI 	8	6.9
<ul style="list-style-type: none"> • Stamford <li style="padding-left: 20px;">Darien-Greenwich-New Canaan- Norwalk-Stamford-Weston- Westport-Wilton 	17	6.9
<ul style="list-style-type: none"> • Torrington <li style="padding-left: 20px;">Canaan-Colebrook- Cornwall-Goshen-Hartland-Kent- Litchfield-Morris- Norfolk-North Canaan-Salisbury- Sharon-Torrington-Warren 	2	6.9
<ul style="list-style-type: none"> • Waterbury <li style="padding-left: 20px;">Bethlehem- Middlebury-Naugatuck- Prospect-Southbury-Thomaston- Waterbury-Watertown-Wolcott- Woodbury 	10	6.9

EDUCATION, WELFARE AND PUBLIC HEALTH TAX

(SALES AND USE TAX)

The Contractor's attention is called to Regulation No. 12-426-18 as amended promulgated by the Sales and Use Tax Division of the State Department of Revenue Services, which provided for the Exemption of the Sales and Use Tax on the purchase of such materials and supplies as are to be physically incorporated in and become a permanent part of the project being performed under this contract. The Contractor or Subcontractor shall furnish his suppliers with a completed certificate, in the following prescribed form:

The Contractor hereby acknowledges and agrees to 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 attached copy of the "Governmental Agency Exemption Certificate" is hereby made a part hereof."

* * * *

CONTRACTOR'S
EXEMPT PURCHASE CERTIFICATE

Project No. _____

Town _____

Route or Road _____

I hereby certify under the penalties of (FALSE STATEMENTS) that I am engaged in the performance of a construction contract on a project for the following named exempt agency or organization.

CONNECTICUT
Department of Transportation
2800 Berlin Turnpike, Newington, Connecticut 06111-4116

That such agency is to the best of my knowledge and belief exempt from the Education, Welfare and Public Health Tax (Sales and Use Tax) because it is a Branch of the State Government, in accordance with Regulation No. 12-426-18 of the Department of Revenue Services.

That this certificate is issued to cover all purchases of materials and supplies to be physically incorporated in and become a permanent part of the project referred to above.

Permit No. _____
Print No. or "None"

(Signed) _____
Written Signature of Contractor

Date _____

Name of Firm

Place _____

Address

* * * *

CONNECTICUT

REQUIRED CONTRACT PROVISION

CONSTRUCTION SAFETY AND HEALTH STANDARDS

It is a condition of this contract, and shall be made a condition of each subcontract entered into pursuant to this contract, that the contractor and any subcontractor shall not require any laborer or mechanic employed in performance of the contract to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health or safety, as determined under construction safety and health standards (Title 29, Code of Federal Regulations, Part 1926, formerly Part 1518, as revised from time to time), promulgated by the United States Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (83 Stat. 96).

CONNECTICUT

November 1980

REQUIRED CONTRACT PROVISION

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY

CONSTRUCTION CONTRACT SPECIFICATION

(EXECUTIVE ORDER 11246)

1. Appendix A and Appendix B referred to below and attached hereto express goals and timetables for the utilization of females and minorities respectively on all federally assisted construction projects advertised by the Connecticut Department of Transportation.

Appendix A establishes the goal for female utilization in all crafts statewide. Appendix B refers to minority utilization for each trade in designated areas.

2. The goals for minority and female participation, expressed in percentage terms for the contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

FEMALES

See Appendix A

MINORITIES

See Appendix B

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or Federally assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

3. The Contractor's compliance with the Executive Order and the regulations in 41-CFR Part 60-4 shall be based on its implementation of the specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3 (a) and its efforts to meet the goals established for the geographical area where the contract is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from contractor to contractor or from project to project for the sole purpose of meeting the contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

4. As used in these specifications:

a. "Covered area" means the geographical area described in the solicitation from which this contract resulted.

b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority.

c. "Employer Identification Number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U. S. Treasury Department Form 941.

d. "Minority" includes:

1. Black (all persons having origins in any of the Black African racial groups not of Hispanic origin):

2. Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or Origin, regardless of race):

3. Asian or Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands: and

4. American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

5. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications which contains the applicable goals for minority and female participation.

6. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U. S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or subcontractor's failure to take good faith efforts to achieve the plan goals and timetables.

7. The Contractor shall implement the specific affirmative action standards provided in paragraphs 10a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form and such notices may be obtained from any Office of Federal Contract Compliance Programs (OFCCP) Office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

8. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

9. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U. S. Department of Labor.

10. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities:

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off the street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the Union or Unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the Union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on the job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 10b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy.

manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO Policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO Policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc. prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

11. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (10 a through p). The efforts of a contractor association, joint contractor union, contractor community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 10 a through p of these Specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

12. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is under-utilized).

13. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

14. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

15. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

16. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 10 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

17. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status, (e.g. mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

18. Nothing herein provided shall be construed as a limitation upon the application of their laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g. those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program.)

19. The Director of the Office of Federal Contract Compliance Programs, from time to time, shall issue goals and timetables for minority and female utilization which shall be based on appropriate workforce, demographic or other relevant data and which shall cover construction projects or construction contracts performed in specific geographical areas. The goals, which shall be applicable to each construction trade in a covered contractor's or subcontractor's entire workforce which is working in the area covered by the goals and timetables, shall be published as notices in the Federal Register, and shall be inserted by the contracting officers and applicants, as applicable, in the Notice required by 41 C.F.R. 60-4.2. Covered construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed.

November 1980

Appendix A

Female Coal

6.9%

APPENDIX B

Until further notice, the following goals for minority utilization in each construction craft and trade shall be included in all Federal or federally assisted construction contracts and subcontracts in excess of \$10,000 to be performed in the respective geographical areas. The goals are applicable to each nonexempt contractor's total onsite construction workforce, regardless of whether or not part of that workforce is performing work on a Federal, federally assisted or nonfederally related project, contract or subcontract.

006 Hartford - New Haven - Springfield, CT-MA:	11
Standard Metropolitan Statistical Area Counties	
3283 Hartford - New Britain - Bristol, CT CT Hartford, CT Middlesex, CT, Tolland	6.9
5483 New Haven - Waterbury - Meriden, CT CT New Haven	9.0
5523 New London - Norwich, CT CT New London	4.5
6323 Pittsfield, MA MA Berkshire	1.6
8003 Springfield - Chicopee - Holyoke, MA CT MA Hampden, MA Hampshire	4.8
Non Standard Metropolitan Statistical Area Counties	5.9
CT Litchfield, CT, Windham, MA - Franklin, NH Cheshire, VT - Windham	

State of Connecticut

Department of Transportation

SUPPLEMENTAL SPECIFICATIONS

TO

THE STANDARD SPECIFICATIONS

FOR

ROADS, BRIDGES AND INCIDENTAL CONSTRUCTION

FORM 814A

1995

JANUARY 2000

January 2000

DIVISION I
GENERAL REQUIREMENTS AND COVENANTS

<u>SECTION</u>		<u>SPECIFICATION NUMBER</u>
1.01	Definition of Terms and Permissible Abbreviations	101
1.02	Proposal Requirements and Conditions	102
1.03	Award and Execution of Contract	103
1.04	Scope of Work	104
1.05	Control of Work	105
1.06	Control of Materials	106
1.07	Legal Relations and Responsibilities	107
1.08	Prosecution and Progress	108
1.09	Measurement and Payment	109
1.10	Environmental Compliance	110

DIVISION II
CONSTRUCTION DETAILS

<u>SECTION</u>		<u>SPECIFICATION NUMBER</u>
2.01	Clearing and Grubbing	201
2.02	Roadway Excavation, Formation of Embankment and Disposal of Surplus Material	202
2.05	Trench Excavation	205
2.07	Borrow	207
2.09	Subgrade	209
2.10	Water Pollution Control (Soil Erosion)	210
2.12	Subbase	212
2.13	Granular Fill	213
3.04	Processed Aggregate Base	304
3.05	Processed Aggregate	305
4.01	Concrete Pavement	401
4.06	Bituminous Concrete	406
4.15	Pressure Relief Joint	415
5.07	Catch Basins, Manholes and Drop Inlets	507
6.01	Concrete for Structures	601
6.02	Reinforcing Steel	602
6.03	Structural Steel	603
6.05	Masonry facing	605
6.51	Culverts	651
7.14	Temporary Sheet Piling	714
8.05	Reinforced Concrete Ditch Liner	805
8.15	Bituminous Concrete Lip Curbing	815
9.10	Metal Beam Rail	910
9.13	Chain Link Fence	913
9.21	Concrete Sidewalks	921
9.39	Sweeping for Dust Control	939
9.40	Furnishing Water Equipment	940
9.43	Water for Dust Control	943
9.49	Furnishing Planting and Mulching ...	949
9.52	Selective Clearing and Thinning	952
9.70	Trafficperson	970
9.71	Maintenance and Protection of Traffic	971
9.76	Barricade Warning Lights	976
9.77	Traffic Cone	977
9.78	Traffic Drum	978
9.79	Construction Barricades	979
9.80	Construction Staking	980
9.81	42-Inch Traffic Cone	981

DIVISION II
CONSTRUCTION DETAILS

<u>SECTION</u>		<u>SPECIFICATION NUMBER</u>
10.01	Trenching and Backfilling	1001
10.08	Electrical Conduit	1008
11.11	Loop Vehicle Detector and Sawcut	1111
11.13	Control Cable	1113
11.30	High Mounted Internally Illuminated Flashing Arrow	1130
11.31	Changeable Message Sign	1131
12.05	Delineators	1205
12.07	Sign Face - Extruded Aluminum (Type III Reflective Sheeting)	1207
12.08	Sign Face - Sheet Aluminum	1208
12.09	Painted Pavement Markings	1209
12.10	Epoxy Resin Pavement Markings, Symbols and Legends	1210
12.12	Temporary Plastic Pavement Marking Tape	1212
12.14	Preformed Black Line Mask Pavement Marking Tape	1214
12.16	Black Epoxy Resin Pavement Markings	
	Black Epoxy Resin Symbols and Legends	1216
12.20	Construction Signs - Type III Reflective Sheeting	1220
18.00	General Clauses - Impact Attenuation System	1800
18.05	Furnishing Type D - Portable Impact Attenuation System	1805
18.06	Use Type D - Portable Impact Attenuation System	1806
18.07	Temporary Impact Attenuation System	1807

DIVISION III
MATERIALS SECTION

<u>SECTION</u>		<u>SPECIFICATION NUMBER</u>
M.02	Gravel Fill, Subbase, Gravel Base and Surfaces, Stone Base, Pervious Structure Backfill, Free-Draining Material Crusher-Run Stone	M02
M.03	Portland Cement Concrete	M03
M.04	Bituminous Concrete Materials	M04
M.05	Processed Aggregate Base and Pavement Surface Treatment	M05
M.06	Metals	M06
M.07	Paint	M07
M.08	Drainage	M08
M.10	Fence, Railing and Posts	M10
M.11	Masonry Facing, Cement and Dry Rubble Masonry, Brick, Mortar	M11
M.12	Bearing Areas, Riprap, Slope Paving & Slope Protection, Waterproofing and Dampproofing Stone and Granite Slope Curbing, Calcium Chloride for Dust Control, Wood	M12
M.13	Roadside Development	M13
M.14	Prestressed Concrete Members	M14
M.15	Highway Illumination	M15
M.16	Traffic Control Signals	M16
M.18	Signing	M18

LIST OF STANDARD PAY ITEMS

ADD THE FOLLOWING ITEM(S):

<u>Section</u>		
<u>Reference</u>	<u>Pay Item</u>	<u>Pay Unit</u>
2.02	Rock Excavation (No Explosives)	C.Y.
3.05	Processed Aggregate	Ton
4.06	Removal of Bituminous Surface	S.Y.
6.02	Deformed Steel Bars - Epoxy Coated	LB.
6.02	Deformed Steel Bars - Galvanized	LB.
6.02	Deformed Steel Bars - Weldable	LB.
6.02	Welded Wire Fabric	LB.
6.02	Dowel Bar Splicer System	EA.
6.02	Dowel Bar Splicer System - Epoxy Coated	EA.
6.02	Dowel Bar Splicer System - Galvanized	EA.
6.51	(Size) Slotted Drain Pipe	L.F.
6.51	(Size) Temporary Slotted Drain Pipe	L.F.
9.10	Convert Metal Beam Rail to Metal Beam Rail (Type)	L.F.
9.13	(Type) (Size) Chain Link Gate	EA.
9.13	(Type) (Size) Polyvinyl Chloride Chain Link Gate	EA.
9.50	Erosion Control Matting	S.Y.
9.70	Trafficperson	Est.
9.78	Traffic Drum	EA.
12.09	Hot-Applied Painted Pavement Markings (Width) (Color)	L.F.
12.10	Epoxy Resin Pavement Markings (Width) (Color)	L.F.
12.10	Epoxy Resin Pavement Markings, Symbols and Legends	S.F.
12.14	(Width) Preformed Black Line Mask Pavement Marking Tape	L.F.
12.16	(Width) Black Epoxy Resin Pavement Markings	L.F.
12.16	Black Epoxy Resin Symbols and Legends	S.F.
18.06	Type D Portable Impact-Attenuation System	HR.

DELETE THE FOLLOWING ITEM(S):

<u>Section</u>		
<u>Reference</u>	<u>Pay Item</u>	<u>Pay Unit</u>
2.02	Unclassified Excavation	C.Y.
6.02	Structural Steel Shapes	LB.
6.02	Wire Fabric	S.Y.
8.05	Reinforced Concrete Ditch Liner (Size)	L.F.
9.39	Furnishing Sweeper	L.S.
9.40	Furnishing Water Equipment	L.S.
9.50	Temporary Seeding	S.Y.
9.70	Trafficmen	HR
9.78	Traffic Drum	DAY
12.09	Fast-Drying Painted Pavement Markings (Width) (Color)	L.F.
18.05	Furnishing (Type) Portable Impact Attenuation System	EA.

REVISE THE FOLLOWING ITEM(S):

<u>Section</u>		
<u>Reference</u>	<u>Pay Item</u>	<u>Pay Unit</u>
8.15	Bituminous Concrete Lip Curbing to Bituminous Concrete (Type) Curbing	L.F.
12.07	Sign Face--Extruded Aluminum (Type) to Sign Face--Extruded Aluminum (Type III Reflective Sheeting)	S.F.
12.20	Construction Signs--Encapsulated Lens Reflective Sheeting to Construction Signs--Type III Reflective Sheeting	S.F.

January 2000
STANDARD SPECIFICATIONS
FOR
ROADS, BRIDGES AND INCIDENTAL CONSTRUCTION
FORM 814A

ERRATA

<u>PAGE</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
1	1.01.01	16	Change "therefor" to "therefore".
4	1.01.01	25	Add a period to the end of the sentence.
5	1.01.02	19	Delete "AAN – American Association of Nurserymen" and replace with "ANLA – American Nursery and Landscape Association".
	1.01.02	26	Delete "AIA – American Institute of Architects" and replace with "AIA – The American Institute of Architects".
	1.01.02	36	Delete "Refrigeration" and replace with "Refrigerating".
	1.01.02	39	Delete "Engineers" and replace with "Engineering".
6	1.01.02	1	Delete the first line and replace with "standard or tentative standard of the American Society for".
	1.01.02	7	Delete "Wood Preservers" and replace with "Wood-Preservers' ".
	1.01.02	21	Delete "Reinforcement" and replace with "Reinforcing".
	1.01.02	22	Delete "Standards" and replace with "Standard".
	1.01.02	36	Delete "FSS" and the text and replace with "FS – Wherever reference is made to FS in the Contract, it refers by number, letter, or both, to the latest standard or tentative standard of the Federal Specification Unit, General Services Administration, Federal Supply Service, as to materials, specifications, or methods of testing, whichever the case may be.

**January 2000
ERRATA (cont'd)**

<u>PAGE</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
7	1.01.02	2	Change "Congress" to "Conference".
	1.01.02	4	Delete "Electronic" and replace with "Electronics".
	1.01.02	5	Delete "IES – Illuminating Engineering Society" and replace with "IESNA – Illuminating Engineering Society of North America".
	1.01.02	8	Delete "Manufacturers' " and replace with "Manufacturers".
	1.01.02	10	Delete "MIL – Military Specifications of the Department of Defense" and replace with "MIL – Military Standardization Documents, U.S. Department of Defense".
	1.01.02	21	Delete "NFP" and replace with "NFPA".
	1.01.02	22	Delete "NFPA – National Forest Products Association" and replace with "AFPA – American Forest and Paper Association".
	1.01.02	27	Delete "NFS – National Sanitation Foundation" and replace with "NFS – NFS International".
	1.01.02	31	Delete "Prestressed" and replace with "Precast/Prestressed".
	1.01.02	33	Delete "Product Standard, Product Standard Section U.S. Department of Commerce" and replace with "Product Standard of NBS, U.S. Department of Commerce".
	1.01.02	38	Delete "Society of Automotive Engineers" and replace with "SAE International".
8	1.01.02	12	Delete "Underwriters' " and replace with "Underwriters".
14	1.02.10	11	Add a period to the end of the sentence.
24	1.04.02(b)	29	Change "time" to "item".

**January 2000
ERRATA (cont'd)**

<u>PAGE</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
45	1.07.02 (Items #1 and #2)	Supplement	Change "Connecticut General Statutes (CGS)" to "CGS".
46	1.07.05	Supplement	Change "Connecticut Department of Transportation" to "CDOT".
47	1.07.07	2, 3	Delete "Code of Federal Regulations" and replace with "CFR".
	1.07.07	4	Delete "Code of Federal Regulations" and replace with "CFR".
	1.07.07	5	Delete "Occupational, Safety and Health (OSHA)" and replace with "OSHA".
63	1.09.02	Supplement	Under <u>Payment</u> , #3, change "are" to "is".
73	1.10.03	14, 15	Delete "Connecticut Department of Environmental Protection (DEP)" and replace with "DEP".
	1.10.03	32, 33	Delete "Connecticut Department of Environmental Protection" and replace with "DEP".
87	2.02.03-5	24	Change "now" to "nor".
88	2.02.03-5	17	Change "in" to "is".
112	2.07.01	9	Change "of" to "or".
	2.07.03	28	Change "an" to "and".
133	3.02.04	8	Change "plus or minus three-fourths of an inch" to " $\pm \frac{3}{4}$ in."
134	3.03.05-1	27	Delete "beams" and replace with "cylinders"
		30	Delete "beams" and replace with "cylinders"
136	3.04.03	4 and 5	Change "any" to "none" and remove the word "not".

**January 2000
ERRATA (cont'd)**

<u>PAGE</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
140	4.01.03 - C	17	Delete "National Institute of Standards and Technology" and replace with "NIST".
167	4.06.03-1(a)	33	Change "Graduation" to "Gradation".
168	4.06.03-1(b)	Supplement	First paragraph, last sentence, change "mesh" to "sieve".
175	4.06.03-4	41	Change "DOT" to "CDOT".
178	4.06.03-4(f)	36	Change "DOT" to "CDOT".
181	4.06.03-5(d)	35	Change "ConnDOT" to "CDOT".
183	4.06.03-7	Supplement	At the end of Subarticle 7 - Paving Equipment, see chart PAVER- Fixture Type A, add closing parenthesis after HO.
207	5.01.02	8, 9	Delete "Connecticut Department of Environmental Protection" and replace with "DEP".
217	5.07.02	Supplement	Change "Connecticut Department of Transportation's" to "CDOT's".
	5.07.03	33	Delete "American Welding Society" and replace with "AWS".
235	5.14.03	6	Delete "Prestressed Concrete Institute" and replace with "PCI".
268	6.02.02-2(a)	Supplement	Delete "the American Concrete Institute publication, ".
	6.02.03-4(e)	Supplement	Delete "Federal Specification" and replace with "FS".
270	6.02.03-5(c)	Supplement	Delete "American Welding Society".
278	6.03.03-15	23	Change "sub article" to "Subarticle".
287	6.03.03-23	42	Delete "Steel Structures Painting Council" and replace with "SSPC".

**January 2000
ERRATA (cont'd)**

<u>PAGE</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
290	6.03.03-27	15, 16	Delete "Steel Structures Painting Council Surface Preparation Specification" and replace with "SSPC".
	6.03.03-27	18, 19, 20	Delete "Steel Structures Painting Council Surface Preparation Specifications" and replace with "SSPC".
	6.03.03-27	22, 23	Delete "Steel Structures Painting Council Surface Preparation Specifications" and replace with "SSPC".
293	6.03.03-37	6	Delete "Military Specification" and replace with "MS".
312	6.51.03	39	Change "directly" to "directed".
325	7.02.03-8	18	Change "of" to "or".
326	7.02.03-9	10	Change comma after "Engineer" to a period.
330	7.02.04-1	36	Change "State" to "Engineer".
331	7.02.04-2	5	Change "cast-in place" to "cast-in-place".
	7.02.04-3	25	Change "State" to "Engineer".
336	7.03.03	41	Add "the" before Engineer.
337	7.04.02-1(a)	34	Delete "Federal Specification" and replace with "FS".
338	7.04.02-1(a)	6	Delete "Federal Specification" and replace with "FS".
	7.04.02-1(d)	41, 42	Delete "Federal Specifications" and replace with "FS".
	7.04.02-1(d)(2)	44	Delete "Federal Specifications" and replace with "FS".
339	7.04.02-1(e)	2	Delete "and a Certificate of Compliance"

**January 2000
ERRATA (cont'd)**

<u>PAGE</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
339	7.04.03	36	Change "DOT" to "Department".
343	7.08.01	27	Change "of" to "or".
345	7.11.03	7	Change "subarticles" to "Subarticles".
346	7.13.01	15	Add "of" before substructures.
347	7.13.05	10	Add the word "Sheet" to read "Permanent Steel Sheet Piling".
348	7.14.03	3	Change "Article 1.05.02(a)" to "Article 1.05.02(2)".
355	7.51.03	32	Change "gravel" to "granular".
357	7.55.02	42	Change "Filter Fabric" to "Geotextile".
359	8.03.04	15	Change "or" to "of".
365	8.13.05	36	Change "or" to "of".
368	8.16.03-3	41	Change "wooden rammer" to "wooden hand rammer".
369	8.16.04	24	Change "10 feet" to "100 feet".
	8.16.04	25	Change "curbed" to "curved".
371	8.17.05	28	Add "d" to slope in the last pay item to read "Curved Sloped Granite Stone Curbing".
377	8.22.05	12	Capitalize "State".
	9.04.02	37	Remove upper case "S" from Steel to read "structural steel".
378	9.04.03	13, 14	Delete "American Welding Society" and replace with "AWS".
	9.04.03	19	Delete "Federal Specification" and replace with "FS".

**January 2000
ERRATA (cont'd)**

<u>PAGE</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
381	9.06.05-1	37	Change "compete" to "complete".
383	9.08.01	3	Change "fountain" to "foundation".
384	9.10.03	16	Change "throughly" to "thoroughly".
385	9.10.03	18	Delete "American Welding Society" and replace with "AWS".
389	9.12.05-4	13	Capitalize "guide" to read "Remove Cable Guide Rail" and capitalize "rail" to read "Remove Metal Beam Rail".
396	9.18.03	26	Change "normally" to "normal".
397	9.18.03	1	Change "Engineeer" to "Engineer".
	9.18.03	33	Delete "Federal Specifications" and replace with "FS".
402	9.22.03-5	16	Change "in accessible" to "inaccessible".
	9.22.04-1	23	Capitalize "concrete" to read ". . . Bituminous Concrete Sidewalk".
403	9.23.02	14	Add "be" between shall and as.
406	9.25.03	41	Add ° sign to read " ± 25° F.
410	9.41.05	32	Change "off" to "of".
416	9.47.02-6	5	Add comma after swelling.
	9.47.02-8	42	Change "widow" to "window".
427	9.50.03-1(a)	6	Change "discing" to "disking".
429	9.50.05	18	Change "Erosion control lining" to "Erosion control matting".
	9.50.05	24	Delete "Temporary Seeding S.Y.".

**January 2000
ERRATA (cont'd)**

<u>PAGE</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
433	9.70.01	Supplement	Delete "American Traffic Safety Services Association," and replace with "ATSSA."
	9.70.01	Supplement	Change "Connecticut DOT." to "CDOT."
435	9.71.03	Supplement	Delete "American Traffic Safety Services Association (ATSSA)" and replace with "ATSSA".
437	9.73.03	15	Change "works" to "words".
440	9.76.02	33, 34	Delete "Institute of Traffic Engineers" and replace with "ITE".
441	9.76.03	Supplement	Delete "American Traffic Safety Services Association (ATSSA)" and replace with "ATSSA".
442	9.77.05	39, 40	Delete "American Traffic Safety Services Association (ATSSA)" and replace with "ATSSA".
443	9.78.02	Supplement	Delete "Manual on Uniform Traffic Control Devices (MUTCD)." and replace with "MUTCD."
446	9.78.03	19	Delete " "Manual or Uniform Traffic Control Devices," " and replace with "MUTCD,".
446/447	9.78.03	23/1	Delete "American Traffic Safety Services Association, (ATSSA)," and replace with "ATSSA".
448	9.79.03	Supplement	Delete "American Traffic Safety Services Association (ATSSA)" and replace with "ATSSA".
	9.80.01	36	Add "s" to line to read ". . . except property lines, highway lines,..."
451	9.81.05	43, 44	Delete "American Traffic Safety Services Association (ATSSA)" and replace with "ATSSA".

**January 2000
ERRATA (cont'd)**

<u>PAGE</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
453	9.99.04	30	Add "of" between Disposal and Buildings.
456	10.00.05	3	Delete "National Electric Code" and replace with "NEC".
	10.00.05	6, 7	Delete "manual on Uniform Traffic Control Devices" and replace with "MUTCD".
463	10.00.10-(2)(d)-1	7	Change "DOT" to "CDOT's".
	10.00.10-(2)(d)-2	22	Change "7" to "(7)".
464	10.00.11	29	Add "a" before smooth to read ". . . maintained in a smooth and . . ."
466	10.00.13	16	Delete "National Electric Code" and replace with "NEC".
473	10.04.03	1	Delete "IES" and replace with "IESNA".
	10.06.03	37	Delete "IES" and replace with "IESNA".
474	10.08.03	35	Delete "National Electric Code." and replace with "NEC."
475	10.08.03-1	6	Delete "National Electric Code." and replace with "NEC."
477	10.10.02	34	Change "No. 6 Crushed Stone - M.02.01" to "No. 6 Crushed Aggregate - M.01.01".
484	10.18.03	24	Delete "National Electric Code." and replace with "NEC."
489	11.04.03	26	Change "manufacturers" to "manufacturer's".
	11.04.03	28	Change "Contractors" to "Contractor's".
490	11.04.03(C)	4	Change "manufacturers" to "manufacturer's".
499	11.11.03	32	Change "the" to "than", and change "deg." to "°" to read: ". . . 40° F or more than 100° F".

**January 2000
ERRATA (cont'd)**

<u>PAGE</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
501	11.13.03	36, 37	Delete "National Electric Code" and replace with "NEC".
503	11.13.05-2	38	Change "Contact" to "Contract".
505	11.15.03	33	Delete "National Electric Code." and replace with "NEC."
506	11.16.02	26	Change "Article M.16.18" to "Article M.16.17".
508	11.18.01	9	Add the word "or" to read ". . . the plans or as directed by the . . . "
509	11.30.02	37, 38	Delete "Manual on Uniform Traffic Control Devices" and replace with "MUTCD".
510	11.30.03	Supplement	Delete "American Traffic Safety Services Association (ATSSA)" and replace with "ATSSA".
511	11.31.03	Supplement	Delete "American Traffic Safety Services Association (ATSSA)" and replace with "ATSSA".
514	12.01.03	19	Delete "Federal Specification" and replace with "FS".
518	12.04.02	20	Delete "American Plywood Association." and replace with "APA."
522	12.07.02	Supplement	Delete "Federal Specifications" and replace with "FS".
526	12.10.03-3	Supplement	Under <u>First Year</u> , in the second line, delete "linear" and replace with "square"
528	12.12.05	Supplement	Delete "American Traffic Safety Services Association (ATSSA)" and replace with "ATSSA".
529	12.15.02	18	Delete "Federal Specification" and replace with "FS".

**January 2000
ERRATA (cont'd)**

<u>PAGE</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
529	12.15.02	22	Delete "Federal Specification" and replace with "FS".
533	12.20.05	Supplement	Delete "American Traffic Safety Services Association (ATSSA)" and replace with "ATSSA".
534	18.00.02	Supplement	Delete "National Cooperative Highway Research Program (NCHRP)" and replace with "NCHRP".
	18.00.02	14, 15	Delete "National Cooperative Highway Research Program (NCHRP)" and replace with "NCHRP".
545	M.01.01	Table	3rd column from left (No. 4) change "0-10" to "0-15".
546	M.02.01-3	32	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
547	M.02.02-1	3	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
	M.02.02-3	26	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
	M.02.03	43	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
548	M.02.04	10	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
	M.02.05-2	34	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
550	M.03.01	Table	Delete "(# Mpa)" from table - 2nd column. In the 4th column, delete "(kg/cu. meter)" and all the listed parenthetical amounts.
552	M.03.01-1(e)	20, 21	Delete "Federal Highway Administration" and replace with "FHWA".

**January 2000
ERRATA (cont'd)**

<u>PAGE</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
554	M.03.01-3	12, 13	Change "Connecticut Department of Transportation" to "CDOT".
556	M.03.01-7(a)	15	Change "Type II" to "Type I and Type II".
	M.03.01-9	42	Delete "National Bureau of Standards." and replace with "NBS."
561	M.03.01-11	41, 42	Change "Connecticut Department of Transportation" to "CDOT".
562	M.03.01-12(b)	33	Delete "Certificate of Compliance".
563	M.03.01-13	26, 27	Delete "Cement and Concrete Reference Laboratory." and replace with "CCRL."
564	M.03.01-15	31, 32	Change "Connecticut Department of Transportation" to "CDOT".
	M.03.02	38, 39	Change "Connecticut Department of Transportation" to "CDOT".
566	M.04.01-1(b)	13	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
567	M.04.01-1(d)	13	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
	M.04.01-1(d)	16	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
	M.04.01-1(d)	20	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
	M.04.01-1(d)	28	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
	M.04.01-1(e)	41	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
568	M.04.01-1(e)	6	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".

**January 2000
ERRATA (cont'd)**

<u>PAGE</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
569	M.04.01-2	2	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
	M.04.01-3	31	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
	M.04.01-3	35	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
570	M.04.01-3	11	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
	M.04.01-3	13	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
	M.04.01-5	41	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
571	M.04.01-5	9	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
	M.04.01-5	11	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
	M.04.01-5	32	Change "Assistant Manager of Materials Testing" to "Director of Research and Materials".
573	M.04.03	Table Footnotes I & J	Change "Chief, Division of Materials Testing" to "Director of Research and Materials".
582	M.06.02-6(d)	35	Delete "Certificate of Compliance".
588	M.06.04	20	Delete "American Welding Society".
590	M.07.02	Supplement	Change "Connecticut Department of Transportation" to "CDOT".
	M.07.02-	Supplement	Delete "North East Protective Coatings Committee (NEPCOAT)" and replace with "NEPCOAT".

**January 2000
ERRATA (cont'd)**

<u>PAGE</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
590	M.07.02	Supplement	Delete "Federal Standard" and replace with "FS".
591	M.07.08	1	Delete "Federal Specification" and replace with "FS".
	M.07.09-2	20	Delete "Federal Specification" and replace with "FS".
	M.07.09-2	22	Delete "Federal Specification" and replace with "FS".
	M.07.09-3	35	Delete "Federal Specification" and replace with "FS".
592	M.07.12	31	Delete "Federal Specification" and replace with "FS".
	M.07.12	37, 38	Delete "Federal Specification" and replace with "FS".
593	M.07.12	2, 3	Delete "federal Specification" and replace with "FS".
594	M.07.12(4)	26, 27	Delete "Federal Specification" and replace with "FS".
599	M.07.21	Supplement (4 times)	Delete "Federal Standard" and replace with "FS".
600	M.07.22(c)	Supplement	Delete "ASTM E 42" and replace with "ASTM G 23"
	M.07.22	Supplement	Change "Connecticut Department of Transportation" to "CDOT".
	M.07.22	Supplement (2 times)	Delete "Federal Standard" and replace with "FS".
605	M.08.01-6 (c)	Supplement	Change "ConnDOT" to "CDOT".
607	M.08.01-11	Supplement	Delete "Federal Standard" and replace with "FS".

**January 2000
ERRATA (cont'd)**

<u>PAGE</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
608	M.08.01-18	23 - Table	Change "dmn" to "dmm".
609	M.08.01-19	6, 7	Delete "Federal Specification SSSS00210 (G.S.A. – F.S.S)" and replace with "FS SSSS00210."
614	M.08.02-5	41	Delete "Federal Specification" and replace with "FS".
623	M.10.02-11	6, 7	Delete "Federal Specification" and replace with "FS".
626	M.10.05-1(b)	25	Delete "Federal Specification" and replace with "FS".
	M.10.05-2	42	Delete "Certificate of Compliance".
627	M.10.05-2	20	Delete "Federal Specifications" and replace with "FS".
	M. 10.05-3c	29	Delete "Federal Specification" and replace with "FS".
636	M.12.06-1	16	Change "vertrical" to "vertical".
640	M.13.01	18, 19	Delete "United States Department of Agriculture" and replace with "USDA".
	M.13.01	32	Delete "(6)".
642	M.13.03	28, 29	Delete "Association of Official Agricultural Chemists." and replace with "AOAC International."
644	M.13.04	48	Delete "Association of Official Seed Analysts." and replace with "AOSA."
652	M.13.07-14(i)	1	Change "typing" to "tying".
658	M.15.04(h)	25	Delete "American Welding Society" and replace with "AWS".
	M.15.05	39	Delete "IES" and replace with "IESNA".

**January 2000
ERRATA (cont'd)**

<u>PAGE</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
660	M.15.07	6	Delete "IES" and replace with "IESNA".
662	M.15.11-2	7	Delete "Federal Specifications" and replace with "FS".
672	M.16.05-1(b)	5	Delete sentence 7 (duplicate of sentence 6).
673	M.16.05-2	30	Change "simple" to "single".
679	M.16.06-6	1	Delete "National Electric Code." and replace with "NEC."
	M.16.06-6	9	Delete "Institute of Traffic Engineers." and replace with "ITE."
681	M.16.06-9	18	Delete "Federal Specification" and replace with "FS".
	M.16.06-9	22, 23	Delete "Federal Specifications" and replace with "FS".
	M.16.06-9	25	Delete "Federal Specifications" and replace with "FS".
	M.16.06-9	29	Delete "Federal Specifications" and replace with "FS".
	M.16.07	41	Delete "Manual on Uniform Traffic Control Devices" and replace with "MUTCD".
683	M.16.07-I	19, 20	Delete "Federal Specification" and replace with "FS".
	M.16.07-I	22, 23	Delete "Federal Specification" and replace with "FS".
	M.16.07-I	26	Delete "Federal Specification" and replace with "FS".
	M.16.07-I	27	Delete "Federal Standard" and replace with "FS".

**January 2000
ERRATA (cont'd)**

<u>PAGE</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
683	M.16.07-I	28, 29	Delete "Federal Specification" and replace with "FS".
	M.16.07-I	31	Delete "Federal Standard" and replace with "FS".
684	M.16.08	1, 2	Delete "Americans With Disabilities Act (ADA)", and replace with "ADA".
	M.16.08	22	Delete "Federal Specification" and replace with "FS".
	M.16.08	24	Delete "Federal Specification" and replace with "FS".
	M.16.08	26	Delete "Federal Specification" and replace with "FS".
688	M.16.09-1	12	Change "resynhronizing" to "resynchronizing".
692	M.16.09	2	Delete "Federal Specification" and replace with "FS".
696	M.16.12-2A	8	Delete "National Electric Code." and replace with "NEC."
698	M.16.14-1	42, 43	Delete "National Electric Code." and replace with "NEC."
699	M..16.14-2	3, 4	Delete "National Electric Code" and replace with "NEC".
702	M.17.01-2	39	Delete "Aluminum Alloy Association" and replace with "AAA".
703	M.17.01-3	7, 8	Delete "Rubber Manufacturers Association" and replace with "RMA".
709	M.18.07	32	Delete "Federal Specification" and replace with "FS".
711	M.18.08	39	Delete "Federal Specification" and replace with "FS".

January 2000
ERRATA (cont'd)

<u>PAGE</u>	<u>ARTICLE OR SUBARTICLE</u>	<u>LINE NO.</u>	<u>CORRECTION</u>
729	M.18.10-2	34, 35	Delete "Federal Highway Administration" and replace with "FHWA".
738	7.13	17	Change "Permanent Steel Piling" pay item to "Permanent Steel Sheet Piling".
752	Inch-Pound Units & Conversion Factors Table	-	<p>(From left to right) change Column 2 "Inch-Pound" to "Metric", change Column 3 "Metric" to "Inch-Pound".</p> <p>Change the conversion factor for W to hp (electric) from "0.001 134 1" to "0.001 341".</p> <p>Change the conversion formula for °C to °F from "9/5 (°C+32) to "9/5 (°C)+32".</p> <p>Change the conversion factor for m³/s to cfm from "2 188.88" to "2118.88".</p>

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.01
DEFINITION OF TERMS AND PERMISSIBLE ABBREVIATIONS**

Article 1.01.01 - Definitions:

Add the following terms:

EXECUTION OF CONTRACT: The date of execution of the Contract by the Department is the date on which the Department's authorized signatory signs the Contract on behalf of the Department.

EQUAL: A material, device, type of equipment, or method other than what is specified in the Contract, which is a recognized equivalent in substance and function for that specified thing, taking into account quality, workmanship, economy of operation, durability, and suitability for purposes intended, provided that the proposed equivalent would not require or constitute a change in Contract work.

SUBSTITUTE: A replacement for a specified material, device, type of equipment, or method, which is sufficiently different in substance and function, quality, or workmanship to constitute a change in the Contract work.

Add to the definition of the term "PLANS", the following:

STANDARD SHEETS: Standardized plans containing details approved by the Department and the FHWA, for construction of a given type on any project, included in contracts on an as-needed basis.

Article 1.01.02 - Abbreviations, Publications and Standards:

Add the following abbreviations:

AFPA – American Forest and Paper Association

ANLA – American Nursery and Landscape Association

AOAC – AOAC International

AOSA – Association of Official Seed Analysts

APA – The Engineered Wood Association

ATSSA - American Traffic Safety Services Association.

CCRL – Cement and Concrete Reference Library
CDOT – Connecticut Department of Transportation
CFR – Code of Federal Regulations
CGS – Connecticut General Statutes
CSI - Construction Specifications Institute
HMA - Hot Mix Asphalt or bituminous concrete
IESNA – Illuminating Engineering Society of North America
NBS – National Bureau of Standards
NCHRP – National Cooperative Highway Research Program
NEPCOAT - North East Protective Coatings Committee
NFPA – National Fire Protection Association
USDA – United States Department of Agriculture

Replace the "SSPC" description with the following:

SSPC – Where reference is made to SSPC in the Contract, it refers by number, letter, or both, to the latest standard or tentative standard specification of The Society for Protective Coatings, formerly the Steel Structures Painting Council, as to materials specifications, methods of testing, systems, procedures, inspection or other specification pertaining to any or all phases of cleaning or painting, whichever may apply.

Article 1.01.03 - Abbreviations and Terms:

Add the following abbreviation:

BCPC - Bituminous Concrete Park Curbing

HMA - Hot Mix Asphalt or bituminous concrete

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.02
PROPOSAL REQUIREMENTS AND CONDITIONS**

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

After the last paragraph, add the following:

Plan sheets furnished to the State by various utility companies affected by the proposed construction are not intended to show all proposed work in utility installations to be done by the various utility companies or municipal authorities or both before, during, or after the life of this Contract. In addition to the work indicated on these plans, the utility companies and authorities may make adjustments to or remove certain of their installations other than those indicated on the plans or may install facilities not indicated.

Bidders must inform the Department, at the earliest opportunity, in writing, of any and all omissions, errors, and/or discrepancies within or among the plans, specifications, and bidding documents which a bidder discovers. Such inquiries, in addition to inquiries concerning the conditions of bidding or award or the interpretation of contract documents are to be made in writing and directed to the Transportation Manager of Contracts, Connecticut Department of Transportation, P. O. Box 317546, Newington, Connecticut 06131-7546. The Department cannot ensure a response to inquiries received later than ten (10) days prior to the scheduled bid opening. When warranted, responses to such inquiries that relate to changes in, or interpretations of, the Project documents (plans and specifications) will be issued to all bidders in the form of addenda and made a part of the Contract. Bidders are responsible for ensuring that they are aware of all addenda. Failure by the Department or postal or other courier services to deliver addenda or other information regarding a Contract being bid does not release the bidder from any obligations under the conditions of the bid.

Article 1.02.05 – Preparation of Proposals:

After the second sentence of the only paragraph, "The blank spaces ... work contemplated.", add the following:

No unit or lump sum bid price may be expressed, in whole or in part, as a fraction of a cent.

Article 1.02.07 - Proposal Guaranty:

Delete the entire article and substitute the following:

Except when otherwise specified in the bid documents, no proposal will be considered unless; (a) it is accompanied by a proposal guaranty in the form of a bond from a surety company, satisfactory to the Commissioner, on the form furnished by the Department, in an amount equal to at least one-third of the amount of the bid; or (b) the bidder has on file in the Contract Section a current annual bid bond, satisfactory to the Commissioner, on the form provided by the Department, for an amount equal to at least one-third of the aggregate amount of all current bids by the bidder for the Department's contracts.

At the time of the bid opening, the surety must be a corporate surety licensed by the Insurance Commissioner of the State of Connecticut and must hold a Certificate of Authority as an acceptable Surety and/or Reinsuring Company acceptable to the Federal Department of Treasury. The surety's underwriting limitation must not be less than the full amount required by the bond, itself.

Article 1.02.11 - Miscellaneous Grounds for Rejection of Proposals:

Delete the second sentence of the first paragraph and replace with the following:

No bidders that have mutual financial interests, or common ownership, directors, officers or principal shareholders (i.e., shareholders holding at least five percent [5%] of either the common or the preferred shares of the company's stock) may bid for the same Department contract. Such proscribed bidders shall include, but not be limited to, affiliates and subsidiaries of each other. If any non-bidding party has an ownership interest in more than one bidder that is bidding for a given contract, either directly or through the non-bidding party's ownership interests in another company, no matter how high up or far removed in a vertical or horizontal chain of ownership that party might be from the bidders, the bids of those bidders shall not be accepted.

In addition, with respect to any given Department contract that is advertised for bidding, no bidder owned by, or in the chain of ownership of, a company which provides surety bonds may bid against a bidder for whom a bond has been or will be provided by that company for the given contract bidding. All bids proscribed by the terms of this paragraph shall be rejected by the Commissioner.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.03
AWARD AND EXECUTION OF CONTRACT**

Article 1.03.07 - Insurance:

At the end of the first paragraph, add the following:

State of Connecticut, Department of Transportation, Form Number CON-32 entitled "CERTIFICATE OF INSURANCE" shall be the only acceptable form as evidence of insurance. Continuance of the required insurance during the entire term of the Contract shall be the responsibility of the Contractor and is a condition of the Contract.

Add the following as paragraph three:

The State must be named as an additional insured party for the insurance required under paragraphs 2, 3, and 6 stipulated below. In the event the Contractor secures Excess/Umbrella Liability Insurance to meet the minimum requirements specified under paragraph 2, 3, and 6 below, the State shall be named as an additional insured.

Delete the first sentence of the paragraph numbered 1, and replace with the following:

1--Worker's Compensation Insurance: With respect to all operations the Contractor performs and all those performed for it by subcontractors, the Contractor and subcontractor shall carry Workers' Compensation Insurance in accordance with the requirements of the laws of the State.

Add the following:

The Contractor's Workers Compensation policy shall contain the U.S. Longshoreman's and Harbor Worker's Act endorsement when work is to be performed over or adjacent to a navigable water.

Delete the paragraphs numbered 2, 4, 5 and 6 in their entirety and replace with the following:

2—Commercial General Liability Insurance: With respect to the operations it performs and also those performed for it by subcontractors, the Contractor shall carry regular Commercial General Liability Insurance, including Contractual Liability Insurance which shall provide coverage for each accident or occurrence in the amount of \$750,000 for all damages resulting from (1) bodily injury to or death of persons and/or (2) injury to or destruction of property. Subject to that limit per accident or

occurrence, the policy shall provide a total or aggregate coverage of \$1,500,000 for all damages during the policy period.

4—Owner's and Contractor's Protective Liability Insurance for and in the Name of the State: With respect to the Project operations the Contractor performs and also those performed for it by subcontractors, the Contractor shall carry, for and on behalf of the State, insurance which shall provide coverage for each accident or occurrence in the amount of \$750,000 for all damages resulting from (1) bodily injury to or death of persons and/or (2) injury to or destruction of property. Subject to that limit per accident or occurrence, the policy shall provide a total or aggregate coverage of \$1,500,000 for all damages during the policy period.

5--Railroad Protective Liability Insurance: When the Contract involves work on, over or under the right of way of any railroad company, the Contractor shall carry with respect to the operations it performs and also those performed for it by subcontractors, Railroad Protective Liability Insurance for and on behalf of the railroad company as named insured, and the State named as additional insured providing coverage for each accident or occurrence in the amount of \$2,000,000 for all damages resulting from (1) bodily injury to or death of persons and/or (2) injury to or destruction of property. Subject to that limit per accident or occurrence, the policy shall provide a total or aggregate coverage of \$6,000,000 for all damages during the policy period.

6--Blasting: When explosives are to be used in the prosecution of the work, the insurance required under paragraphs 2, 4 and 5 above shall also contain provisions for protection, in the amounts stated, against damage claims due to such use of explosives.

Add the following subarticle:

Subarticle 1.03.07-10: Protection and Indemnity Insurance for Marine Construction Operations in Navigable Waters.

If a vessel of any nature or kind is involved, the Contractor shall obtain the following additional insurance coverage:

- A. Protection and Indemnity Coverage of \$300,000 per vessel or a limit equal to the value of hull and machinery, whichever is greater.
- B. If there is any limitation or exclusion with regard to crew and employees under the protection and indemnity form, there must be a worker's compensation policy in effect, including coverage for operations under admiralty jurisdiction with a limit of liability of \$300,000 per accident or to a limit equal to the hull and machinery, whichever is greater, or as otherwise required by statute.

Article 1.03.08 - Notice to Proceed and Commencement of Work:

Delete the second sentence of the first paragraph and replace with the following:

The date specified will be no later than 45 calendar days after the date of the execution of the Contract by the Department, except that if the expiration of said 45 days occurs during the period between November 30 and April 1 of the following year, the Engineer may specify that the April 1 following said expiration shall be the date for the Contractor to proceed with the work.

In the first sentence of the second paragraph "If a Notice...for the project." Replace "90 days" with "45 days".

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.04
SCOPE OF WORK**

Article 1.04.05 - Extra Work:

Add the following as paragraph four:

If the Engineer changes the scope of work of the Contract, the Contractor shall submit a proposed revised schedule and a cost revision proposal which takes all such changes into account. The schedule shall be revised in accordance with Article 1.08.08.

Article 1.04.07 - Rights In and Use of Materials Found on the Work Site:

In the first sentence, after the words, "existing bridge substructures", add ", buildings, or other structures,".

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.05
CONTROL OF WORK**

Article 1.05.04 – Coordination of Special Provisions, Plans, Supplemental Specifications, Standard Specifications and Other Contract Requirements:

Delete the second sentence of the first paragraph, "In the case of such a conflict..." and replace with the following:

In the case of such a conflict, the order of governance among those requirements in order of descending authority, shall be as follows: 1. Environmental Permits, 2. Environmental Permit Applications, 3. Special Provisions, 4. Plans other than Standard Sheets (enlarged details on plans, used to clarify construction, shall take precedence over smaller details of the same area: information contained in schedules or tables titled as such shall take precedence over other data on plans), 5. Standard Sheets, 6. Supplemental Specifications, 7. Standard Specifications and other Contract requirements.

Article 1.05.09 - Authority of Inspectors:

After the only paragraph, add the following:

The presence, absence, sufficiency, or accuracy of any inspection does not relieve the Contractor of its responsibility to perform the work properly, to monitor its work and the work of its subcontractors and to institute quality control systems as appropriate for the proper execution of the work.

Article 1.05.12 - Payrolls:

After the only paragraph "The Contractor shall...performed on the project." add the following:

Every Contractor or Subcontractor performing work on the project is required to post the prevailing wage rates as determined by the State Labor Commissioner and, on federal aid projects, the Secretary of Labor. The wage rate determinations shall be posted in prominent and easily accessible places at the site of work.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.06
CONTROL OF MATERIALS**

Article 1.06.01– Source of Supply and Quality:

After the first paragraph, "The Contractor must obtain ... in the work.", add the following:

All permanently incorporated steel (and iron) used in the construction of the Project shall be produced and fabricated in the United States. It is the express intent of this specification to require that all manufacturing processes for all steel (and iron) materials and products, including the coating of steel and iron, occur within the United States, with the following exceptions:

The Contractor may request, in accordance with Section 635.410(b)(4) of Title 23 CFR, approval to include a minimal amount of foreign steel in the Project. This amount is defined as one-tenth of one percent (0.1 percent) of the total contract cost or \$2,500:00, whichever is greater. The cost of the foreign steel or iron is defined as its value delivered to the Project.

Additionally, the FHWA has granted a nationwide waiver of the requirements of 23 CFR 635.410, Buy America requirements, for the production of pig iron and processed, pelletized, and reduced iron ore. Items not specifically included in the waiver remain subject to the Buy America requirements. The Contractor may request the Engineer to seek from the FHWA a further waiver of said requirements, but it shall be in the sole discretion of the Engineer whether or not to seek such a waiver.

In the last paragraph, delete the first sentence and replace with the following:

Where one manufacturer's product is specified in the Contract, it shall be understood that this represents the standard required, but that a comparable product of another manufacturer may be considered as a satisfactory equal and approved, unless the plans or special provisions indicate that no equal shall be allowed.

Article 1.06.07– Certified Test Reports and Materials Certificates:

Add the following as paragraph ten:

The Contractor shall be responsible for any testing, materials certificates, and inspections required under individual sections of the Special Provisions.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.07
LEGAL RELATIONS AND RESPONSIBILITIES**

Article 1.07.02 - Permits and Licenses:

After the only paragraph, "Except as otherwise...prosecution of the work", add the following:

1. Under Connecticut law, a commercial vehicle used by contractors and vendors in connection with work on this project may be subject to Connecticut registration requirements. Connecticut General Statutes (CGS) requires such registration for any vehicle which is most frequently garaged in this state, or most frequently leaves from, and returns to one or more points within this state in the normal course of operations. In addition, a vehicle must obtain Connecticut registration if it continuously receives and discharges cargo within this state. Reciprocal registrations as allowed under CGS are acceptable for meeting the registration requirements.

Residence or domicile of the owner, lessor or lessee of the motor vehicle, or the place where the owner, lessor or lessee is incorporated or organized, shall not be a factor in determining the necessity for registration of the vehicle in this state. Failure to register a vehicle will result in a citation for any infraction, and also may result in administrative action by the Commissioner of Motor Vehicles.

This requirement applies to not only the Contractor, but also to its subcontractors, suppliers, etc. It is the Contractor's responsibility to ensure that its subcontractors, suppliers, etc., comply with this requirement.

The Contractor shall maintain, on this project, records which document compliance with this requirement.

2. The Contractor shall ensure that for each commercial vehicle utilized by subcontractors to haul bulk materials (i.e.: bituminous concrete, earth, stone, gravel, etc.) to and from the project site over public highways, the Contractor shall possess an original or a copy of a valid intrastate motor common carrier certificate or motor contract carrier permit issued in accordance with Connecticut General Statutes. The vehicles shall also possess a valid Connecticut fuel tax sticker affixed to the vehicle. Any vehicle found to be in noncompliance with this provision shall be immediately removed from the project. If the vehicle is not removed from the project, the Engineer shall deduct from monies due or to become due the Contractor payment for the value of work performed by the vehicle(s) found to be in noncompliance with these provisions.

The certificate, permit and fuel tax sticker shall be available in each vehicle for inspection when requested by the Engineer. Failure to provide the certificates, permit and/or fuel tax sticker when requested shall result in the vehicle being ordered removed from the project.

Article 1.07.05 - Vacant

Replace with the following:

Article 1.07.05 - Load Restrictions:

The Contractor shall comply with all legal load restrictions as to truck size, gross weight of vehicle, and axle weight of the vehicle in the hauling of materials.

This provision shall apply to travel both on existing pavements and pavements under construction. Vehicles of the Contractor, either loaded or unloaded, will not be allowed to travel across any bridge or on any highway when such vehicle exceeds the statutory limit or posted limit of such bridge or highway unless the Contractor receives and complies with the requirements of a permit from the Connecticut Department of Transportation for such travel, as provided in the statutes. Such permit will not excuse the Contractor from liability for damage to the highway caused by its equipment.

The Contractor is subject to fines, assessments and other penalties levied as a result of violations of the vehicle size and weight restrictions committed by those in its employ.

Article 1.07.07 - Public Convenience and Safety

Delete the second sentence of the first paragraph and replace with the following:

The Contractor shall provide, in a manner acceptable to the Engineer, for the convenience and interests of the general public; traveling public; parties residing along or adjacent to the highway or facility project site; and parties owning, occupying or using property adjacent to the project site, such as commuters, workers, tenants, lessors and operating agencies.

Delete the second paragraph and replace with the following:

Notwithstanding any other provision in the Contract, no section of road, access drive, parking lot, sidewalk, station platform, railroad track, bus stop, runway, taxiway, occupied space within a site, or occupied space within a building shall be closed to vehicles or pedestrians except with the written permission of the Engineer.

Add the following paragraph three:

All pieces of equipment, all equipment or materials storage areas, and all work areas must be placed, located, and used in ways that do not create a hazard to people or property, especially in areas open to public pedestrians or vehicular traffic.

The paragraph beginning with "All equipment and materials . . . edge of the travelway." will now be paragraph four.

Add the following as paragraph five:

The Contractor must always erect effective barriers and warning signs between (a) its work and storage areas and (b) any areas open to public pedestrian or vehicular traffic. Such barriers and signs must comply with all laws and regulations, including any applicable codes.

Add the following as paragraph six:

The Contractor must arrange for temporary lighting, snow and ice removal, security against vandalism and theft, and protection against excessive precipitation runoff within its work and storage areas, and within other areas specifically designated in the Contract Documents.

Article 1.07.11 - Opening of Section of Highway to Traffic

Delete the entire article, including the title, and replace with the following:

Article 1.07.11 - Opening of Section of Project to Traffic or Occupancy:
Whenever, in the opinion of the Engineer, any substantially completed traveled way (including any such highway, roadway, railroad, runway, taxiway, apron or parking lot) facility site, or building, or portion thereof, is in satisfactory condition for travel or occupancy, it shall be opened to traffic or occupancy as directed by the Engineer. The Engineer's approval of any such opening shall not be held to be in any way an acceptance of the roadway, traveled way, facility site, or building, or of any part of it, or as a waiver of any of the provisions of these specifications, or of any state or federal statutes, applicable building codes, or other Contract provisions. Such approval shall not constitute a basis for claims for damages due to interruptions to, or interference with, the Contractor's operations. If repair or replacement of any section of a roadway, traveled way, facility site, or building becomes necessary because the Engineer has directed that the structure or facility be opened to travel or occupancy prior to completion of the Contract work, the Contractor shall perform that repair or replacement. The Contractor shall perform such work at its own expense, unless it is determined definitely that the damage necessitating the repair or replacement was caused by equipment operated by a State employee while controlling snow or ice, or by routine State maintenance operations. In the latter case, the State shall reimburse the Contractor for the cost of the repair or replacement. When the damage was caused by a traffic accident, the Contractor may seek recovery from the responsible person.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.08
PROSECUTION AND PROGRESS**

Article 1.08.04 - Limitation of Operations:

After the only paragraph "The Contractor shall...with Article 1.05.06". add the following:

The Contractor shall give the Engineer a seven (7) day advance written notice of proposed changes in construction activities that will alter traffic patterns that result in lane shifts, detours, temporary closures of lane(s), permanent closures of lane(s), or lane reductions. This advance notification will allow the Department to publish news releases and/or provide public radio announcements to inform the public of revised traffic patterns or possible traffic delays. Failure of the Contractor to provide such timely notice will subject the Contractor to stop work orders until such time as the seven day notice has been satisfied.

Article 1.08.05 – Workmen and Equipment:

After the first paragraph, "The Contractor shall employ ... that person.", add the following:

The use of convict labor on federally funded projects is prohibited.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.09
MEASUREMENT AND PAYMENT**

Article 1.09.02 - Vacant; Replace with the following:

Article 1.09.02 - Value Engineering Incentive:

Scope and Purpose

These value engineering provisions apply as an incentive to the Contractor to initiate, develop, and present to the Department for consideration any cost reduction proposals conceived by the Contractor, involving changes in the drawings, designs, specifications, or other requirements of the Contract. These provisions do not apply unless the proposal submitted is specifically identified by the Contractor as being presented for consideration as a Value Engineering Proposal.

The cost reduction proposals contemplated are those that would require a change order modifying the Contract and would produce a savings to the Department by providing less costly items or methods than those specified in the Contract without impairing essential functions and characteristics such as service life, reliability, economy of operation, ease of maintenance, and necessary standardized features. Savings in time only (without monetary savings in the construction contract) will not be considered for Value Engineering.

Conceptual Proposals

Before expenditure of considerable funds in development of a formal Value Engineering Proposal, the Contractor may find it beneficial to submit a conceptual proposal to the Department. The Contractor will be notified in writing of the acceptability of the proposal or the reason(s) for rejection. The Department retains the right to reject the formal proposal even if the conceptual proposal was determined acceptable. A conceptual Value Engineering Proposal must be submitted for cost reduction proposals involving structures, rights of way acquisitions, permits or revisions as per Section 1.10, or railroad property involvement on forms provided by the Department.

Proposal Submittals

Value Engineering proposals will be processed in the same manner as alterations of the Contract that require a change order. As a minimum, the following information shall be submitted by the Contractor with each proposal:

1. A statement that the proposal is submitted as a Value Engineering proposal.

2. A description of the difference between the existing contract requirements and the proposed change, and the comparative advantages and disadvantages of each, including considerations of service life, economy of operations, ease of maintenance, desired appearance, safety, and environmental impacts or changes to permits. When an item's function or characteristics are being altered, a justification of the effect of the change on the end item's performance must be included.

A life cycle cost analysis must be included for items involving alteration of functional characteristics. Factors for future worth will be provided by the Department.

3. Complete plans, specifications, and computations sealed by a licensed Professional Engineer in the State of Connecticut showing the proposed revisions which incorporate the same design criteria and restrictions relative to the original contract features and requirements. These revisions will be in the Department's change order format consisting of mylar reproducible plans, quantity increases and decreases by item number with associated cost, new items with quantity and cost, and specifications in contract format, and, if needed, compliance permit applications and revisions in accordance with Section 1.10.
4. A complete analysis of the cost effects of the proposed changes on operations, maintenance, durability, and other considerations as appropriate.
5. A statement of the time in which the proposal must be executed so as to obtain the maximum cost reduction. This date must be selected to allow the Department ample time for review and processing. Should the Department find that insufficient time is available for review and processing, it may reject the proposal solely on such basis. If the Department fails to respond to the proposal by the date specified, the Contractor shall consider the proposal to be rejected and shall have no claims against the State as a result thereof.
6. A statement as to the effect the proposal will have on the time for completion of the contract.

Conditions

Value Engineering Proposals will be subject to the following conditions:

1. The Contractor is cautioned not to base any bid prices on the anticipated approval of a Value Engineering Proposal and to recognize that such proposal may be rejected. The Contractor will be required to perform the Contract in accordance with the existing plans and specifications at the prices bid until formal acceptance of any Value Engineering Proposal.

2. All Value Engineering Proposals apply only to the ongoing Contract and whether approved or not approved become the property of the Department and shall contain no restrictions imposed by the Contractor on their use or disclosure. The Department will have the right to use, duplicate and disclose in whole or in part any data necessary for the utilization of the proposal. The Department retains the right to utilize any accepted proposal or part thereof on any other or subsequent projects without any obligation to the Contractor. This provision is not intended to deny rights provided by law with respect to patented materials or processes.
3. If the Department already has under consideration certain revisions to the contract or has approved certain changes in specifications or standard drawings for general use which are subsequently incorporated in a Value Engineering Proposal, the Department may reject the Contractor's proposal and may proceed with such revisions without any obligation to the Contractor. If an accepted Value Engineering Proposal is adopted for general use, only the Contractor who first submitted such proposal will be eligible for compensation of the Value Engineering incentive and only on contract(s) awarded to him prior to submission of the accepted Value Engineering Proposal.
4. The proposal shall not be experimental in nature but shall have been proven to the Department's satisfaction.
5. The proposal must be presented and approved prior to undertaking any work on the items involved in the proposal. Savings due to a reduction in quantities or deletion of items which result solely from adjustments to field conditions and proposals which would only waive specification or contract requirements are not considered to be Value Engineering.
6. The Contractor shall have no claim against the Department for any costs or delays due to the Department's rejection of a Value Engineering Proposal, including but not limited to, development costs, anticipated profits, or increased material or labor costs resulting from delays in the review of such proposal.
7. The Department will be the sole judge of the acceptability of a proposal and of the estimated net savings in construction costs from the adoption of all or any part of such proposal. In determining the estimated net savings, the right is reserved to disregard the contract bid prices if, in the judgment of the Engineer, such prices do not represent a fair measure of the value of work to be performed or to be deleted. Errors in the original estimate shall be corrected by the Department prior to utilization in the calculations of savings in the Value Engineering Proposal.
8. In order for the Department to consider such a proposal, the savings likely to be generated by the proposal must be sufficient, in the sole judgement of the Department, to warrant its review and processing by the Department. All costs

resulting from such review or processing will be borne by the Department. Before any Value Engineering proposal will be considered by the Department, the Department must determine, in its sole judgement, that implementation of the proposal would result in a total contract savings of more than \$200,000, reflecting a savings of at least \$100,000 for the Department. The Department will not consider any Value Engineering proposal that would require an increase in contract days.

9. The Engineer may reject all or any portion of work performed pursuant to an approved Value Engineering Proposal if he/she determines that unsatisfactory results are being obtained. The Engineer may direct the removal of such rejected work and require the Contractor to proceed in accordance with the original Contract requirements. Reimbursement for any work performed under the Value Engineering Proposal, or for its removal, will be reimbursed as per Contract unit price or cost plus as determined by the Department. Where modifications to the Value Engineering Proposal are approved in order to adjust to field or other conditions, reimbursement will be limited to the total amount payable for the work at the Contract bid prices as if it were constructed in accordance with the original Contract requirements. Such rejection or limitation of reimbursement shall not constitute the basis of any claim against the State for delay or for any other costs.
10. Design proposals must conform to the specifications or standards of the Department. The standards governing the original design of the contract will be the minimal standard allowed.
11. If additional information is needed to evaluate proposals, this information must be provided within 14 calendar days or other time periods as approved by the Department. Failure to do so will result in rejection of the proposal. Such additional information could include, where design changes are proposed, results of field investigations and surveys, design computations, and field change sheets.
12. The Contractor is responsible for modifying the plan as part of the Value Engineering Proposal, and shall furnish a copy of such modified plan in change order format to the Department and shall be solely responsible for any errors or omissions resulting from such modification.
13. Savings not specifically part of the Contractor's contract such as, but not limited to, reductions in inspection cost, Department overhead, or reduced testing requirements will not be included in the savings calculation for any Value Engineering Proposal.

Payment

Payment for accepted Value Engineering Proposals will be made in the following manner:

1. The changes resulting from a Value Engineering Proposal will be incorporated into the Contract by change order and shall reflect the changes in unit bid item quantities or new agreed price items as appropriate, in accordance with the Specifications.
2. The cost of the revised work will be paid directly as accomplished. In addition to such payment, the Department will pay the Contractor, under a separate item or a Value Incentive Engineering Item, 50 percent of the total savings, which savings is reflected by the difference of the original cost less the adjusted cost of the Value Engineering Proposal. The Value Engineering Incentive will be payable in two (2) parts consisting of 60 percent of the anticipated amount due the Contractor at the time of the acceptance of the Value Engineering Proposal and 40 percent of the amount due the Contractor upon completion of the Value Engineering work. The second payment will reflect all adjusted costs based on actual savings as determined by the Department as a result of the Value Engineering Proposal.
3. The Contractor's cost for development, design and implementation of the Value Engineering Proposal are not eligible for reimbursement.
4. Value Engineering Proposal forms will be supplied by the Department at the Preconstruction meeting.
5. Any cost savings not identified in the Value Engineering proposal prior to acceptance will not be eligible for reimbursement.

Article 1.09.04 - Extra and Cost-Plus Work:

Delete the section under (a) Labor, (3) and replace with the following:

(3) For property damage, liability and workmen's compensation insurance premiums, unemployment insurance contributions and social security taxes on the cost-plus work, the Contractor shall receive its actual cost. The Contractor shall furnish satisfactory evidence of the cost paid for such insurances and taxes.

Delete the section under (a) Labor, (4), first paragraph only and replace with the following:

(4) An amount equal to 20% (15% for overhead, 5% for profit), of the total sums described in (a) (1) through (3) above will also be paid to the Contractor.

Add the following sentence to the only paragraph under (b) Specialized Work:

Prior to performing such specialized work, the Contractor shall obtain and submit to the Engineer a minimum of three price quotes for the work, if requested by the Engineer.

Delete the first sentence under (d) Equipment and replace with the following:

For any Contractor-owned machinery, trucks or equipment authorized by the Engineer for use, the Engineer will allow the Contractor the rental rate set forth in the current edition of the Rental Rate Blue Book published by K III Directory Corporation of San Jose, California (referred to herein as the Rental Rate Blue Book).

Delete the following from (d) Equipment, from the third paragraph, second sentence:

. . . as published by Dataquest, Inc.

Delete the following from (d) Equipment, from the fourth paragraph, second sentence:

. . . as published by Dataquest, Inc. of San Jose, California, . . .

Delete the last sentence from the seventh paragraph under (d) Equipment and replace with the following:

If, however, certain pieces of equipment remain idle during any day or portion of a day within such a rental period, the State will pay for those periods at 50% of the applicable rate (exclusive of operating costs) set forth in the Rental Rate Blue Book.

Delete the eighth paragraph under (d) Equipment and replace with the following:

For rented equipment not owned by the Contractor or a subsidiary, affiliate, or parent company (no matter how far up the chain of ownership) of the Contractor, the following maximum rates shall apply:

Delete the tenth paragraph under (d) Equipment and replace with the following:

The weekly rate per hour shall apply when the assigned time exceeds 7 consecutive calendar days, but does not exceed 21 consecutive calendar days.

Delete the thirteenth paragraph under (d) Equipment and replace with the following:

For equipment owned by the Contractor or a subsidiary, affiliate, or parent company (no matter how far up the chain of ownership) of the Contractor, the maximum hourly rate to be used shall be the monthly rate as set forth in the current edition of the Rental Rate Blue Book, including all Rate Adjustment Tables and amendments, divided by 176 (176 working hours per month).

Delete the following from (d) Equipment, from the fifteenth paragraph:

. . . as published by Dataquest, Inc.,

Change the section designation for Miscellaneous from:

(f) Miscellaneous: . . . to: (g) Miscellaneous:

Add the following as (f):

(f) Bonding Costs: For bonding on the total cost of the cost-plus work plus administrative expenses as outlined in (e) above, the Contractor shall receive its actual cost. The Contractor shall furnish satisfactory evidence of the cost paid for such bonding.

Article 1.09.05 - Eliminated Items:

In the first sentence after "Should any items", delete "contained in the proposal" and replace with ", or portion of work contained in a lump sum item,".

In the first sentence after ". . . eliminate such items", insert "or portion of work".

Delete the second sentence and replace with the following:

Such action shall in no way invalidate the Contract; and no allowance for any items, or portion of work contained in a lump sum item so eliminated, will be made in making final payment to the Contractor, except for such actual work as may have been done on the items, or portion of work contained in a lump sum item, and such related material as may have been purchased prior to the Engineer's notice to the Contractor that the items, or portion of work contained in a lump sum item, had been eliminated.

In the third sentence, after "given item", insert ", or portion of work contained in the lump sum item,".

In the last sentence, after "elimination of the item", insert ", or portion of work contained in a lump sum item."

Article 1.09.06 - Partial Payments

In Subarticle A — Monthly and Semi-monthly Estimates, Section (1), add the following after the first sentence:

The Contractor shall submit to the Engineer for verification a monthly payment requisition documenting the value of work performed in accordance with the Contract during the previous month.

In Subarticle A — Monthly and Semi-monthly Estimates, Section (1), add the following after the third sentence:

When work equaling the original contract value has been accomplished, no additional retainage will be withheld.

Subarticle 1.09.06--B -- Payment of Materials Delivered at the Site:

Delete the entire subarticle, including the title and replace with the following:

B--Payment for Stored Materials: Non-perishable materials which meet specifications requirements, specifically produced or purchased for incorporation into the Project, and delivered at the site or at such location as the Engineer may approve, but not incorporated in the work, may be included in current estimates at such fraction of the Contract unit price or lump sum price, as the Engineer may consider to represent a fair value for the material when such materials have been paid for by the Contractor as shown by receipted bills, or in lieu of such receipted bill or bills, a duly executed Certification of Title executed by the Contractor and the Vendor in the form approved by the Department. When partial payment is made for stored materials, such materials shall become the property of the State; but such payment shall in no way release the Contractor from its responsibility for the condition, protection and, in case of loss, replacement of such materials, or from any liability resulting in any manner from the presence of such materials wherever they may be stored or kept. All materials shall be stored in accordance with Article 1.06.03 and in accordance with the manufacturer's recommendations. Material test approval shall be required prior to payment for the materials.

Offsite storage may be approved by the Engineer provided the materials proposed are segregated from other materials, clearly labeled as being owned by the Department for use on the identified Project, and otherwise meet the requirements of Article 1.06.03 and are in accordance with the manufacturer's recommendations. All materials must be readily available for inventory and inspection by the Engineer. Storage outside of the State of Connecticut will 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 a schedule of values for the material costs for the Engineer's review and approval. The approved schedule of values shall become the Basis of Payment for the stored materials provided all other requirements of the specifications have been satisfied.

Generic materials having a use on many projects will be considered for payment only if in unopened packaging or in large lots. Stock and Raw materials will not be considered for payment without prior written consent of the Engineer.

In no case shall material payments exceed the Contract unit price or lump sum price less the actual value of delivery and installation of the materials. The Engineer reserves the right to adjust the price paid for the material in these instances. Such reductions in payment shall in no way affect the Department's ownership interest in the stored materials.

Add the following article:

Article 1.09.09 - Payment of Recoverable Costs Due the State:

The State shall have the right to set off against amounts otherwise due to the Contractor under this Contract or under any other contract or arrangement that the Contractor has with the State (a) any costs that the State incurs which are due to the Contractor's noncompliance with this Contract and (b) any other amounts that are due and payable from the Contractor to the State. Any sum taken in set off from the Contractor shall be deemed to have been paid to the Contractor for purposes of the Contractor's payment obligations under Article 1.03.04 of the Standard Specifications.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.10
ENVIRONMENTAL COMPLIANCE**

Article 1.10.01 – General:

After the first paragraph, "This Section of the ... transportation Projects.", add the following paragraph:

The Contractor shall be bound to comply with all requirements of permits and permit applications as though the Contractor were the permittee. If at the time the permit is received, its contents differ from that which is outlined in the application, the permit shall govern. Should the permit be received after the receipt of bids and the permit requirements significantly change the character of the work, adjustment will be made to the Contract in accordance with the appropriate articles in Section 1.04. The requirements and conditions set forth in the permit and permit application shall be binding on the Contractor just as any other specification would be.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 2.01
CLEARING AND GRUBBING**

Article 2.01.03 – Construction Methods:

After the third paragraph, "In areas where ... on the plans.", add the following:

Prior to clearing operations, a meeting must be held. Those attending the meeting should include the Contractor, the Engineer, the designer, local tree warden or equivalent, and the District Environmental Coordinator. All clearing issues shall be resolved to the satisfaction of the Engineer before any trees are cut.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 2.02
ROADWAY EXCAVATION, FORMATION OF
EMBANKMENT AND DISPOSAL OF
SURPLUS MATERIAL**

Subarticle 2.02.01-1 - Classification:

In the first paragraph, first sentence, replace " 'Channel Excavation - Rock,' or 'Unclassified Excavation,' " with:

or "Channel Excavation - Rock,"

Delete the third paragraph "Unclassified Excavation ..."

Subarticle 2.02.03-4 - Excavation of Rock :

Delete the entire subarticle and replace with the following:

4 - Excavation of Rock: When rock is encountered, it shall be excavated to the slope lines and depths indicated on the plans.

The Contractor shall presplit the rock along the proposed rock slopes to the lines and inclinations shown on the plans except as otherwise provided in the specifications. Presplitting will be required where the backslope is designed at an inclination one (vertical) on one (horizontal) or steeper or where the cut in rock is ten feet or more, measured on the inclination of the proposed slope from the bottom of excavation to the natural surface of sound rock. The maximum vertical height of slope face which can be presplit at any one time shall be 50 feet.

The presplitting holes shall follow the required rock slope lines and inclinations. Hole drilling shall commence only when solid rock is encountered and exposed to the satisfaction of the Engineer. Unless otherwise permitted by the Engineer, presplitting holes shall have a spacing of three (3) feet, center-to-center, and a diameter not greater than 3 inches. The holes shall be extended from the top of solid rock surface to the toe of finished rock slope, unless lesser depths are specified on the plans. The proper angle of drilling shall be maintained at all times so all presplit holes lie essentially in the same plane and are paralleled to each other. No holes shall deviate more than one-half foot at any place in the plane of the specified slope line nor in its vertical alignment. If any cut is presplit by vertical stages (lifts), the presplit holes may be offset, for each stage, a distance not more than 24 inches inside the previously presplit face. Presplit holes shall be lightly loaded with a continuous column charge manufactured especially

for presplitting. All space in each hole not occupied by the explosive charge shall be filled with clean stone chips less than 3/8-inch in size or approved equal. Charges near the top of hole shall be reduced sufficiently to eliminate overbreak and heaving. The top charge shall not be less than three feet below the top of the drill hole. The methods of detonation shall be such that a uniform plane of rupture of the rock occurs from top to bottom and between presplit holes. If necessary, the Contractor shall adjust the methods as outlined above so as to result in a uniform plane of rupture in the rock.

Unless otherwise approved by the Engineer, presplit holes shall be drilled at least 50 feet ahead of and shall be detonated prior to the drilling and blasting of the general pattern holes within the section of any lift of rock to be excavated. The presplitting shall be performed so as to produce a uniform plane of rupture in the rock such that the resulting rock face will not be affected by subsequent blasting and excavation operations.

In the general pattern, blasting following presplitting operations, no portion of any blast hole shall be drilled closer than 4 feet to the presplit face. No portion of any blast hole larger than 3 inches in diameter shall be permitted closer than 12 feet to the presplit face. The spacing of blast holes, distribution and type of explosives, methods of detonation, and the blasting techniques shall be adjusted by the Contractor according to the characteristics and structure of the rock encountered so as not to fracture the rock beyond the presplit face.

Prior to any blasting, the Department will call a blasting conference at which the Contractor shall be represented to determine the methods to be used and the required protection to insure the utmost safety during blasting operations. The Contractor shall be responsible for all damage due either directly or indirectly to such operation.

The Contractor shall schedule his operations so that all rock excavation within a distance of one hundred (100) feet of bridge or other large structures, or any portions thereof, is completed to the required slope lines and depths before any structure work is started.

All loose and unstable material, even if located beyond the payment lines, and all breakage and slices shall be removed as directed and as the excavation for each vertical stage (lift) progresses. It shall be, at all times, the responsibility of the Contractor to perform all phases of this work to produce the required rock slope faces to the satisfaction of the Engineer.

Where indicated on the plans or as ordered by the Engineer, rock shall be excavated without the use of explosives. Excavation methods by the use of drilling, splitting, wedging and or other approved methods not involving the use of explosives shall be utilized. The method selected by the Contractor shall allow excavation to the slope line(s) and depth(s) as shown on the plans and shall not affect in any way the material or structures outside the excavation line or grade.

Subarticle 2.02.03 -5 - Placement of Embankment:

In the first sentence of the fourth paragraph, "Embankments shall be ... of recycled bituminous concrete.", replace; "15 percent by weight of recycled bituminous concrete", with:

2 percent by weight of asphalt cement

Subarticle 2.02.03 -6 - Compaction:

Delete the second sentence of the second paragraph, "Correction for particles retained ...AASHTO Method T-224."

Article 2.02.04 - Method of Measurement :

After the twelfth paragraph, " Where removal of rock ...: by the Engineer.", add the following :

Payment lines for Rock Excavation (No Explosives), where mechanical means of removal is required by these specifications, will extend to the slope and depth line(s) shown on the plans or as directed, to include only the rock actually removed within these limits.

Delete the seventeenth paragraph "Payment lines for unclassified excavation ..."

Article 2.02.05 - Basis of Payment :

In the first paragraph after the term " "Rock Excavation," insert the term " "Rock Excavation (No Explosives)," -

In the first paragraph, first sentence, replace " 'Channel Excavation - Rock' or 'Unclassified Excavation,' " with:

or "Channel Excavation - Rock,"

In the eighth paragraph, end the only sentence after the words "Earth Excavation."

July 1997

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 2.05
TRENCH EXCAVATION**

Article 2.05.03 - Construction Methods:

In the first paragraph, in the second and third sentences, delete the word "sheeting,".

Article 2.05.04 - Method of Measurement:

Add the following at the end of the article:

There will be no measurement for payment for the cost of plugging existing pipes.

Article 2.05.05 - Basis of Payment:

In the eleventh paragraph, third sentence, delete the word "sheeting,".

Add the following to the end of the eleventh paragraph:

When it becomes necessary, in the opinion of the Engineer, to install sheet piling for the support of existing facilities, pavement, utilities, or for other constraints, the sheeting items will be paid for in accordance with Section 7.13, 7.14 or 7.15.

Add the following at the end of the article:

There will be no direct Payment for the plugging of existing pipes, but the cost thereof shall be included in the contract unit prices of the drainage and excavation items.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 2.07
BORROW**

Article 2.07.01 - Description:

In the first sentence of the second paragraph, "Stockpiled hydraulically ... borrow requirements.", replace: '15 percent by weight of recycled bituminous concrete', with:

2 percent by weight of asphalt cement

July 1997

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 2.09
SUBGRADE**

Article 2.09.01 - Description:

After the first paragraph add the following:

Where precast concrete barrier curb is to be permanently installed, the work of formation of subgrade shall be performed on the area under the precast concrete barrier curb.

Where shoulders are to be reconstructed and the existing subbase is to remain, the work of formation of subgrade shall be performed at the plane coincident with the surface of the existing subbase.

Article 2.09.04 - Method of Measurement:

After the first sentence add the following:

Where precast concrete barrier curb is permanently installed, payment shall include the area under the precast concrete barrier curb.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 2.10
WATER POLLUTION CONTROL (SOIL EROSION)**

Article 2.10.04 -- Method of Measurement:

Delete the second sentence of the second paragraph "When no applicable....Extra and Cost-Plus Work." and replace with the following:

When no applicable contract item appears in the proposal for any additional measures not shown on the plans, the additional work and materials required for those measures shall be measured for payment as provided for under Article 1.09.04 - Extra and Cost-Plus Work. All extra work performed on an agreed-price basis shall be incorporated through construction orders and paid for on an item-by-item basis.

Article 2.10.05 -- Basis of Payment:

Delete the first paragraph and replace it with the following:

Work will be paid for under the applicable contract items or as provided for under Article 1.09.04 - Extra and Cost-Plus Work. No payment will be made for the cleanout of accumulated sediment for either permanent or temporary erosion control measures.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 2.12
SUBBASE**

Article 2.12.01 - Description:

In the only sentence, "The subbase shall... with these specifications.", replace: '15 percent by weight of recycled bituminous concrete', with:

2 percent by weight of asphalt cement

Article 2.12.03 - Construction Methods:

Delete the fifth paragraph: "Correction for particles retained on the 3/4-inch sieve shall be as specified in AASHTO T-224."

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 2.13
GRANULAR FILL**

Article 2.13.01 - Description:

*In the second sentence of the only paragraph, "It shall consist... these specifications.",
replace: '15 percent by weight of recycled bituminous concrete', with:*

2 percent by weight of asphalt cement

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 3.04
PROCESSED AGGREGATE BASE**

Article 3.04.03 - Construction Methods:

In the first sentence of the first paragraph, "Coarse aggregate shall... option of the Contractor.", replace: '15 percent by weight of recycled bituminous concrete', with:

2 percent by weight of asphalt cement

At the end of the fourth paragraph, "After the aggregate is spread... operate on the road." add the following sentence:

The dry density of each layer of processed aggregate base after compaction shall not be less than 95 percent of the dry density for that material when tested in accordance with AASHTO T 180, Method D.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION**

Add this section:

**SECTION 3.05
PROCESSED AGGREGATE**

3.05.01 -- Description: Work under this item shall consist of furnishing, placing, shaping and compacting processed aggregate to be used for back-up to bituminous concrete overlays in areas shown on the plans or where directed by the Engineer.

3.05.02 -- Materials: The material for this item shall conform to the requirements of Article M.05.01, except that coarse aggregate shall be broken stone, and fine aggregate shall be stone sand, screenings, or a combination thereof.

3.05.03 -- Construction Methods: The material shall be placed, shaped, and compacted in one continuous operation to the lines, grades, and cross slopes shown on the plans or as directed by the Engineer. Only the amount of material that can be placed, shaped, and compacted during the work shift shall be placed. No excess loose material shall be left along the edge of road.

Compaction will be by vibratory equipment determined to be acceptable to the Engineer prior to the start of the work. No specific percent of compaction is required; however, no loose material shall be evident after completion of compaction as approved by the Engineer.

During the hauling and placing operations, the Contractor shall immediately remove any material dumped or spilled on the shoulders or pavement.

It shall be the Contractor's responsibility to maintain and restore any eroded areas to the required line, grade, and cross slope with approved material and to keep the areas in acceptable condition until the construction work is considered complete by the Engineer.

3.05.04 -- Method of Measurement: The quantity of processed aggregate to be included for payment will be determined by the net weight, in tons, measured in the hauling vehicles. Scales shall be of a type satisfactory to the Engineer and shall be sealed by the Department of Consumer Protection at the expense of the Contractor, as often as the Engineer may require. When required, weighing shall be done in the presence of a Department representative.

3.05.05 -- Basis of Payment: This material will be paid for at the contract unit price per ton for "Processed Aggregate", complete in place, which price shall include all materials, equipment, tools, and labor incidental thereto.

Pay Item
Processed Aggregate

Pay Unit
Ton

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 4.01
CONCRETE PAVEMENT

Article 4.01.04 -- Method of Measurement:

B. -- Pay Adjustment for Pavement Thickness:

1 -- Determination of Pavement Thickness:

After the first paragraph insert the following new paragraph:

The thickness of fixed form pavement shall be determined by using measurements and/or elevations obtained by the Contractor and submitted to the Engineer prior to the placement of concrete. Thickness measurements using cores tested in accordance with AASHTO T 148 shall remain the option of the Engineer.

Modify the only sentence in the next paragraph to read as follows:

The thickness of slip form pavement will be determined by average caliper measurements of cores tested in accordance with AASHTO T 148.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 4.06
BITUMINOUS CONCRETE**

Article 4.06.02 - Materials

In the second paragraph, "The Contractor has the option ... shall apply.", delete "Class 114".

Under the heading **Bituminous Materials**:

In the first paragraph, first sentence, delete "AC 20, AC 15, AC 10, AC 5, AC 2.5 or other asphalt cement grades", and replace with "a performance graded binder".

In the first paragraph, last sentence, delete "AASHTO M226, (Table 2)" and replace with "AASHTO MP1".

Article 4.06.03 - Construction Methods:

Subarticle 4.06.03-1(b) Cessation of Supply

In the first paragraph, at the end of the last sentence, "The producing plant ... any one production day.", add the following:

or when the minus 200 mesh material exceeds the extracted AC content on three consecutive samples during any production day.

Subarticle 4.06.03-3 Mixing Plant Inspection - Field Laboratory

Delete the Subarticle text and replace with:

3. Mixing Plant Inspection - Field Laboratory: At no expense to the State, a field laboratory shall be provided at each plant, equipped for the use of the inspector to perform tests. This laboratory shall be a separate building or room having a minimum floor space of 80 ft² (100 ft² for laboratories constructed after January 1, 1991), with the least dimension to be 6 ft. The Contractor shall ensure that all State inspectors are given priority in the use of this laboratory. The field laboratory shall be approved by the Assistant Manager, Division of Materials Testing.

The field laboratory shall be equipped with a suitable heating and cooling system able to maintain the temperature between 65° F and 80° F. It shall be clean, and free of all materials and equipment not associated with the laboratory. Windows shall be installed to provide sufficient light and ventilation. Light fixtures and outlets shall be installed at convenient locations. A telephone shall be in audible range of the testing area. The laboratory shall be furnished with an adequate workbench that has a suitable width and a minimum total length of 10 ft. and height of 30-36 in. A table for sampling that has a minimum dimension of 36 in. by 36 in. shall also be provided.

The field laboratory shall be in compliance with all current OSHA requirements, including the regulation known as the OSHA hazardous communication standard and right-to-know standard.

Plants producing material during nighttime hours shall have suitable lighting at the sample platform and surrounding areas for the inspector to obtain samples safely.

The laboratory shall contain, and be kept supplied with, the following laboratory equipment:

- a. Fire extinguisher, at least one, capable of extinguishing electrical or chemical fires and effective on all solvents used in the laboratory, rated 2A.10BC
- b. Paint brush, 1-1 1/2 in. wide
- c. Hand brush suitable for cleaning sieves
- d. Scoop, 3 1/4" x 5" x 2" deep
- e. Pointed shovel with a long handle
- f. Two large spatulas
- g. Heavy Kraft wrapping paper, 36-in. wide, for quartering
- h. Sample splitter suitable for splitting aggregate samples and sand, through and including 1-1/2 in. aggregate
- i. Five 3-gallon sample buckets for cold-feed and hot-bin samples
- j. Six metal pie plates with a minimum diameter of 10 in.
- k. Hot plate and infrared lamp of suitable wattage
- l. An oven, thermostatically controlled so as to maintain the required temperature within 5° F. The oven shall have a temperature range of 100° F to 200° F. The minimum inside dimensions of the oven shall be 12 in. deep x 17 in. wide x 17 in. high.
- m. A suitable, nonchlorinated solvent approved by the Assistant Manager, Division of Materials Testing, shall be supplied and located at a reasonable distance from the laboratory (not to exceed 75 ft.). A materials safety data sheet shall be posted in each field laboratory. Some nonchlorinated solvents may require additional equipment or supplies, which shall be the responsibility of the Contractor and may include a potable water source, a revised disposal method and other items deemed necessary for the particular solvent used.
- n. 1000 ml nonbreakable wash bottle or flask
- o. Centrifugal extractor with a 1500 g, minimum, capacity bowl and capable of controlled, variable speeds up to 3600 rpm. A direct disposal is required to carry extracted solvent-bitumen solution directly from extractor bowl to a safe storage point outside of the laboratory.
FILTER RINGS: A heavy, smooth, white, medium-fast filter paper of a diameter at least equal to the external diameter of the bowl sealing surface and to exceed the internal diameter of the bowl sealing surface by at least 1 in. to conform with AASHTO T 164.
FILTER PAPER: In addition to the filter rings, filter paper (VWR Scientific, Grade 613 or equal) is required. The filter paper must have a diameter and surface area at least equal to the filter ring.
- p. Suitable forced ventilation sufficient to remove harmful testing solvent vapors from the work area shall be located directly behind and between the extractor and sample drying area and no further than 12 in. above the workbench, with ventilation provisions separate from doors and/or windows. Laboratory air quality shall be monitored and shall conform to the latest threshold limit values.
Eye-wash Station: A double (two-eye) wash station (minimum 2000 ml) shall be located in the field laboratory and readily accessible in an emergency.

- r. Sieve Shaker: One motorized shaker that has both a horizontal sieving mechanism and a tapping action, or one of equal performance as determined by the Assistant Manager, Division of Materials Testing. Sieve-retaining mechanism must be able to secure at least a 15 in. nest of sieves.
Shaker Timer: An automatic device to stop the electrical shaker after a predetermined time of 0 to 30 minutes.
- t. Thermometer: 50° F to 450° F
- u. Balance: 1500 g capacity, 1 g sensitivity
- v. Mechanical Marshall Hammer conforming to AASHTO T 245: The apparatus shall automatically compact the sample and stop the motor after the desired number of strokes has been applied. The trip mechanism shall be arranged so that the hammer falls the prescribed distance for every stroke. The molds shall be held in position by a spring-loaded clamp ring to allow easy insertion and removal from the compactor. The hammer shall be held in position during compaction by a locking device that makes it simple to insert and remove the hammer.
- w. Marshall Molds conforming to AASHTO T 245. Items required:
 - Two cylinder molds
 - One base plate with sufficient amount of 4-in. paper molding disks
 - One extension collar
 - One specimen extractor (Marshall Mold)

The specimen extractor shall be steel and shall have a plunger with a diameter not less than 3.95 in. and a thickness of ½ in. for extracting the compacted specimen from the specimen mold with the aid of a mold collar. The apparatus shall have a suitable frame to securely hold the mold collar during extraction and shall be equipped with a hydraulic jack able to provide the necessary force to easily extract the compacted Marshall Mold specimen.
- x. Marshall Molding Block conforming to AASHTO T 245
Sieves: Set of U. S. Standard 8-in. sieves, 2 in. high, consisting of one each with pan* and cover of the following sizes: #200*, #50*, #30*, #8, #4, 1/4", 3/8", 1/2", 3/4", 1" and 1-1/2". (*May be half-height).

Article 4.06.03-5 - Preparation of Bituminous Concrete Mixtures

Storage Bins: *In the first paragraph, "Bituminous concrete mixtures (Class 1, 114, 2, 3, 4 and 12)... conforms to the following conditions:", delete "114".*

Subarticle 4.06.03-7 Paving Equipment

At the end of the only paragraph, "Paving equipment shall...will prevent accumulation of bituminous material.", add the following sentence:

Extendible paver screeds must be of the vibratory type when used.

Insert the following at the end of subarticle 7 - Paving Equipment:

LIGHTING FOR NIGHT PAVING:

For paving operations which will be performed during hours of darkness, the Contractor shall provide lighting as described below for the purpose of illuminating the work area and equipment. The Contractor shall be responsible for furnishing, mounting, and maintaining in proper working order all of the required lighting. The Engineer will inspect the lighting equipment for conformance to this

specification and for proper working order, prior to allowing a nighttime paving operation to commence or continue. A sufficient number of spare lamps shall be available on site as placements in the event of failures. The Contractor shall equip his paving equipment with lighting fixtures as described below, or with approved lighting fixtures of equivalent light output characteristics.

PAVER

<u>Fixture Type</u>	<u>Quantity</u>	<u>Remarks</u>
A-(Fluorescent, twin 4' HO	3	Mount over screed area
B-(Narrow) or C (Spot)	2	Aim to auger and guideline
B-(Wide) or C (Flood)	2	Aim 25' behind paver

ROLLER: Use 4 Type B or 4 Type C Fixtures

<u>Fixture Type</u>	<u>Quantity</u>	<u>Remarks</u>
B-(250 W. M.H. Wide Beam)	2	Mounted above roller
B-(250 W. M.H. Narrow Beam)	2	Aim floodlights and wide beam lights 50'
C-(QPAR64 1000 W. Flood)	2	in front of and behind roller, aim
C-(QPAR64 1000 W. Spot)	2	spotlights and narrow beam lights 100'
		in front of and behind roller.

Fixture Type A:

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

Fixture Type B:

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

Fixture Type C:

The power beam holder shall have a ribbed die cast aluminum housing, and a clear tempered-glass lens to enclose the fixture. There shall be an arm fully adjustable for aiming, with a male-threaded mount with serrated teeth and lock nuts. There shall be a 120 volt heat proof socket with extended fixture wiring for an "Extended Mogul End Prong" lamp base. The fixture shall be gasketed, and shall be UL listed as suitable for wet locations. Lamps shall be 1000 watt quartz PAR64, both 1000PAR64MFL (flood) and Q1000PARNSP (spot) will be required.

Electric Power:

The Contractor shall provide generators on rollers and pavers of the type, size, and wattage, to adequately furnish 120 V AC electric power to operate the specified lighting equipment. A sufficient amount of fuel shall be available on site. There shall be switches to control the various lights. Wiring shall be weatherproof, and installed in accordance applicable codes.

Equipment Mounting:

The Contractor shall design and fabricate brackets and hardware for mounting light fixtures and generators to suit the configuration of the rollers and pavers. Mountings shall be designed so that light fixtures will be located such that they may be aimed as specified to provide proper lighting. Mounting brackets and fixtures shall not interfere with the equipment operator, or any overhead structures. Mounting brackets and hardware shall provide for secure connection of the fixtures, minimize vibration, and allow for adjustable positioning and aiming of the light fixtures. Lighting shall be aimed to maximize the illumination on each task, and minimize glare to passing traffic.

The cost for providing this lighting shall be considered part of the Contractor's equipment and tools, and will not be measured for payment, but will be included in the general cost of work.

Article 4.06.03-8 - Construction Methods

Subarticle 4.06.03-8 Placing of Mixture

In the first paragraph, delete the last four sentences, "The mixture shall not be placed...on frozen subbase material."

Subarticle 4.06.03-8(a) Placing and compacting mixture

Reassign as subarticle 4.06.03-8(b)

Subarticle 4.06.03-8(a) Vacant due to reassignment noted above

Replace vacant subarticle with the following:

(a) Weather and Seasonal Limitations: The Hot Mix Asphalt (HMA) mixture shall not be placed whenever the surface is damp, wet or frozen. In addition, no pavement will be permitted to be placed on frozen material.

The HMA mixtures shall be placed in accordance with the temperature limitations in Table 1 below.

TABLE 1
TEMPERATURE LIMITATIONS FOR PLACEMENT OF HMA PAVEMENT

Thickness of the Individual course (inches)	Minimum Temperatures- Degree F for Air and Surface**	
	Final course	All other courses
Less than 1-1/2 in.	50	50
1-1/2 to 2-1/2 in.	40	40
Over 2-1/2 in.	40	32

** Air and surface temperatures are taken in the shade. The surface is defined as the surface on which the new HMA pavement layer is to be placed.

Seasonal Limitation: In addition to temperature limitations stated in Table 1, the HMA pavement shall not be placed between October 15 and the following April 15 unless a cold weather paving procedure is submitted and approved by the Engineer. Such approval will not serve to relieve the Contractor of its contractual responsibility for the successful completion of the work.

Subarticle 4.06.03-9 Compaction:

After the second paragraph, "The in-place density of the completed Class 4...void-free density.", add the following paragraph:

The in-place density of the longitudinal joint(s) of each course of Class 1 or Class 2 placed at a depth of 1.5 inches or greater shall be compacted to a density of at least 90 percent and no more than 97 percent of the theoretical void-free density.

Non-Vibratory Rollers:

At the end of the second sentence of the first paragraph, "Rolling shall be performed...not less than 10 tons.", add the following:

for each single lane paver.

Article 4.06.04 – Method of Measurement

Subarticle 4.06.04-2 - Adjustment of Measured Weight

In the heading for the fourth paragraph, delete "114".

(f) In the first sentence, "Where the thickness ...can be achieved.", delete "114".

In heading for (l), delete 114.

In the first sentence of (l), "The computed weight ...Classes 1, 114, 2, 4 and 12.", delete "114".

Subarticle 4.06.04-3 - Adjustment for Material Deficiency:

the table, delete "114".

Subarticle 4.06.04-4 - Adjustment for Density:

In the first paragraph, delete the last sentence, "The in-place density . . . void-free density."

After the last sentence of the first paragraph add the following:

The in-place density of the longitudinal joint(s) of each course of Class 1 or Class 2 placed at a depth of 1.5 inches or greater shall be compacted to a density of at least 90 percent and no more than 97 percent of the theoretical void-free density.

Change the first sentence of the second paragraph to read:

The completed pavement, mat and longitudinal joint(s) will be tested, with respect to compaction, on a lot-to-lot basis.

After the last sentence of the second paragraph add the following:

When multiple lane paving is required, the 10 sublots shall be divided equally among the total linear feet of longitudinal joints. The average densities from the ten sublots shall be used to determine payment according to the payment schedule entitled "Schedule of Payment- Joint Density".

Delete the table and title following the sixth paragraph, "The average density ...with the following:", and replace with the following:

SCHEDULE OF PAYMENT – MAT DENSITY

<u>Average Percent Density of Ten (10) Sublots</u>		<u>Percent Payment (In-place Price)</u>
<u>CLASSES 1 and 2</u>		
100	98	97.5
97	92	100
91	90	97.5
89	88	96
87	or less	92 or rejection
<u>CLASS 4</u>		
100	99	97.5
98	90	100
89	88	97.5
87	86	96
85	or less	92 or rejection

After the table titled, "SCHEDULE OF PAYMENT - MAT DENSITY", add the following paragraph and table:

The average longitudinal joint density for each lot shall be determined by averaging the densities of the ten sublots. The adjustment assigned each lot shall be in accordance with the following:

SCHEDULE OF PAYMENT - JOINT DENSITY

Average Percent Density Class 1 and 2	Percent Payment (In-Place Price)
100 - 98	97.5
97 - 90	100.0
89 - 87	97.5
86 - 84	90.0
83 or less	70.0

Note – If neither the average in-place mat or joint density of the pavement meets the applicable specification requirement (i.e.: an average in-place density of [a] 92-97% of the theoretical mat density, and [b] 90-97% of the theoretical joint density, for Classes 1 and 2), then the percent of the unit price that the Department will pay to the Contractor will be the lower of either (1) the percent of the unit price that would be paid if payment were based only on the average mat density or (2) the percent that would be paid if based only on the average joint density.

Delete the last three paragraphs, "The pay factor ... original vendor's plant." and replace with the following:

The percent of payment shall be applied to the price per unit ton as bid.

Article 4.06.05 Basis of Payment:

Delete the fourth paragraph, "Replacement reinforcing steel...and work incidental thereto."

January 1996

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 4.15
PRESSURE RELIEF JOINT**

Article 4.15.01 -Description:

In the first sentence of the only paragraph, before the words "reinforced concrete pavement", add, "new or existing".

Article 4.15.03 - Construction Methods:

In the only sentence, after the words "Section 4.06" add "2.02 and 2.12". After the first sentence, add the following:

Prior to the installation of the pressure relief joint, the subbase shall be adjusted to the correct grade, with additional material if required, and compacted.

Article 4.15.05 - Basis of Payment:

Add the following paragraph:

There will be no payment for cutting concrete pavement and bituminous concrete pavement, removal of concrete pavement and bituminous concrete pavement, additional subbase, and compaction of subbase but the cost thereof shall be considered in the general cost of the pressure relief joint.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 5.07
CATCH BASINS, MANHOLES AND
DROP INLETS**

Article 5.07.02 - Materials:

After the last paragraph, add the following:

Geotextile shall be of a type appearing on the Connecticut Department of Transportation's Approved Product List for Geotextiles, referred to in Subarticle M.08.01-26.

Article 5.07.03 - Construction Methods:

After the fifth paragraph "Inlet and outlet pipes ... plans.", add the following as a new paragraph:

When constructing a new drainage structure within a run of existing pipe, the section of existing pipe disturbed by the construction shall be replaced with new pipe of identical type and size extending from the drainage structure to the nearest joint of the existing pipe.

At the end of the second sentence of the sixth paragraph after the words "...the pervious backfill", add the following:

to convey subsurface drainage. The openings shall be covered with geotextile.

Article 5.07.04 - Method of Measurement:

After the last paragraph, add the following:

Measurement for payment for work and materials involved with installing pipes to connect new drainage structures into a run of existing pipe will be as provided for under the applicable contract items.

Subarticle 5.07.05 - 5 - Reset Units:

In the only paragraph after the words "extra work," add the following:

in accordance with the provisions of Article 1.04.05

Subarticle 5.07.05 - 7 - Pervious material and dampproofing:

Change the title "Pervious material and dampproofing" to:

Pervious Material, Dampproofing and Geotextile

Subarticle 5.07.05 - 9 Conversion of drainage structures:

In the second sentence of the last paragraph after the words "extra work," add the following:

, in accordance with the provisions of Article 1.04.05,

January 1998

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 6.01
CONCRETE FOR STRUCTURES**

Article 6.01.03 - Construction Methods:

20-Removal of Forms

Delete the entire third paragraph.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 6.02
REINFORCING STEEL**

Delete the entire Section and replace with the following:

6.02.01 - Description: Work under this item shall consist of furnishing and placing reinforcing steel and splicing materials, of the type and size designated, as shown on the plans, as directed by the Engineer and in accordance with these specifications.

6.02.02 - Materials: The materials for this work shall conform to the requirements of Article M.06.01.

6.02.03 - Construction Methods:

1 - Shop Drawings: Prior to fabricating any materials, the Contractor shall submit shop drawings of the reinforcing steel and splicing materials, with material lists, material designations, placement diagrams, bending diagrams and manufacturer's literature for mechanical connections, for review and approval, in accordance with Article 1.05.02. Any expenses incidental to the revision of materials furnished in accordance with shop drawing and order lists to make them comply with the requirements of the plans, specifications or special provisions shall be borne by the Contractor.

2 - Fabrication:

(a) Cutting and Bending:

Bar reinforcement shall be cut and bent to the shapes shown on the plans. Fabrication tolerances shall be in accordance with the requirements of the American Concrete Institute publication, ACI 315. All bars shall be bent cold, unless otherwise permitted.

Coated bars shall not be field cut, unless permitted by the Engineer. Field cutting of coated bars should be performed using hydraulic-powered cutters or friction cutting tools to minimize coating damage and field touch-up. Flame cutting of coated bars will not be permitted. Field cut coated bars shall be repaired immediately.

Bars partially embedded in concrete shall not be field bent, except as shown on the plans or permitted by the Engineer.

(b) Hooks and Bend Dimensions:

The dimensions of hooks and the diameters of bends measured on the inside of the bar shall be as shown on the plans. When the dimensions of hooks or the diameter of bends are not shown, they shall be in accordance with the ACI, "Building Code Requirements for Reinforced Concrete (ACI 318)" as amended by ASTM A767M for galvanized bars.

(c) Identification:

Bar reinforcement shall be shipped in standard bundles, tagged and marked in accordance with the CRSI "Manual of Standard Practice".

3 - Handling, Storing and Surface Condition of Reinforcement: Steel reinforcement shall be stored above the surface of the ground on platforms, skids, or other supports and shall be protected as far as practical from mechanical injury and surface deterioration caused by exposure to conditions producing rust.

Epoxy-coated and galvanized reinforcing steel shall be handled and stored by methods that will not damage the coating. All systems for handling coated reinforcement shall have adequately padded contact areas wherever possible. All bundling bands shall be padded and all bundles shall be lifted with a strong back, multiple supports, or platform bridge so as to prevent bar-to-bar abrasion from sags in the bar bundle. Bars or bundles shall not be dropped or dragged. Coated reinforcing steel shall be transported and stored on wooden or padded supports. Epoxy-coated reinforcing steel, stored at the jobsite, shall be protected by covering with opaque polyethylene or other suitable protective material. Provisions shall be made for adequate ventilation to prevent condensation under the covering. Since the epoxy coating is flammable, the epoxy coated reinforcing shall not be exposed to any fire or flame.

Prior to placement of concrete, all reinforcement shall be free from dirt, loose rust or scale, mortar, paint, grease, oil, or other materials that would reduce bond. Reinforcement shall be free from injurious defects such as cracks and laminations. Bonded rust, surface seams, surface irregularities, or mill scale will not be cause for rejection, provided the minimum dimensions, cross section area, and tensile properties of a hand wire brushed specimen meet the physical requirements for the size and grade of steel specified.

4 - Placing and Fastening

(a) General:

Steel reinforcement shall be accurately placed as shown on the plans and firmly held in position during the placing and setting of concrete. Bars shall be tied at all intersections except where the spacing is less than 12 inches in each direction when alternate intersections shall be tied. Bars shall be tied at all intersections around the perimeter of each mat.

Bundled bars shall be tied together at not more than 6 foot centers. Lap splices shall have a minimum of two ties or be tied 12 inches apart for the length of the splice, whichever requires the greater number of ties. For epoxy-coated reinforcement, tie wires and metal clips shall be epoxy, plastic or nylon coated. For galvanized reinforcement, tie wires and metal clips shall be plastic coated or galvanized.

With the exception of tie down bars, welding (tack welding) will not be permitted for assembly of reinforcement, unless shown on the plans. Tie down bars shall be placed as shown on the plans and a top longitudinal reinforcing bar tied to these bars. When welding coated bars an appropriate protective mask must be worn, safety equipment used and suitable ventilation provided.

If wire fabric reinforcement is shipped in rolls, it shall be straightened into flat sheets before being placed.

(b) Support Systems:

Reinforcing steel shall be supported in its proper position by use of precast mortar blocks, wire bar supports, supplementary bars (tie-down bars), side form spacers or other approved devices. Such devices shall be sufficiently strong and properly placed at frequent intervals so as to maintain the cover between the reinforcing and the surface of the concrete. The reinforcing steel cover shall be no less than that shown on the plans and no greater than that shown plus 1/4 inch.

Platforms for the support of workers and equipment during concrete placement shall be supported directly on the forms and not on the reinforcing steel.

(c) Precast Mortar Blocks:

Precast mortar blocks shall have a compressive strength not less than that of the concrete in which they are to be embedded. The face of the blocks in contact with forms for exposed surfaces shall not exceed 2 inches x 2 inches in size and shall have a color and texture that will match the concrete surface. Precast mortar blocks shall not be used on exposed surfaces of precast concrete members. When used on vertical or sloping surfaces, such blocks shall have an embedded wire for securing the block to the reinforcing. When used in slabs, either such a tie wire or, when the weight of the reinforcing is sufficient to firmly hold the blocks in place, a groove in the top of the block may be used. For epoxy-coated bars, such tie wires shall be epoxy, plastic or nylon coated. For galvanized bars, such tie wires shall be plastic coated or galvanized.

(d) Wire Supports:

Wire bar supports, such as ferrous metal chairs and bolsters, shall conform to industry practice as described in the CRSI "Manual of Standard Practice of the Concrete Reinforcing Steel Institute." All bolsters or chairs which bear against the forms for exposed surfaces shall

be equipped with snug fitting, high density, polyethylene tips which provide 1/2 inch minimum clearance between the metal and any exposed surface. For epoxy-coated reinforcement, all wire bar supports and bar clips shall be epoxy or plastic coated. For galvanized reinforcement, chair and bar supports shall be hot-dip galvanized, after fabrication, in accordance with ASTM A123.

The maximum spacing of slab bolster rows and high chair rows for concrete deck slabs shall be 4 feet unless otherwise directed by the Engineer.

(e) Repair of Coated Reinforcing Steel:

Epoxy-coated Reinforcing Steel - In addition to the requirements of ASTM D3963M, all damage (ie. scratches, nicks, cracks) to the epoxy coating of the bar reinforcement, visible to the unaided eye with corrective vision, caused during shipment, storage or placement shall be repaired by the Contractor at the jobsite with approved patching material. Ends of bars that have been sheared, saw cut or cut by other means shall be coated with approved patching material. The areas on the bars and tie down bars damaged by welding shall be repaired with approved patching material.

Patching of damaged areas shall be performed in accordance with the patching material manufacturer's recommendations. Any singular damaged surface area (prior to repair with approved patching material), shall not exceed 2% of the total surface area of the bar. The total bar surface area covered by patching material shall not exceed 5% of the total surface area of the bar. Should either of these limits be exceeded the bar shall be removed from the work and replaced with an acceptable bar. All patching material shall be fully cured prior to placing concrete.

The patching material shall be compatible with the epoxy coating, inert in concrete, and suitable for repairs in the field. The patching material shall be prequalified, as required for the coating material, and shall be either identified on the container as meeting the requirements of Annex A1 of ASTM D3963M or shall be accompanied by a Materials Certificate certifying that the material meets the requirements of said Annex A1.

Galvanized Reinforcing Steel - All damage (ie. scratches, nicks, cracks) to the galvanized coating on bar reinforcement, visible to the unaided eye with corrective vision, caused during shipment, storage or placement shall be repaired by the Contractor at the jobsite in accordance with ASTM A780, Annex A2 - "Repair using Zinc-Rich Paints". Ends of bars that have been sheared, saw cut or cut by other means shall be coated with zinc-rich paint. The area on the bars and tie down bars damaged by welding shall be repaired with zinc-rich paint.

Field coating of damaged areas shall be performed in accordance with the zinc-rich paint manufacturer's recommendations. The zinc-rich paint shall conform to Federal Specification TT-P-641, Type 1 and shall be brush applied to achieve a dry film thickness from 3 - 6 mils. All touchup paint shall be fully cured prior to placing concrete.

5 - Splicing of Bars:

(a) General:

All reinforcement shall be furnished in the full lengths indicated on the plans unless otherwise permitted. Except for splices shown on the plans, splicing of bars will not be permitted without written approval of the Engineer. Splices shall be staggered as far as possible.

(b) Lapped Splices:

Lapped splices shall be of the lengths shown on the plans.

In contact lap splices, the bars shall be placed in contact and tied together in such a manner as to maintain the minimum distance to the surface of the concrete shown on the plans.

In non-contact lap splices, the bars shall be placed as shown on the plans and tied to adjacent bars in such a manner as to maintain the minimum distance to the surface of the concrete shown on the plans.

(c) Welded Splices:

Welded splices shall be used at the locations shown on the plans. Welding shall conform to the American Welding Society publication "Structural Welding Code, Reinforcing Steel, AWS D1.4" and applicable special provisions.

Welded splices shall not be used on epoxy-coated or galvanized bars. No welding shall be performed close enough to epoxy-coated or galvanized bars to cause any heating of the coating.

(d) Splices made with Dowel Bar Mechanical Connections:

Splices made with dowel bar mechanical connections shall be used at the locations shown on the plans. The minimum size of the bars and the length of the lap splices for the dowel bar mechanical connections shall be as shown on the plans.

The mechanical connections shall be installed in accordance with the manufacturers recommendations. All tools and equipment required to install and field inspect the connections shall be provided by the Contractor. The Contractor shall take all measures necessary to prevent concrete from adhering to the threaded portions of the mechanical connections.

After installing the coated mechanical connectors, all damaged areas on the coated connectors shall be repaired in accordance with 6.02.03-4(e).

6 - Splicing of Welded Wire Fabric: Welded wire fabric reinforcement shall be lap spliced as shown on the plans.

7 - Substitutions: Substitution of different size bars will be permitted only when authorized by the Engineer. The substituted bars shall have an area equivalent to or larger than the area shown on the plans.

8 - Inspection: Reinforcement in any member or component shall be placed, inspected and approved by the Engineer before placing of concrete begins. Concrete placed prior to approval of the reinforcement may be rejected and its removal required.

6.02.04 - Method of Measurement:

1 - General: No measurement will be made for payment for any clips, wire, separators, wire chairs, precast mortar blocks and other material used for fastening and supporting the reinforcement in the correct position.

2 - Bar Reinforcement: Uncoated, epoxy coated, galvanized and weldable bar reinforcement shall be classified as "Deformed Steel Bars", "Deformed Steel Bars - Epoxy Coated", "Deformed Steel Bars - Galvanized" and "Deformed Steel Bars - Weldable" respectively.

This work will be measured for payment by the number of pounds of bar reinforcement installed and accepted.

The weight of reinforcing steel shall be computed using the unit weights tabulated in Subarticle M.06.01.02. No allowance shall be made for the weight of the epoxy or galvanized coatings.

Tie down bars will not be measured for payment.

In case short bars are used when full length bars might reasonably be required, only the amount which would be obtained if full length bars were used will be measured for payment. No allowance will be made for lap splices not contemplated by the plans unless approved by the Engineer.

If bars are substituted upon the Contractor's request and as a result more reinforcing steel is used than specified, only the amount specified will be included.

3 - Welded Wire Fabric: This work will be measured for payment by the number of pounds of welded wire fabric installed and accepted.

The weight of welded wire fabric will be computed from the values published in the CRSI "Manual of Standard Practice".

4 - Dowel Bar Mechanical Connections: Uncoated, epoxy coated and galvanized dowel bar mechanical connections shall be classified as "Dowel Bar Splicer System", "Dowel Bar Splicer System - Epoxy Coated" and "Dowel Bar Splicer System - Galvanized" respectively.

This work will be measured for payment by the number of dowel bar mechanical connections installed and accepted.

6.02.05 - Basis of Payment: Payment for this work will be made as follows:

1 - Bar Reinforcement: This work will be paid for at the contract unit price per pound for "Deformed Steel Bars", "Deformed Steel Bars - Epoxy Coated" or "Deformed Steel Bars - Galvanized" and "Deformed Steel Bars - Weldable" complete in-place and accepted, including shop drawings, furnishing, fabricating and placing reinforcing steel, welding splices and all materials, equipment, tools, labor and work incidental thereto.

2 - Welded Wire Fabric: This work will be paid for at the contract unit price per pound for "Welded Wire Fabric", complete in-place and accepted, including shop drawings, furnishing, fabricating and placing welded wire fabric and all materials, equipment, tools, labor and work incidental thereto.

3 - Dowel Bar Mechanical Connections: This work will be paid for at the contract unit price each for "Dowel Bar Splicer System", "Dowel Bar Splicer System - Epoxy Coated" and "Dowel Bar Splicer System - Galvanized" complete in place and accepted, including shop drawings, furnishing, fabricating and placing dowel bar mechanical connections and all materials, equipment, tools, labor and work incidental thereto.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 6.03
STRUCTURAL STEEL**

Article 6.03.02 - Materials:

In the only sentence, delete "Section M.07" and replace with:

Article M.07.02**Article 6.03.03 - Construction Methods:****Subarticle 6.03.03 - 6(a) - Welding:**

After the second paragraph, "If a welder ... through examination.", add the following paragraph:

Updating of Department welder certification cards shall be performed by personnel from the Division of Materials Testing.

SURFACE PREPARATION**Subarticle 6.03.03-23 - General**

After the first paragraph, "Surface preparation ... of the Engineer", add the following paragraph:

Prior to abrasive blast cleaning, all flame cut or sheared corners shall be ground in accordance with ANSI/AASHTO/AWS Bridge Welding Code D1.5, Section 3.2.9. In addition, all rough surfaces shall be ground smooth. Flame-cut edges shall be ground over their entire surface regardless of appearance, so that any hardened surface layer will be removed and subsequent abrasive blast cleaning will produce the specified surface profile depth. All steel surfaces shall then be solvent-cleaned in accordance with SSPC-SP1 - "Solvent Cleaning" before being blast cleaned.

Replace the first sentence of the third paragraph with the following:

Surface preparation shall be done in accordance with SSPC specifications with the following exceptions:

Subarticle 6.03.03-27 - Cleaning for Weathering:

In the last paragraph, replace "Steel Structures Painting Council" in the first, second and third sentences, with "SSPC".

January 1996

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 6.05
MASONRY FACING**

Article 6.05.02 - Materials:

In the only sentence, "The materials for this work ... metal dowels and ties.", delete the words "and lead".

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 6.51
CULVERTS**

Article 6.51.01 - Description:

After the first paragraph "This item shall consist of ... with these specifications.", add the following sentence:

This item shall also consist of furnishing and installing slotted drain pipes to the dimensions, details and of the size, length and location shown on the plans or ordered by the Engineer.

Article 6.51.03 - Construction Methods:

At the end of the article add the following subarticle:

For Slotted Drain Pipe:

All slotted drain pipe and related fittings shall be handled and assembled in accordance with the manufacturer's instructions except as modified in the contract documents or as ordered by the Engineer.

Placement of concrete shall conform to Article 6.01.03. The Contractor shall ensure all voids are filled with the concrete.

Care shall be taken in placing concrete backfill immediately adjacent to the interceptor drain pipes to avoid damage to the pipe and to prevent pipe misalignment. The concrete shall be thoroughly consolidated using internal vibrators. Sufficient hold downs shall be provided by the Contractor to prevent the interceptor drain from floating during concrete placement.

The Contractor shall make sure the surface of the concrete shall be sloped towards the slotted drain pipe detailed in the contract documents. The Contractor shall provide a suitable cover for the wall openings to prevent the concrete backfill or any other foreign debris from entering the pipe or sealing the opening during the installation and subsequent curing periods.

Transverse contraction joints shall be either formed or sawed in the concrete backfill at 20' intervals unless the concrete abuts concrete curbs. In this case, the transverse joints shall be 3/8 inches wide and 2-1/2 inches deep. Sawing will be done within 24 hours after placement. Care shall be taken not to saw into the interceptor drain pipe.

One expansion joint shall be provided in the concrete backfill for every 500 feet of continuous interceptor drain pipe installed or at every location where the concrete backfill abuts a drop inlet, manhole, or other similar structure. This joint shall be formed for the full depth of the backfill concrete and shall be a minimum of 3/4 inches in width.

A longitudinal joint shall be provided if the concrete backfill is placed adjacent to a concrete pavement. This joint shall be either formed or sawed 1/4 inch wide and 2 1/2 inches deep. Finish of concrete will be similar to burlap drag finish.

After curing, the transverse, expansion, and longitudinal joints shall be thoroughly cleaned to remove any contaminants or laitance remaining from forming or saw cutting. Before sealing, a backer rod bond breaking material such as closed cell polyurethane rod shall be placed so that a sealer width to depth ratio of 1:1 will be achieved. The joints shall then be sealed with an elastomeric polymer sealer. The methods and materials used to construct the various joints shall be chosen by the Contractor subject to the approval by the Engineer.

Movement of construction equipment and all other vehicles and loads over and adjacent to any slotted drain pipe shall be done at the Contractor's risk. Any pipe or backfill which becomes damaged or disturbed through any cause shall be replaced or repaired as directed by the Engineer at the expense of the Contractor and at no cost to the State. Suitable temporary crossovers consisting of steel plate or other materials approved by the Engineer shall be employed for a minimum of 7 days following concrete backfill operations in all areas where vehicular traffic must be maintained or until such time as the pipe installation will withstand loading without damage. All concrete surfaces shall receive a protective coating.

End cap installation shall be as recommended by the manufacturer.

Article 6.5I.04 - Method of Measurement:

Add the following:

9 - Slotted Drain Pipe or Temporary Slotted Drain Pipe shall be measured in linear feet along the top centerline, including elbow, as designated on the plans or as directed by the Engineer.

Article 6.5I.05 - Basis of Payment:

Add the following:

9 - Slotted Drain Pipe or Temporary Slotted Drain Pipe will be paid for at the contract unit price per linear foot for "Slotted Drain Pipe" or "Temporary Slotted Drain Pipe" of the size specified, complete in place, which price shall include all excavation, pipe, saw cutting, end caps, elbows, concrete, protective coating, grate, and all materials, tools, equipment, and labor incidental thereto.

In addition, if **Temporary Slotted Drain Pipe** is required, as shown on the plans, the contract unit price shall also include the removal and disposal of the pipe and concrete backfill, including excavation and all materials, tools, equipment and labor incidental thereto to permit the construction of the permanent structures and/or pavement. The price shall also include any repair of receiving drainage structures subsequent to the removal of the slotted drain pipe outlet.

January 1997

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 7.14
TEMPORARY SHEET PILING**

Article 7.14.04 - Method of Measurement:

Add to the end of the first paragraph:

If no payment limits are shown on the plans, the limits used for payment will be the actual horizontal limit of temporary sheet piling installed and accepted, and the vertical limit as measured from the bottom of the exposed face of the sheeting to the top of the retained earth behind the sheeting.

January 1996

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 8.05
REINFORCED CONCRETE DITCH LINER**

Delete the section.

January 1996

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 8.15
BITUMINOUS CONCRETE LIP CURBING**

Change the title "Bituminous Concrete Lip Curbing" to "Bituminous Concrete Curbing".

Article 8.15.01 - Description:

In the only sentence, change "Bituminous Concrete Lip Curbing" to "Bituminous Concrete Curbing."

Article 8.15.04 - Method of Measurement:

In the only sentence, change "bituminous concrete lip curbing" to "bituminous concrete curbing".

Article 8.15.05 - Basis of Payment:

In the only sentence replace "Bituminous Concrete Lip Curbing": with "Bituminous Concrete Curbing" of the type specified,".

Change the Pay Item from "Bituminous Concrete Lip Curbing" to "Bituminous Concrete (Type) Curbing".

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.10
METAL BEAM RAIL**

Article 9.10.01 - Description:

Add the following paragraph:

The alteration or conversion of the existing metal beam rail to the type specified shall be accomplished in conformity with the lines, grades, dimensions and details shown on the plans or as ordered by the Engineer.

Article 9.10.02 - Materials:

Add the following:

All undamaged existing rail elements and posts shall be reused to construct the railing as indicated on the plans or as directed by the Engineer.

Any parts of the existing railing, to be used in the conversion, which are damaged or missing shall be replaced with new parts conforming to the requirements of this specification.

Article 9.10.04 - Method of Measurement:

Delete the Article and replace with the following:

1. Metal Beam Rail (Type): The length of metal beam rail measured for payment will be the number of linear feet of accepted rail of the type or designation installed, measured along the top rail to the nearest foot, between the centers of the end posts in each continuous section, plus the terminal length of rail at bridges.
2. Convert Metal Beam Rail to Metal Beam Rail (Type): The conversion of existing metal beam rail to the type specified will be the number of linear feet of accepted rail installed measured along the top rail to the nearest foot, between the centers of the posts in each continuous section.

Article 9.10.05 - Basis of Payment:

After the first paragraph add the following:

Conversion of the existing metal beam rail will be paid for at the contract unit price per linear foot for "Convert Metal Beam Rail to Metal Beam Rail (Type)" complete in place, which price shall include materials (excluding new parts for damaged or missing parts), fittings, posts, rail elements, delineators, equipment, tools and labor incidental to the conversion of the existing railing.

Payment for authorized new parts, which replace damaged or missing parts will be at the applicable contract unit prices, or in their absence as extra work in accordance with Article 1.04.05.

Removal of existing metal beam rail required for the conversion to the type rail specified will be included in the cost per linear foot to convert. Also included in this item will be all necessary backfilling and disposal of surplus material. Surplus material not needed for the conversion shall become the property of the Contractor.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.13
CHAIN LINK FENCE**

Article 9.13.01 - Description:

After the word "fencing" add the following:

and gates

Article 9.13.03 - Construction Methods:

Add the following:

Fabric shall be fastened to the end of the gate frames by stretcher bars and fabric bands, and to the top and bottom of the gate frames by tie wires in the same manner as specified for the chain link fence fabric.

The drop bar locking device for the gate shall be provided with a footing of portland cement concrete crowned at the top to shed water and provided with a hole to receive the locking bar. A heavy duty padlock with (2) keys shall be furnished by the Contractor for each gate or set of double gates. The size of the footing and depth of penetration of the locking bar into the footing shall be as specified by the manufacturer of the locking device.

In the last sentence of the first paragraph, delete "and all other ... Section 6.01" and replace with:

and all other type posts shall be set in portland cement concrete acceptable to the Engineer.

Article 9.13.04 - Method of Measurement:

Add the following:

Gates will be measured for payment by the number of gates installed, of the type and size specified, completed and accepted.

Article 9.13.05 - Basis of Payment:

Add the following:

Gate work will be paid for at the contract unit price each for "Chain Link Gate" or "Polyvinyl Chloride Chain Link Gate" of the type and size specified; complete in place, which price shall include gate frame, gate posts, chain link fabric, lock, concrete, excavation, backfill, fabrication, installation, disposal of surplus material, and all materials, equipment, tools, labor and any work incidental thereto. Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
(Type) (Size) Chain Link Gate	EA.
(Type) (Size) Polyvinyl Chloride Chain Link Gate	EA.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.21
CONCRETE SIDEWALKS**

Subarticle 9.21.03-1 - Excavation:

After the only paragraph add the following paragraph:

When connecting new concrete sidewalk to a section of existing concrete sidewalk, the connection point shall be at the nearest joint in the existing sidewalk.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.39
SWEEPING FOR DUST CONTROL**

Article 9.39.04 - Method of Measurement:

Delete the only sentence of the second paragraph:

Furnishing of the pickup sweeper will be at the contract lump sum price for the sweeper.

Article 9.39.05 - Basis of Payment:

In the only sentence of the first paragraph, after the words "Shall include", insert "the furnishing of".

At the end of the first paragraph add the following:

This price shall also include the maintenance of the pickup sweeper for the life of the Contract.

Delete the second paragraph, "Furnishing of the pickup sweeper ... life of the contract."

January 1996

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.40
FURNISHING WATER EQUIPMENT**

Delete this section.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.43
WATER FOR DUST CONTROL**

Article 9.43.01 - Description:

In the only sentence, "This item shall ... dust conditions.", after the word "furnishing", insert "water equipment,"

Article 9.43.03 - Construction Methods:

Delete the second paragraph; "Watering equipment shall ... positive operator control." and replace with the following:

The Contractor shall have available and maintain in an operable condition at all times sufficient equipment for the purpose of applying water for dust control. This equipment shall consist of pipelines, tanks, tank-trucks, pumps, meters, hose, distributors or other devices, approved by the Engineer. A suitable device for a positive shutoff and for regulating the flow of water shall be located so as to permit positive operator control.

Article 9.43.05 - Basis of Payment:

Delete the article, "This work will be paid ... in accordance with section 9.40.", and replace with the following:

This work will be paid for at the contract unit price per "M" gallons for "Water for Dust Control," which price shall include all water, labor, and equipment including devices to measure and apply to surfaces designated by the Engineer and at the times specified.

This price shall also include all work necessary to erect, relocate, re-erect, and dismantle the entire water equipment system.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.49
FURNISHING PLANTING AND MULCHING
TREES, SHRUBS, VINES AND GROUND COVER PLANTS**

Article 9.49.03 - Construction Methods:

Subarticle 11 - Guying and Staking:

At the end of this paragraph add the following sentence:

Guy wires, hose and tree support stakes shall be removed after the initial establishment period.

Article 9.49.05 - Basis of Payment:

Subarticle 3 - The unit prices ...

In the only sentence of this paragraph, following the phrase "... and all work incidental thereto," add "including the removal of guy wires, hose and tree support stakes after the initial establishment period,".

**CONNECTICUT
SUPPLEMENTAL SPECIFICATIONS
SECTION 9.52
SELECTIVE CLEARING AND THINNING**

Article 9.52.03 – Construction Methods:

After the first paragraph, "All work pertaining ... as directed.", add the following:

Prior to clearing operations, a meeting must be held. Those attending the meeting should include the Contractor, the Engineer, the designer, local tree warden or equivalent, and the District Environmental Coordinator. All clearing issues shall be resolved to the satisfaction of the Engineer before any trees are cut.

All trees scheduled to be removed shall be visibly marked or flagged by the Contractor at least seven days prior to the cutting of such trees.

The Engineer will inspect the identified trees and verify the limits of clearing and thinning prior to the Contractor proceeding with its cutting operation.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.70
TRAFFICMEN**

Delete this section and replace with the following:

**SECTION 9.70
TRAFFICPERSON**

9.70.01 - Description: Under this item the Contractor shall provide the services of Trafficpersons of the type and number, and for such periods, as the Engineer approves for the control and direction of vehicular traffic and pedestrians.

On a weekly basis, the Contractor shall inform the Engineer of their scheduled operations for the following week and the number of Trafficpersons requested. The Engineer shall review this schedule and approve the type and number of Trafficpersons required.

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

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

Trafficpersons shall consist of the following types:

State Police Officers: State Police Officers shall be uniformed off-duty sworn Connecticut State Police Officers. Their services will also include the use of official State Police vehicles and associated equipment.

State Police Officers will be used on all limited access highways. State Police Officers will not be used on non limited access highways unless specifically authorized in writing by the Engineer. State Police Officers with official State Police vehicles will be used at such locations and for such periods as the Engineer deems necessary to control traffic operations and promote increased safety to motorists through the construction sites. On limited access highways, the Engineer may determine that State Police Trafficpersons will be utilized for regional work zone traffic safety and enforcement operations in addition to project-related work zone assignments.

Uniformed Municipal Police Officers: Uniformed Municipal Police Officers shall be sworn Municipal Police Officers or Uniformed Constables who perform criminal law enforcement duties from the Municipality in which the project is located. Their services will also include an official Municipal Police vehicle when requested by the Engineer. Uniformed Municipal Police Officers will be used on all non limited access highways. If Uniformed Municipal Police Officers are unavailable, other Trafficpersons may be used when authorized in writing by the Engineer.

Uniformed Municipal Police Officers and requested Municipal Police vehicles will be used at such locations and for such periods as the Engineer deems necessary to control traffic operations and promote increased safety to motorists through the construction sites.

Uniformed Flagger: Uniformed Flaggers shall be persons who have successfully completed flagger training by the American Traffic Safety Services Association, National Safety Council or other programs approved by the Engineer. A copy of the Flagger's training certificate shall be provided to the Engineer before the Flagger performs any work on the project. Services of Uniformed Flaggers shall include the following equipment: garments (including high visibility headgear) so as to be readily distinguishable as a Flagger in accordance with Standard 6E-3 of the MUTCD, and these specifications, and a STOP/SLOW paddle that is at least 18 inches in width with letters at least 6 inches high, mounted on a handle of sufficient length so that the bottom of the sign will be 6 feet above the ground, and conforms to Standard 6E-4 of the MUTCD and catalog number 387-80-9950 of the Catalog of Signs Connecticut DOT.

Uniformed Flaggers will only be used on non limited access highways when authorized in writing by the Engineer. Uniformed Flaggers will be used at such locations and for such periods as the Engineer deems necessary to control traffic operations.

General: Uniformed Law Enforcement Personnel being used as Trafficpersons may conduct motor vehicle enforcement operations in and around work areas as directed and approved by the Engineer.

Trafficpersons shall wear a high visibility safety garment that complies with OSHA, MUTCD, ASTM Standards and the following:

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

Uniformed Flagger - The base material for the safety garment shall be a fluorescent color of orange, yellow, or strong yellow-green. The garment shall have vertical and horizontal stripe markings of contrasting color to the base material to enhance noticeability of the wearer. These markings shall be made of retroreflective or combination of retroreflective and non-retroreflective materials. The retroreflective material shall be orange, yellow, white, silver, strong yellow-green, or a fluorescent version of one of these colors and shall have a minimum width of 5/8 inch. A minimum area of 40 square inches of retroreflective material must be visible when the garment is viewed from either the front or back and a minimum area of 12 square inches of retroreflective material must be visible from any other normal observation angle. The safety garment shall have the words "Traffic Control" clearly visible on the front and rear panels (minimum letter size 2 inches).

Worn/faded safety garments that are no longer highly visible shall not be used. The Engineer shall direct the replacement of any worn/faded garment at no additional cost to the State.

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

Prior to the start of operations on the project requiring the use of Trafficpersons, a meeting will be held with the Contractor, Trafficperson agency, and Engineer to review the Trafficperson operations, lines of responsibility, and operating guidelines which will be used on the project.

In the event of an unplanned, emergency, or short term operation, the Engineer may approve the use of properly clothed, non-certified Trafficpersons until such time as a certified Trafficperson may be obtained. In no case shall this temporary use exceed eight (8) hours for any particular operation.

9.70.04 - Method of Measurement: Only Trafficperson services approved by the Engineer will be measured for payment. Services of Trafficpersons will be measured for payment by the actual number of hours for each person rendering services in accordance with these specifications. Services of Trafficpersons utilized by the Contractor for which the Engineer did not approve and deems not necessary for the proper completion of the project or at locations where traffic is unnecessarily restricted by the Contractor's method of operation, will not be measured for payment.

The minimum hours of payment for each Trafficperson supplied by a law enforcement agency or Trafficperson subcontractor in any one day shall be four hours. No Uniformed Trafficperson shall work more than twelve hours in any one day. In case such services are required for more than twelve hours, the Contractor may request additional Trafficpersons. In cases where the Trafficperson is an employee on the Contractor's payroll, payment for the Trafficperson will be made only for those hours when the Contractor's employee is performing Trafficperson duties.

Travel time charged by State Police Officers, up to one hour per day, will be measured for payment. No travel time will be allowed or paid for Uniformed Municipal Police Officers or Uniformed Flaggers.

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

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

"Trafficperson" will be paid for at the actual hourly rate charged for Trafficperson services (monthly statement or receipted bills) by the entity which actually provided the service which have been approved by the Engineer plus a five percent (5%) markup. In situations where the Uniformed Flagger is an employee on the Contractor's payroll, payment will be made in accordance with Article 1.09.04(a) of the Standard Specifications. Use of a Municipal police vehicle requested by the Engineer will be paid at the actual rate charged by the Municipality plus a five percent (5%) markup. The rate charged by the Municipality for use of a Uniformed Municipal Police Officer and/or an official Municipal Police vehicle shall not be greater than the rate it normally charges others for similar services.

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

Pay Item
Trafficperson

Pay Unit
Est.

July 1997

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.71
MAINTENANCE AND PROTECTION OF TRAFFIC**

Article 9.71.03 - Construction Method:

In the third paragraph, add the following to the end of the last sentence:

and in accordance with the American Traffic Safety Services Association (ATSSA) guidelines contained in "Quality Standards for Work Zone Traffic Control Devices.

July 1997

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.76
BARRICADE WARNING LIGHTS**

Article 9.76.03 - Construction Methods:

After the fourth paragraph, "The Contractor shall maintain...dispose of them.", add the following paragraph:

Any barricade warning lights that are missing, damaged, defaced, or improperly functioning so that they are not effective, as determined by the Engineer and in accordance with the American Traffic Safety Services Association (ATSSA) guidelines contained in "Quality Standards for Work Zone Traffic Control Devices", shall be replaced by the Contractor at no cost to the State.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.77
TRAFFIC CONE**

Article 9.77.02 - Materials:

Delete the third sentence and add the following:

Traffic Cones used at night shall be reflectorized by utilizing Type VI Reflective Sheeting, in accordance with Subarticle M.18.09.01.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.78
TRAFFIC DRUM**

Article 9.78.02 - Materials:

In the first paragraph, delete the last sentence and replace the first sentence with the following:

Traffic Drums shall be manufactured plastic or rubber devices designed in accordance with the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD).

In the third paragraph, delete the first sentence and replace with the following:

Either Type III or Type VI Reflective Sheeting, in accordance with Subarticle M.18.09.01, shall be used on traffic drums.

Delete the remainder of the article beginning with Reflective Sheeting:

Article 9.78.03 - Construction Methods:

Delete Table I and Table II

Article 9.78.04 - Method of Measurement:

Delete the entire article and replace with the following:

This work will be measured for payment by the number of traffic drums used on the project.

Article 9.78.05 - Basis of Payment:

Delete the entire article and replace with the following:

This item will be paid for at the contract unit price each for "Traffic Drum" used on the project. Each drum will be paid for once, regardless of the number of times it is used on the project.

Pay Item
Traffic Drum

Pay Unit
EA.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.79
CONSTRUCTION BARRICADES**

Article 9.79.03 - Construction Methods:

Delete the second paragraph and replace with the following:

Alternate stripes of white and orange Type III or Type VI reflective sheeting shall be applied to the horizontal members as shown on the plans. Only one type sheeting shall be used on a barricade and all barricades furnished on a construction project shall have the same type of reflective sheeting.

Delete the third paragraph and replace with the following:

Any barricades that are missing, damaged, or defaced so that they are not effective, as determined by the Engineer and in accordance with the American Traffic Safety Services Association (ATSSA) guidelines contained in "Quality Standards for Work Zone Traffic Control Devices", shall be replaced by the Contractor at no cost to the State.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.80
CONSTRUCTION STAKING**

Article 9.80.03 - Construction Methods

Add the following to the end of the article:

For roadways where the existing pavement markings need to be reestablished:

Prior to any resurfacing of the highway or obliteration of existing pavement markings, the Contractor and a representative of the Engineer must establish and document pavement marking control points from the existing markings. These control points shall be used to reestablish the positions of the lanes, the beginnings and endings of tapers, channelization lines for on and off ramps, lane use arrows, stop bars, and any lane transitions in the project area. The Contractor shall use these control points to provide appropriate premarking prior to the installation of the final markings.

The Contractor shall provide and maintain reference stakes and/or markings at 100-foot intervals immediately off the edge of roadway to be used to reestablish the existing pavement markings. The Contractor shall also provide and maintain reference stakes and/or markings at any point on the roadway where there is a change in pavement markings to reestablish the existing pavement markings.

January 1998

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.81
42-INCH TRAFFIC CONE**

Article 9.81.02 - Materials:

Delete the first sentence of the third paragraph and replace with the following:

Reflectorized stripes shall be fabricated from either Type III or Type VI reflective sheeting.

In the last sentence of the third paragraph delete the following:

“for Type II sheeting and Article M.18.09.02 for Type IV sheeting”

Delete the entire fourth paragraph.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 10.01
TRENCHING AND BACKFILLING**

Article 10.01.02 - Materials:

Delete the first paragraph and replace with the following:

The materials for this work for the encasement of conduit or cable, shall be bedding material, all of which passes a 3/8-inch sieve and not more than 10 percent passes a No. 200 sieve.

July 1996

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 10.08
ELECTRICAL CONDUIT**

Article 10.08.05 - Basis of Payment:

In the second paragraph after the words, "bonding bushings," add the words, "bonding wire,"

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 11.11
LOOP VEHICLE DETECTOR AND SAWCUT

Article 11.11.03 - Construction Methods

Subarticle 1 - The Loop Vehicle Detector

Delete the second paragraph and the first sentence of the third paragraph. Add the following:

A loop identification tag shall be permanently attached to each loop amplifier harness. The tag shall be pre-printed by the manufacturer so that the Contractor can record the pertinent information on the tag. The following information shall be recorded legibly on the tag by the Contractor, with indelible ink, in the order shown.

CT D.O.T.

LOOP NO.: _____
PHASE CALL: _____
FIELD LOCATION: _____

LOCAL DET. NO.: _____
SYSTEM DET. NO.: _____
CABINET TERMINALS: _____

Field location shall include the route number or street name, the direction (such as Northbound), and the lane (left, center, right).

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 11.13
CONTROL CABLE**

Article 11.13.03 - Construction Methods

Subarticle 3 - Cable Closures

After the only paragraph add the following:

The terminals shall then be securely wrapped with electrical tape. Connectors shall not extend beyond the end of the terminal post. The terminals and connectors shall not be in contact with the closure cover at any point.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 11.30
HIGH MOUNTED INTERNALLY ILLUMINATED
FLASHING ARROW**

Article 11.30.03 - Construction Methods:

After the only paragraph, "The Contractor shall...of it.", add the following paragraph:

Any signs that are missing, damaged, defaced, or improperly functioning so that they are not effective, as determined by the Engineer and in accordance with the American Traffic Safety Services Association (ATSSA) guidelines contained in "Quality Standards for Work Zone Traffic Control Devices", shall be replaced by the Contractor at no cost to the State.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 11.31
CHANGEABLE MESSAGE SIGN
REMOTE CONTROLLED CHANGEABLE
MESSAGE SIGN**

Article 11.31.02 - Materials:

Delete the first sentence of the second paragraph and substitute the following:

The sign shall have a three line message panel with 8 characters per line and a minimum horizontal dimension of 115 inches.

Article 11.31.03 - Construction Methods:

Add the following to the end of the only paragraph:

When the sign is not in use, it shall either be turned off or turned from view.

After the only paragraph, "The Contractor shall...or turned from view.", add the existing paragraph:

Any signs that are missing, damaged, defaced, or improperly functioning so that they are not effective, as determined by the Engineer and in accordance with the American Traffic Safety Services Association (ATSSA) guidelines contained in "Quality Standards for Work Zone Traffic Control Devices", shall be replaced by the Contractor at no cost to the State.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 12.05
DELINEATOR**

Article 12.05.02 - Materials:

Delete the only sentence and replace with the following:

The materials for delineators shall conform to Articles M.18.07 and M.18.13.

Add the following sentence:

Reflective sheeting shall conform to either Subarticle M.18.09.01 (Type V) or M.18.09.02.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 12.07**

Change the title to the following:

SIGN FACE-EXTRUDED ALUMINUM (TYPE III REFLECTIVE SHEETING)

Article 12.07.01 - Description:

Delete the only paragraph and replace with the following:

This item shall consist of furnishing and installing sign face-extruded aluminum with the Type III reflective sheet facing at locations indicated on the plans or as ordered and in conformance with the plans and these specifications.

Article 12.07.02 - Materials:

Delete the second paragraph and replace with the following:

Structural steel shall conform to the requirements of ASTM A36. All members shall be galvanized after fabrication in accordance with the requirements of ASTM A123.

Zinc paint shall conform to the requirements of Federal Specifications TT-P-641 Type 1.

Article 12.07.03 Construction Methods:

Add the following:

Extruded aluminum signs shall be attached to existing supports with new post clip assemblies consisting of post clips, bolt, nut and washer as shown on the plans. All other hardware used for attachment of the overhead signs to the supports may remain in use and be relocated on the structure as required. Check and tighten all bolts and nuts for attachment hardware which is to remain in use.

New extruded aluminum signs shall be vertically centered on existing supports. Overhead sign support brackets (z bar, l bar, channel shape or angle iron) that project beyond the top or bottom of a new sign shall be cut to fit even with the edge of the new sign, preferably at the bottom. If necessary cuts may be made at both ends.

Where overhead signs having a vertical dimension exceeding the length of the existing sign support brackets, the existing brackets shall be removed and replaced with new vertical brackets having the length equal to the sign height.

All galvanized areas damaged by field cuts or welds shall receive zinc paint that is brush applied to achieve a dry film thickness from 3 to 6 mils.

All overhead sign erections shall be made immediately upon removal of the sign being replaced.

Article 12.07.05 - Basis of Payment:

Add the following:

Also included shall be any additional vertical sign support brackets required to attach new signs to existing supports.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 12.08
SIGN FACE-SHEET ALUMINUM**

Article 12.08.02 - Materials:

Delete the first paragraph and replace with the following:

Reflective sheeting shall conform to the requirements of Article M.18.09.01, Type I, II or III.

Delete the third paragraph and replace with the following:

Silk screening of Type I, Type II or Type III reflective sheeting shall conform to the requirements specified by the reflective sheeting manufacturer.

Delete the sixth paragraph, "For materials . . . on the project."

Article 12.08.03 - Construction Methods:

In the third and fourth sentence of the first paragraph, delete "encapsulated lens" and replace with "Type III".

In the first sentence of the third paragraph, delete "enclosed lens and encapsulated lens" and replace with "Type I, Type II or Type III".

In the fourth sentence of the third paragraph, delete "Enclosed lens" and replace with "Type I or Type II".

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 12.09
PAINTED PAVEMENT MARKINGS**

Article 12.09.01 - Description:

Replace the phrase, "fast-drying painted pavement markings" with:

hot applied painted pavement markings

Article 12.09.02 - Materials:

Delete the only paragraph, and replace with the following:

Materials for this work shall conform to the requirements of Article M.07.20 for waterborne pavement marking paint, Article M.07.21 for hot-applied waterborne pavement marking paint and Article M.07.30 for glass beads.

Article 12.09.03 - Construction Methods:

In the second paragraph; "Paint shall be applied ... painted pavement markings.", delete the words "fast-drying", and replace with:

hot-applied

Delete the only sentence of the third paragraph; "Fast-drying paint ... at the spray gun", and replace with:

Hot-applied paint shall be applied at a temperature of 130 °F to 145 °F at the spray gun.

Article 12.09.04 - Method of Measurement:

In the first sentence, delete the words "fast-drying", and replace with:

hot-applied

Article 12.09.05 - Basis of Payment:

In first sentence, delete "fast-drying painted pavement markings", and replace with:

hot-applied painted pavement markings

Under "Pay Item", delete "Fast-Drying Painted Pavement Markings", and replace with:

Hot-Applied Painted Pavement Markings

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION**

Add this section:

**SECTION 12.10
EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS**

12.10.01 – Description: This item shall consist of furnishing and installing reflectorized white and yellow epoxy resin pavement markings of the width and color specified and epoxy resin pavement markings, symbols and legends at the locations indicated on the plans and in conformity with the plans, these specifications and as directed by the Engineer.

Epoxy resin pavement markings includes epoxy resin installed with a truck-mounted machine such as center lines, lane lines, and shoulder lines.

Epoxy resin pavement markings, symbols and legends include stop bars, crosswalks, parking stalls, lane arrows, legends, and markings within areas such as paved islands, gore areas and paved medians.

On two-way highways, the exact location for passing zones will be determined by the Engineer prior to the application of the pavement markings. The Contractor shall notify the Engineer of the anticipated date of installation at least two weeks prior to that date, to allow time for the determination of the passing zone locations.

12.10.02 – Materials: Materials for this work shall conform to the requirements of Article M.07.22.

12.10.03 – Construction Methods:

1 - Equipment: 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 glass 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 glass bead application shall not be used. Before epoxy color is changed, equipment shall be cleaned out sufficiently to ensure that the color of material applied will be correct.

When working on a roadway with more than one lane in either direction, the applicator truck (striper) shall have a permanently mounted direction variable illuminated arrow board, fully operational and visible to approaching traffic. There will be no additional payment for the arrow board. Its cost shall be included in the bid price for this item.

For markings applied on pavements over one year old, equipment furnished shall also include a power washing machine capable of cleaning the pavement with a pressure of 2,400 to 2,800 psi, with water heated to 180° - 195° F. No chemicals shall be added to the water used in the process. The power washer shall be equipped with a turbo blast tip with an oscillating head and shall be capable of supplying a minimum of 5 gallons/minute/gun.

All guns on the spray carriages shall be in full view of the operator(s) during operation.

Each vehicle furnished shall include at least one experienced operator, who shall be fully knowledgeable about all equipment operations and application techniques.

The Contractor shall also furnish one technical expert, who shall be fully knowledgeable about all equipment operations and application techniques, to oversee the project operation.

2 - Procedures: Pavement markings shall be applied in accordance with the details shown on the plans and the control points established by the Contractor and approved by the Engineer.

The road surface shall be cleaned at the direction of the Engineer just prior to application. Pavement cleaning shall consist of power washing using clean water heated to 180° - 195° F at a pressure of 2,400 - 2,800 psi. The areas to be power washed shall include all areas where epoxy marking symbols and legends (including stop bars and crosswalks) are to be applied and at least one (1) inch beyond the area to be marked. The surface shall be cleaned to the satisfaction of the Engineer. For other pavement areas, cleaning shall consist of brushing with rotary broom (non-metallic), and any additional work as recommended by the material manufacturer and acceptable to the Engineer. New portland cement concrete surfaces shall be cleaned by abrasive blasting to remove any surface treatments and/or laitance. New bituminous concrete surfaces are not to be power washed.

All surfaces which 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. Glass beads shall be applied immediately after application of the epoxy resin marking to provide an immediate no-track system.

The Contractor shall place necessary "spotting" at appropriate points to provide horizontal control for striping and to determine necessary starting and cutoff points. Broken line intervals will not be marked. Longitudinal joints, pavement edges and existing markings shall serve as horizontal control when so directed.

A tolerance of 0.25 inch under or 0.25 inch over the specified width shall be allowed for striping provided the variation is gradual and does not detract from the general appearance. Alignment deviations from the control guide shall not exceed 2 inches provided the variation is gradual and does not detract from the general appearance. Material shall not be applied over a longitudinal joint. Establishment of application tolerances shall not relieve the Contractor of the responsibility to comply as closely as practicable with the planned dimensions.

Operations shall be conducted only when the road surface temperature is 40° F or as allowed by the Engineer. They shall be discontinued during periods of rain, and shall not continue until the Engineer determines that the roadway surface is dry enough to achieve adhesion.

Glass beads conforming to the requirements of Grading "B" (larger beads) shall be applied at a rate of 12 LB. per gallon of epoxy pavement marking material, immediately followed by a second drop of glass beads conforming to the requirements of Grading "A" (smaller beads) applied at a rate of 13 LB. per gallon of epoxy pavement marking material. Traffic cones or some other acceptable method shall be used to protect the pavement markings until cured.

Time to No-Track: The material shall be in "no-tracking" condition within 15 minutes, or as allowed by the Engineer. The no-tracking time shall be determined by passing over the line with a passenger car or pickup truck in the simulated passing maneuver. A marking showing no visual deposition of the material to the pavement surface when viewed from a distance of 50 feet shall be considered as showing "no-tracking" and conforming to this requirement for time to no-track.

When stencils are used during the application of epoxy markings, care must be used when removing the stencils so that the epoxy resin does not drip on the road, sidewalk, grass, etc., and so that the applied markings have edges which are clean, straight and neat.

Epoxy resin pavement markings may be applied over existing painted markings, provided they are sufficiently worn to allow adequate adhesion. If required by the Engineer, existing plastic, thermoplastic, epoxy or freshly painted markings shall be removed prior to the application of epoxy markings. Payment for removal will be made under the item "Removal of Pavement Markings."

Delete "3 – Performance:" and replace with "3 – Performance and Warranty:"

3 – Performance and Warranty: In order to be accepted, the applied markings must meet the following minimum retroreflectivity reading as measured using a MiroLux 12 within two weeks after installation:

White Epoxy	250 millicandelas per foot-candle per square foot
Yellow Epoxy	175 millicandelas per foot-candle per square foot

Add the following warranty language:

WARRANTY:

The Contractor shall warrant for the period and percentage level indicated below that the installation shall remain intact and serviceable. The installed material shall show no fading, lifting, shrinking, tearing, rollback, distortion or chipping due to vehicular traffic or normal maintenance activities including snow plowing. Although some wear is expected, the markings shall not wear out for the period and percentage level indicated below.

	<u>First Year</u>
Epoxy Resin Pavement Markings	95% (linear feet)
Epoxy Resin Pavement Markings, Symbols and Legends	95% (square feet)

In addition, the epoxy resin pavement markings shall be warranted to retain a minimum reflective value of 150 millicandelas per footcandle per square foot one year after installation. The measurements shall be made utilizing a MiroLux 12 with 15° geometry.

Determination of percentages of serviceability and minimum reflective values will be made jointly at the end of one year by the Contractor's representative and by the Engineer. The decision of the Engineer shall be final. The term "percentage of serviceability" shall be defined as follows: The percentage of serviceability of the markings shall apply to the total linear feet for Epoxy Resin Pavement Markings and total square feet for the Epoxy Resin Pavement Markings, Symbols and Legends measured on the project for payment.

The Contractor shall replace, entirely at the Contractor's expense, such amount of markings, if any, required to meet the above stated percentage. The Engineer will indicate the areas and lines to be replaced to meet the above stated percentages. The Contractor shall also replace those markings that fail the minimum value for reflectance. Replacement under either situation shall include all materials, equipment, labor and work incidental thereto.

The Contractor shall provide to the State, at no extra cost, any manufacturer's warranties or guarantees that exceed the minimum requirements stated previously, that are normally provided by the manufacturer.

These written warranties shall be provided when the documentation for the product is provided. These warranties will be retained by the Department.

4 - Crosswalks: Only glass beads conforming to the requirements of Grading "A" (smaller beads) shall be applied at a rate of 25 LB. per gallon of epoxy pavement marking material.

12.10.04 – Method of Measurement: Epoxy resin pavement markings shall be measured for payment by the actual number of linear feet of epoxy resin pavement markings installed on the pavement and accepted by the Engineer. Epoxy resin pavement markings, symbols and legends will be measured for payment by the actual number of square feet of epoxy resin pavement markings, symbols and legends installed on the pavement and accepted by the Engineer.

12.10.05 – Basis of Payment: This work shall be paid for at the contract unit price per linear foot for “Epoxy Resin Pavement Markings” of the width and color specified, and/or the contract unit price per square foot for “Epoxy Resin Pavement Markings, Symbols and Legends” installed on the pavement and accepted. This price 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	Pay Unit
(Width) (Color) Epoxy Resin Pavement Markings	L.F.
Epoxy Resin Pavement Markings, Symbols and Legends	S.F.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 12.12
TEMPORARY PLASTIC PAVEMENT MARKING TAPE**

Article 12.12.05 - Basis of Payment:

In the only sentence of the second paragraph, after the words "...in the opinion of the Engineer", add the following:

and in accordance with the American Traffic Safety Services Association (ATSSA) guidelines contained in "Quality Standards for Work Zone Traffic Control Devices,

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION**

Add this section:

**SECTION 12.14
PREFORMED BLACK LINE MASK PAVEMENT MARKING TAPE**

12.14.01 - Description: This item shall consist of furnishing, installing, and removing preformed, patterned, black line mask pavement marking tape of the width specified to temporarily cover existing pavement markings in accordance with this provision and in conformance with the plans and as directed by the Engineer.

The preformed, patterned, black line mask pavement marking tape shall be a highly durable, skid resistant, non-reflective, pliant polymer tape designed for the temporary covering of existing pavement markings. The black line mask pavement marking tape shall be removed when no longer needed, unless directed otherwise by the Engineer.

The black line mask pavement marking tape, when applied according to the recommendations of the manufacturer, shall provide a neat, durable masking that will not flow or distort. The black line mask pavement marking tape shall be weather resistant and, through normal traffic wear, shall show no lifting or shrinkage which will significantly impair the intended usage of the tape throughout its useful life and show no significant tearing or other signs of poor adhesion.

12.14.02 - Materials: Materials for this work shall conform to the requirements of Article M.07.24.

12.14.03 - Construction Methods: The patterned, black line mask pavement marking tape shall be applied in accordance with the manufacturer's recommendations, and shall mask the existing markings being covered.

12.14.04 - Method of Measurement: Preformed black line mask pavement marking tape shall be measured for payment by the actual number of linear feet furnished, installed and removed.

12.14.05 - Basis of Payment: This work shall be paid for at the contract unit price per linear foot for "Preformed Black Line Mask Pavement Marking Tape" of the width specified. This price shall be for all the work required by this section including the cleaning and preparing of the pavement surface, installation and removal, and all materials, equipment, tools and labor incidental thereto.

Any masking tape which is no longer effective, in the opinion of the Engineer, shall be replaced by the Contractor at no cost to the State.

Removed masking tape shall become the property of the Contractor and shall be removed from the project.

Pay Item
(Width) Preformed Black Line Mask
Pavement Marking Tape

Pay Unit
L.F.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION**

Add this section: -

**SECTION 12.16
BLACK EPOXY RESIN PAVEMENT MARKINGS
BLACK EPOXY RESIN SYMBOLS AND LEGENDS**

12.16.01 - Description: This item shall consist of furnishing and installing black epoxy resin pavement markings of the width specified and black epoxy resin symbols and legends to cover existing markings in accordance with this provision and in conformance with the plans or as directed by the Engineer.

The black epoxy resin pavement markings and black epoxy resin symbols and legends shall be a highly durable, skid resistant, non-reflective material designed to cover existing pavement markings.

The black epoxy resin pavement marking material, when applied according to the recommendations of the manufacturer, shall provide a neat, durable marking that will not flow or distort. The black epoxy resin pavement marking material shall be weather resistant and, through normal traffic wear, shall show no wearing which would significantly impair the intended usage.

12.16.02 - Materials: Materials for this work shall conform to the requirements of Article M.07.25.

12.16.03 - Construction Methods: The black epoxy resin pavement markings and black epoxy resin symbols and legends shall be applied strictly in accordance with the manufacturer's recommendations and installed as shown on the plans and to the control points as established by the Engineer.

The areas to be covered shall be dry and sufficiently cleaned of sand and debris so as to provide an acceptable bond. All surfaces which are power washed shall be allowed to dry sufficiently prior to the application of the epoxy markings. The areas that have been pre-marked shall be broom cleaned immediately prior to the application of the epoxy markings.

Operations shall be conducted only when the road surface temperatures are 32° F or greater. Operations shall be discontinued during periods of rain, and shall not continue until the Engineer determines that the roadway surface is dry enough to achieve adhesion.

Black aggregate shall be applied at a rate of 100 pounds per gallon of black epoxy pavement marking material. The black aggregate shall be applied using a double drop bead system, with each drop distributing 50 pounds per gallon of black epoxy pavement marking material.

The black epoxy resin pavement markings shall extend approximately 1 inch beyond the edges of the existing markings which are to be covered.

After application, the pavement markings shall be protected from crossing vehicles for a time at least equivalent to the drying time of the material, as specified by the manufacturer.

12.16.04 - Method of Measurement: Black epoxy resin pavement markings shall be measured for payment by the actual number of linear feet of black epoxy resin pavement markings installed and accepted by the Engineer. Black epoxy resin symbols and legends shall be measured for payment by the actual number of square feet of black epoxy resin symbols and legends installed and accepted by the Engineer.

12.16.05 - Basis of Payment: This work shall be paid for at the contract unit price per linear foot for "Black Epoxy Resin Pavement Markings" of the width specified and/or the contract unit price per square foot for "Black Epoxy Resin Symbols and Legend" installed on the pavement and accepted. This price shall be for all the work required by this section including the cleaning and preparing of the pavement surface, and all materials, equipment, tools, and labor incidental thereto.

Any black epoxy pavement marking material which is not effective, in the opinion of the Engineer, shall be replaced by the Contractor at no cost to the State.

Pay Item	Pay Unit
(Width) Black Epoxy Resin Pavement Markings	L.F.
Black Epoxy Resin Symbols and Legends	S.F.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 12.20**

Change the title to the following:

CONSTRUCTION SIGNS - TYPE III REFLECTIVE SHEETING

Article 12.20.02 - Materials:

In the second sentence, delete "(Encapsulated Lens)" and replace with "(Type III)".

In the fourth sentence, delete "and a Certificate of Compliance"

Article 12.20.04 - Method of Measurement:

In the only sentence, delete "encapsulated lens" and replace with "Type III".

Article 12.20.05 - Basis of Payment:

In the last sentence of the first paragraph, after the words "...in the opinion of the Engineer", add the following:

and in accordance with the American Traffic Safety Services Association (ATSSA) guidelines contained in "Quality Standards for Work Zone Traffic Control Devices,

In the first sentence, delete "Encapsulated Lens" and replace with "Type III".

Under Pay Item, delete "Encapsulated Lens" and replace with "Type III".

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 18.00
GENERAL CLAUSES
IMPACT ATTENUATION SYSTEMS**

Subarticle 18.00.02 - Performance Criteria:

In the first paragraph change the requirements set forth in National Cooperative Highway Research Program (NCHRP) Report "230" to "350".

Subarticle 18.00.06 – Delineation of Impact-Attenuation Systems

Delete the only paragraph and replace with the following:

All impact-attenuation systems shall have an appropriate Type 3 Object Marker attached to its nose unless a delineator has been provided by the manufacturer. The object marker shall be attached to the nose, front cylinder or front module by the use of bolts or vandal resistant hardware. The object marker shall be paid for in accordance with Section 9.30.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 18.05
FURNISHING TYPE D - PORTABLE
IMPACT - ATTENUATION SYSTEM**

Delete this section.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 18.06
USE OF TYPE D PORTABLE
IMPACT - ATTENUATION SYSTEM**

Delete this section and replace with the following:

**SECTION 18.06
TYPE D PORTABLE
IMPACT - ATTENUATION SYSTEM**

18.06.01 - **Description:** This item shall consist of the furnishing of and use of a self contained, lightweight portable impact-attenuation system in accordance with the requirements of this section and the design plans or as directed by the Engineer.

18.06.02 - **Materials:** All materials shall conform to the requirements of the plans. If the system is not furnished new, the Contractor shall document and/or demonstrate to the Engineer that the system conforms to the requirements of a new system. The Contractor shall submit a materials certificate in accordance with Article 1.06.07 for each new system supplied.

Type D-1 Connecticut Crash Cushion (CCC): The CCC shall attach behind and beneath a service vehicle and within a telescoping framework. The service vehicle shall weigh between 10,000 and 24,000 pounds. The CCC shall be comprised of four steel cylinders each of 24-inches in diameter and 34-inches deep. An aluminum impact plate shall be attached to and be an integral part of the rear of the system. The assembly shall rest on an aluminum frame which, on impact, will slide forward freely into a guide frame bolted to the truck chassis.

Type D-2 Hex Foam Portable Impact Attenuator: The D-2 system shall attach to a 10,000 to 24,000 LB truck. It shall be comprised of crushable hex foam cartridges, a fiberglass housing, rear jack assembly and skid plate. It shall have a hydraulic device capable of tilting the unit upward from the roadway surface to improve travel characteristics. The Contractor shall present documentation of system performance to demonstrate that the system will perform its intended function with minimum maintenance.

18.06.03 - **Construction Methods:** The Contractor shall have available a portable impact-attenuation system mounted on a truck. The Contractor shall maintain the system in a fully operable condition at all times. A system which is not fully functional will not be permitted at the work site. The truck shall be equipped with at least two strobe type flashers mounted high enough to be fully visible from the rear, and an internally illuminated flashing arrow visible from the rear. The illuminated arrow shall conform to the requirements of Section 11.30.

1. Use of the portable impact-attenuation system(s) as a stationary barrier vehicle shall be under the control of the Engineer at all times, and in conformance with the following required operational provisions:

- A. The portable impact-attenuation system shall be positioned such that adjacent traffic does NOT pass any other object within the protected area (i.e. equipment, personnel, vehicles) before reaching the portable impact-attenuation system.
 - B. Each portable impact-attenuation system in use shall be positioned not less than 25 ft, nor more than 100 ft from the forward boundary of the area to be protected.
 - C. Each portable impact-attenuation system shall be provided for use with an assigned operator. An operator shall be available to reposition the portable impact-attenuation system within a 15-minute time frame.
 - D. Use of one (1) portable impact-attenuation system shall be required, as directed by the Engineer, for each established protection area in a construction zone.
2. Use of the portable impact-attenuation system as a shadow protection vehicle for mobile or stop and go operations shall be under the control of the Engineer at all times, and in conformance with the following required operational provisions:
- A. The portable impact-attenuation system shall be positioned such that approaching traffic does NOT reach or overtake any object in the construction array before passing the portable impact-attenuation system.
 - B. Each portable impact-attenuation system in use shall be positioned not less than 50 ft nor more than 200 ft from the rear of the next vehicle in the mobile array, when the array is in a stopped position. When the array is in motion, the maximum distance between vehicles may extend to 500 ft, depending on the type and speed of the operation, road conditions, traffic volumes, etc.
 - C. Each portable impact-attenuation system in use shall be provided for use with an assigned operator, who must remain in the service vehicle at all times that the portable impact-attenuation system is in use.

The disposal of crushed cylinders or a damaged system is the responsibility of the Contractor. The disposal methodology employed shall be approved by the Engineer.

18.06.04 - **Method of Measurement:** This item will be measured for payment by the actual number of hours that the Type D Portable Impact Attenuation System is used in conformance with the above requirements. Subject to the approval of the Engineer, Type D Portable Impact Attenuation Systems may be used as a contractor option to a High Mounted Internally Illuminated Flashing Arrow. If the Attenuation System is deployed instead of a Flashing Arrow then it will be paid for under the item "High Mounted Internally Illuminated Flashing Arrow."

18.06.05 - **Basis of Payment:** This item shall be paid for at the contract unit price per hour, which shall include: the furnishing and use of the specified vehicle and an operator in conformance with the above requirements; flashers; illuminated arrow; and, all equipment, materials, tools, labor, disposal of damaged systems and/or components, and work incidental thereto.

PAY ITEM
Type D Portable Impact-Attenuation System

PAY UNIT
Hour

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 18.07
TEMPORARY IMPACT ATTENUATION SYSTEM**

Article 18.07.02 - Materials:

Replace the first sentence of the only paragraph with the following:

Type A temporary systems shall conform to the material requirements of 18.02.02; other temporary systems shall conform to the material requirements for the impact attenuator shown on the plans or shall conform to the manufacturer's specifications.

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.02
GRANULAR FILL
SUBBASE
GRANULAR BASE AND SURFACES
STONE BASE
PERVIOUS STRUCTURE BACKFILL
FREE-DRAINING MATERIAL
CRUSHER-RUN STONE

Subarticle M.02.01-1 - Broken or Crushed Stone

Delete the subarticle and replace it with the following:

Subarticle M.02.01-2 - Broken or Crushed Stone shall be the product resulting from the artificial crushing of rocks, boulders or large cobblestones, substantially all faces of which have resulted from the crushing operation. Broken or crushed stone shall consist of sound, tough, durable stone, reasonably free from soft, thin, elongated, laminated, friable, micaceous or disintegrated pieces, mud, dirt or other deleterious material and shall be sized to meet the requirements of grading "A," Article M.02.06.

Subarticle M.02.01-2 - Bank or Crushed Gravel

Add the following sentence at the end of the subarticle:

Crushed gravel shall be the manufactured product resulting from the deliberate mechanical crushing of gravel with at least 50 percent of the gravel retained on the No. 4 sieve having at least one fractured face.

Subarticle M.02.01-3 - Reclaimed Miscellaneous Aggregate

In the second sentence of the first paragraph; "It shall be...bituminous concrete.", delete; "15 percent by weight of bituminous concrete" and replace with:

2 percent by weight of asphalt cement

Subarticle M.02.02-3 - Reclaimed Miscellaneous Aggregate

In the second sentence of the first paragraph; "It shall be bituminous concrete.", delete; "15 percent by weight of bituminous concrete" and replace with:

2 percent by weight of asphalt cement

Article M.02.03 - Granular Base, Rolled Bank Gravel Surface and Traffic Bound Gravel Surface:

In the first sentence of the only paragraph; "The materials for...bituminous concrete." delete; "15 percent by weight of bituminous concrete" and replace with:

2 percent by weight of asphalt cement

Article M.02.05 - Pervious Structure Backfill:

In the only sentence of the first paragraph; "Pervious Structure...bituminous concrete.", replace; "15 percent by weight of bituminous concrete, or a mixture containing no more than 15 percent by weight of recycled bituminous concrete." to read:

2 percent by weight of asphalt cement, or any combination thereof, which mixture contains no more than 2 percent by weight of asphalt cement.

Subarticle M.02.05-3 - Reclaimed Miscellaneous Aggregate:

In the second sentence of the only paragraph; "It shall be...bituminous concrete.", delete; "15 percent by weight of bituminous concrete" to read:

2 percent by weight of asphalt cement

Article M.02.07 - Free-Draining Materials:

In the first sentence of the only paragraph; "Free-draining material...or mixtures thereof.", delete; "15 percent by weight of bituminous concrete" and replace with:

2 percent by weight of asphalt cement

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.03
PORTLAND CEMENT CONCRETE**

Subarticle M.03.01-1 Coarse Aggregate

Delete the entire section under (c) Grading: and replace with the following (814A ONLY):

(c) Grading:

For Pavement: The mix shall be designed utilizing a nominal maximum size of No. 4 aggregate.

For Class "A": The mix shall be designed utilizing a nominal maximum size of No. 4 aggregate.

For Class "B": The mix shall be designed utilizing a nominal maximum size of No. 4 aggregate.

For Class "C": The mix shall be designed utilizing a nominal maximum size of No. 6 aggregate.

For Class "F": The mix shall be designed utilizing a nominal maximum size of No. 6 aggregate.

For Slope Pavement: The mix shall be designed utilizing a nominal maximum size of No. 4 aggregate.

Grading of the various stone sizes shall conform to the gradation table of Article M.01.01.

Article M.03.01 - 12- Non-shrink, Non-staining Grout:

Delete subsections (a) and (b) and replace with the following:

(a) Bagged, pre-mixed formulations of non-shrink grout shall meet the requirements of ASTM C 1107, Grade B. The grout must be mixed with potable water for use. The grout shall be mixed to a flowable consistency as determined by ASTM C 230. All bagged material shall be clearly marked with the manufacturer's name, date of production, batch number, and written instructions for proper mixing, placement and curing of the product.

(b) The Contractor may formulate and design a grout mix for use on the project in lieu of using a pre-bagged product. The Contractor must obtain prior written approval of the Engineer for any such proposed mix design. Any such mix design shall include the proportions of hydraulic cement, potable water, fine aggregates, expansive agent, and any other necessary additive or admixture. This material shall meet all of the same chemical and physical requirements as must the pre-bagged grout, in accordance with ASTM C 1107, Grade B.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.04
BITUMINOUS CONCRETE MATERIALS**

Subarticle M.04.01 - 1(d)(1)

Delete "114"

Delete "Article AASHTO M226, (Table 2)" and replace with "AASHTO MP1"

Subarticle M.04.01 - 1(d)(4)

In the second sentence of the only paragraph; "Tack coat materials ... Manager of Materials Testing.", delete; "CRS-1".

Subarticle M.04.01 - 1(d)(5)

In the second sentence of the only paragraph; "Tack coat materials ... Manager of Materials Testing.", delete "RS-1".

Subarticle M.04.01 -3(a) Job-Mix Formula:

In the second paragraph, "For surface courses Class 1 and 114 ...each testing sieve.", delete "114".

In the fifth paragraph, "Class 1,114,2,...Classes 4, 5, 5A, 5B, 8 and 14.", delete "114".

Article M.04.03-Bituminous Concrete Mixtures

In the table heading, delete reference to "AC 20" and replace with "PG XX^(k)".

In the table, delete reference to 1-1/2" sieve and replace with 2" sieve.

In the table, delete the entire column headed by, "Class 114"

*In the table, under the column headed by "Class 1", change **Bitumen %^(g)** from 5 - 8 percent to read: 5 - 6.5 percent*

In the table, under the column headed by "Class 4", change to read:

100 passing the 2" sieve

At the bottom of the page add the following:

^(k) As required by JMF for project

July 1998

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.05
PROCESSED AGGREGATE BASE AND
PAVEMENT SURFACE TREATMENT**

Article M.05.01 - 1-Gradation

In the table, delete the 2 1/4" Square Mesh Sieve and replace with the following:

2 1/2"

Subarticle M.05.01 -2 -Coarse Aggregate:

In the first sentence of the first paragraph, "Coarse aggregate shall ... option of the Contractor.", replace, "15 percent by weight of recycled bituminous concrete", with;

2 percent by weight of asphalt cement

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.06
METALS**

Subarticle M.06.01-1: *Replace the entire subarticle with the following:*

1 - Bar Reinforcement:

Bar reinforcement shall be deformed and conform to the following:

Uncoated bar reinforcement shall conform to the requirements of ASTM A615, Grade 60.

Epoxy coated bar reinforcement shall conform to the requirements of ASTM A615, Grade 60 and be epoxy coated to the requirements of ASTM D3963.

Galvanized bar reinforcement shall conform to the requirements of ASTM A615, Grade 60 and be galvanized, after fabrication, to the requirements of ASTM A767, Class 1, including supplemental requirements. Dowels and tie bars for masonry facing and for granite curbing shall be galvanized, after fabrication, in accordance with ASTM A767, Class 1.

Weldable bar reinforcement shall conform to the requirements of ASTM A706.

Prior to incorporation into the work, samples of the uncoated, epoxy coated, galvanized and weldable bar reinforcement shall be submitted to the Engineer for destructive testing in accordance with the latest edition of the "Schedule of Minimum Requirements for Sampling Materials for Test". One sample, at least 60 inches long, shall be submitted for each size and type of bar reinforcement.

Subarticle M.06.01-3 - Wire and Welded Steel Wire Fabric: *In the first sentence of the second paragraph, replace "ASTM A184" with "ASTM A185".*

Subarticle M.06.01-5 - Structural Shapes: *Replace and rename the entire subarticle with the following:*

5 - Dowel Bar Mechanical Connections:

Dowel bar mechanical connections shall develop in tension and compression at least 125 percent of the specified yield strength of the bar reinforcement being spliced.

Epoxy coated mechanical connectors shall be epoxy coated in accordance with the requirements of ASTM D3963.

Galvanized mechanical connectors shall be galvanized, after fabrication, in accordance with the requirements of ASTM A767, Class 1, including supplemental requirements.

Prior to incorporation into the work, samples of the uncoated, epoxy coated and galvanized dowel bar mechanical connections shall be submitted to the Engineer for destructive testing. One sample, complete with all the components, shall be submitted for each size, type and manufacturer of the dowel bar mechanical connections.

Add the following Subarticle:

8 - Reports and Certification:

Mill test reports and materials certification shall be submitted for all types of reinforcing steel and dowel bar mechanical connections confirming they meet the requirements of the applicable specifications.

Materials Certificates shall be submitted in accordance with Article 1.06.07 for all types of reinforcing steel and dowel bar mechanical connections.

Subarticle M.06.03 - Galvanizing:

In the second paragraph, replace "ASTM B 454 Class 50" with:

ASTM B 695 Class 50

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.07
PAINT**

Article M.07.02 - Vacant

Replace with the following:

Article M.07.02 - Coating Systems for Structural Steel:

The coating system to be used shall be selected from the Product Reference List of the latest Product Use Status Lists for the Connecticut Department of Transportation Projects. Coating materials on this list are prequalified by meeting the North East Protective Coatings Committee (NEPCOAT) Specification Criteria for Protective Coatings.

Color: The color of the topcoat shall be as noted on the plans (Federal Standard 595 Color Number).

Packaging and Labeling of Coating Material: The container shall be designed to store the specific coating material. Each container of coating material shall bear a label that clearly shows the name of the coating manufacturer, the name of the product, the lot and batch numbers, the date of manufacture and the shelf life expiration date. The label shall also include complete specific instructions for opening the container and for mixing, thinning and applying the coating material contained therein. If the coating material cannot be positively identified from the label on the container, it shall not be used.

Delivery: Coating material shall be furnished in the manufacturer's original sealed and undamaged container.

Control of Materials: For each coating material, a Certified Test Report and a Materials Certificate shall be submitted in conformance with Article 1.06.07. The Certified Test Report shall contain the data required in NEPCOAT Specification Criteria for Protective Coatings, Section VII, Groups I and II.

Article M.07.20 - 15 Minute Dry Pavement Marking Paint:

Delete the entire article, including the title, and replace with the following:

Article M.07.20 - Waterborne Pavement Marking Paint This is for white and yellow waterborne pavement marking paint that is to be applied to bituminous concrete and portland cement concrete pavements. This paint shall be capable of being applied with paint striping equipment that does not require heating above ambient temperatures. All requirements shall be as specified in Article M.07.21, except as follows:

1. total nonvolatile shall not be less than 70 percent by weight;
2. pigment shall be 45-55 percent by weight;
3. weight per gallon shall not be less than 12.5 lb/gal when tested in accordance with ASTM D 1475; and
4. drying time to no pick up shall be 15 minutes or less when tested in accordance with ASTM D 711.

Article M.07.21 - Hot-Applied Pavement Marking Paint:

Delete the entire article, including the title, and replace with the following:

Article M.07.21 - Hot-applied Waterborne Pavement Marking Paint This is for white and yellow fast-drying waterborne pavement marking paint to be applied to bituminous concrete and portland cement concrete pavements. This paint shall be capable of being applied with paint striping equipment at an application temperature of 130° F to 145° F.

General: Specifications and publications that apply are as follows:

Federal Specifications: TT-P-1952D Paint, Traffic and Air Field Marking, Water Emulsion Base; Federal Test Method Standard #141 Paint, Varnish, Lacquer and Related Materials, Methods of Inspection, Sampling and Testing; Federal Standard No. 595 Colors; and HH-R-590 Roofing Felt (Asbestos, Asphalt-saturated).

ASTM Standards: D211-Specifications for Chrome Yellow and Chrome Orange; D476-Specifications for Titanium Dioxide Pigments; D562-Test for Consistency of Paints Using the Stormer Viscometer; D869-Test for 45-deg, 0-deg Directional Reflectance Factor of Opaque Specimens by Broad Band Filter Reflectometry.

Detailed Requirements, Formulation and Manufacture: The paint shall be formulated and manufactured from first-grade raw materials and shall be free from defects and imperfections that might adversely affect the serviceability of the finished product. The materials shall not exhibit settling or jelling after storage in the sealed containers as received that will affect the performance of the products. The paint shall provide the proper anchorage, refraction and reflection for the finished glass spheres when applied as specified.

Composition: The composition of the paint shall be at the discretion of the manufacturer, provided that the finished product meets the requirements of any applicable Federal, State or Local regulations for products of this type and the requirements as follows:

1. paint shall not contain more than 0.06 percent lead;
2. total nonvolatile shall not be less than 76 percent by weight;
3. pigment shall be 58-63 percent by weight;
4. resin solids shall be composed of 100 percent acrylic emulsion polymer;
5. volatile organic compounds shall not exceed 150 g/L, excluding water;
6. closed-cup flash point shall not be less than 100° F; and weight per gallon shall not be less than 12.5 lb/gal when tested in accordance with ASTM D1475.

Viscosity: The consistency of the paint shall not be less than 80 nor more than 90 Kreb units when tested in accordance with ASTM D562. The paint shall have good spraying characteristics when the material is heated to application temperature of 130° F to 145° F.

Flexibility: The paint shall not show cracking or flaking when subjected to the TT-P-1952D flexibility test in which the panels used shall be tin plates that are 3 in. x 5 in. in area and 35-31 U.S. Gauge in thickness. The tin panels shall be lightly buffed with steel wool and thoroughly cleaned with solvent before being used for tests.

Dry Opacity: Both white and yellow paints shall have a minimum contrast ratio of 0.96. Contrast ratio shall be determined by applying a wet film thickness of 0.005 in. to a standard hiding power chart. After drying, the black and white reflectance values shall be determined using a suitable reflectometer and the contrast ratio determined.

Bleeding: The paints shall have a minimum bleeding ratio of 0.97 when tested in accordance with Federal Specification TT-P-1952D. The asphalt-saturated felt shall conform to Federal Specification HH-R-590.

Abrasion Resistance: No less than 210 liters of sand shall be required to remove paint film when tested in accordance with TT-P-1952D.

Color: The paint shall not discolor in sunlight and shall maintain colorfastness throughout its life, approximately two years. Color determination shall be made, without beads, after a minimum of 24 hours. Color for yellow paint shall be a visual match for 595-13538. If not a visual match, the diffuse day color of the paint shall conform to the CIE Chromaticity coordinate limits as follows:

	<u>x</u>	<u>y</u>	<u>x</u>	<u>y</u>	<u>x</u>	<u>y</u>	<u>x</u>	<u>y</u>	<u>y Brightness</u>
White	0.305	0.295	0.360	0.360	0.388	0.377	0.280	0.310	84.0 min
Yellow	0.485	0.455	0.506	0.452	0.484	0.428	0.477	0.438	50.0 min

Glass Bead Adhesion: The paint with glass beads conforming to M.07.30, applied at the rate of 6.0 lb/gal of paint, shall require not less than 150 liters of sand to remove paint film and glass beads.

Scrub Resistance: The paint shall pass 300 cycles minimum when tested in accordance with ASTM D2486.

Drying Time: The reflectorized line shall dry to no pick up in 120 seconds or less when applied at the ratio provided for specified glass spheres to paint (the paint at 15 + one mil wet film thickness equivalent to 100-115 S.F./gal and the glass spheres at the equivalent rate of 6.0 lb/gal). The paint shall be applied with equipment so as to have the paint at a temperature of 130° F to 145° F at the spray gun.

Add the following article:

Article M.07.22 – Epoxy Resin Pavement Markings:

General Requirements:

Standards: All standards herein are minimum standards.

Identification: Each container must bear a label with the following information thereon: Name and address of manufacturer, production batch number, date of manufacture, shipping point, grade name and/or identification number, type of material, number of gallons, contract number, use intended, directions for application and formula. Improperly labeled samples and deliveries shall be rejected.

Certification: The manufacturer shall furnish a certified test report by an independent testing laboratory prior to the start of work indicating that the material as specified has been tested in accordance with ASTM or ACI testing procedures noted in this specification. The certified test report shall indicate the results of testing for the criteria contained herein.

Additionally, infrared spectrophotometer plots for both components of the test material shall be included by the independent laboratory in the certified test report. The unused material submitted for testing by the independent laboratory (minimum one (1) gallon unmixed components) shall be forwarded to the Connecticut Department of Transportation, Materials Testing Laboratory, 280 West Street, Post Office Box 207, Rocky Hill, Connecticut 06067. This sample shall be labeled as required under Section 1.06.07.

The manufacturer shall furnish certified test reports, in accordance with Section 1.06.07 for each batch delivered for application at the project site.

Detailed Requirements:

(a) **Epoxy Resin Material:** The material shall be composed of epoxy resins and pigments only.

(b) Composition:	WHITE (percent by weight)	YELLOW (percent by weight)
	20% ± 2% Titanium Dioxide (ASTM D476 Type III)	25% ± 2% Chrome Yellow (ASTM D 211 Type III)
	80% ± 2% Epoxy Resins	75% ± 2% Epoxy Resins

(c) **Color:** The color of the white material shall be no darker or yellower than color chip 17778 of Federal Standard No. 595a of the latest issue, when the material is placed in a type EH weatherometer for a period of 500 hours and weathered according to ASTM G 23. Any noticeable discoloration of the epoxy markings, either during or after application to the pavement surface, as determined by the Engineer, will be considered unacceptable. Any discolored areas shall be removed and the markings shall be reapplied in accordance with this specification. The color of the yellow shall be reasonably close to color chip 13538 of the Federal Standard No. 595a of the latest issue.

(d) Adhesion Capabilities: When the adhesion of the material to portland cement concrete (the concrete shall have a minimum of 300 psi tensile strength) is tested according to ACI 503R testing procedure, the failure of the system must take place in the concrete. The concrete shall be 90°F when the material is applied, after which the material shall be allowed to cure for 72 hours at 73° ± 3.5° F.

(e) Abrasion Resistance: When the abrasion resistance of the material is tested according to ASTM C 501 with a CS-17 wheel under a load of 1000 grams for 1000 cycles, the wear index shall be no greater than 82. (The wear index is the weight in milligrams that is abraded from the sample under the test conditions).

(f) Hardness: The Type D durometer hardness of the material shall be not less than 75 nor more than 90 when tested according to ASTM D2240 after the material has cured for 72 hours at 73° ± 3.5° F.

(g) Tensile Strength: The tensile strength of the material, when tested according to ASTM D 638, shall not be less than 6,000 psi after 72 hours cure at 73° ± 3.5° F.

(h) Compressive Strength: The compressive strength of the material, when tested according to ASTM D 695, shall not be less than 12,000 psi after 72 hours cure at 73° ± 3.5° F.

(i) Shelf Life: The individual components shall not require mixing prior to use when stored for a period of 12 months.

(j) Glass Beads: General Requirements – The beads shall be transparent, clean, colorless glass, smooth and spherically shaped, free of milkiness, pits, or excessive air bubbles and conform to the following specific requirements:

- **Quality Assurance Control** – The beads shall be segregated into maximum lots of 2,500 LB. and lot numbers shall be stamped onto each lot. Each lot shall be tested for gradation, rounds and embedment coating.
- **Gradation** – The glass spheres shall meet the following gradation requirements:

Grading "A"		Grading "B"	
Sieve Size	% Passing	Sieve Size	% Retained
#20	100	#10	0
#30	80 – 95	#12	0 – 5
#50	9 – 42	#14	5 – 20
#80	0 – 10	#16	40 – 80
		#18	10 – 40
		#20	0 – 5
		Pan	0 – 2

- **Roundness** – The glass beads shall have a minimum of 80 percent rounds per screen for two highest sieve quantities and no more than 3 percent angular particles per screen for Grading “B”. The remaining sieve fractions shall typically be no less than 75% rounds.
- **Refractive Index** – The glass beads shall have a refractive index of 1.50 to 1.52.

Add the following article:

Article M.07.24 - Preformed Black Line Mask Pavement Marking Tape

General Requirements: The preformed, patterned black line mask pavement marking tape shall consist of a matte black, non-reflective tape in widths or sizes sufficiently large to mask the existing markings which are to be temporarily covered.

The patterned masking tape shall be pre-coated with a pressure sensitive adhesive and shall be capable of being adhered to existing markings, on bituminous concrete pavement or Portland cement concrete in accordance with the manufacturer's instructions without the use of heat, solvents or other additional adhesives, and shall be immediately ready for traffic use after application. The Contractor shall identify equipment necessary for proper application and removal, and make recommendations for application that will assure effective product performance.

The preformed, patterned black line masking pavement marking tape shall be suitable for use for one year after the date of receipt when stored in accordance with the manufacturer's recommendations.

Detailed Requirements:

(a) Composition: The non-reflective, patterned black line mask pavement marking tape shall not contain metallic foil and shall consist of a mixture of high quality polymeric materials, pigments and inorganic fillers distributed throughout its base cross-sectional area, with a matte black non-reflective top layer. The patterned surface shall have a minimum of 20 percent of the surface area raised and coated with non-skid particles. The channels between the raised areas shall be substantially free of particles. The film shall be pre-coated with a pressure sensitive adhesive. A non-metallic medium shall be incorporated to facilitate removal.

(b) Skid Resistance: The surface of the patterned, non-reflective black line mask pavement marking tape shall provide an initial average skid resistance value of 60 BPN when tested in accordance with ASTM E 303.

(c) Thickness: The patterned material, without adhesive, shall have a minimum thickness of 0.065 inch at the thickest portion of the patterned cross-section and a minimum thickness of 0.02 inch at the thinnest portion of the cross-section.

(d) Adhesion: The black line mask pavement marking tape shall adhere to the roadway and existing roadway markings under climatic and traffic conditions normally encountered in the construction work zone.

(e) Removability: The black line mask pavement marking tape shall be removable after its intended use, intact or in large pieces, manually, at temperatures above 40° F without the use of heat, solvents, grinding or sand or water blasting. The black line mask pavement marking tape shall be totally removed from existing markings that are adequately adhered to the pavement surface, without damage to the underlying markings.

Add the following article:

Article M.07.25 - Black Epoxy Resin Pavement Markings:

Identification: Each container shall have a label affixed to it with the following information thereon: name and address of manufacturer, shipping point, grade production batch number, date of manufacture, grade name and/or identification number, type of material, number of gallons, contract number, use intended, directions for application, and formula. Improperly labeled samples and deliveries shall be rejected.

Certification: For each batch of black epoxy resin, Certified Test Reports conforming to Article 1.06.07 shall be submitted from an independent testing laboratory and approved by the Engineer, prior to installation on the project.

Detailed Requirements:

(a) Epoxy Resin Material: The material shall be composed of epoxy resins and pigments only.

(b) Composition:	<u>Component</u>	<u>Percent by Weight</u>
	Carbon Black (ASTM D476 Type III)	7 ± 2
	Talc	14 ± 2
	Epoxy Resins	79 ± 4

(c) Black Aggregate: The moisture resistant aggregate shall meet the gradation requirements as follows:

<u>Sieve Size</u>	<u>Percent Retained</u>
#20	23 - 38
#50	58 - 74
#270	1 - 6
Pan	0 - 0.5

The moisture resistant aggregate shall have a urethane coating. The aggregate shall be angular with no dry dispensement pigment allowed.

(d) **Adhesion:** The black epoxy resin pavement marking material shall be formulated so as to adhere to the roadway and existing roadway markings under climatic and traffic conditions normally encountered in the construction work zone.

(e) **Abrasion Resistance:** When the abrasion resistance of the material is tested according to ASTM D 4060 with a CS-17 wheel under a load of 1000 grams for 1000 cycles, the wear index shall be no greater than 82.

(f) **Hardness:** The Type D durometer hardness of the material shall not be less than 75 nor more than 90 when tested according to ASTM D 2240 after the material has cured for 72 hours at $73.5^{\circ} \pm 3.5^{\circ}$ F.

(g) **Compressive Strength:** The compressive strength of the material, when tested according to ASTM D 695, shall not be less than 12,000 psi after 72 hours cured at $73.5^{\circ} \pm 3.5^{\circ}$ F.

Subarticle M.07.30 - Glass Beads:

In the only sentence, "The moisture-resistant glass beads... M 247 Type 1.", delete the words, "moisture-resistant".

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.08
DRAINAGE**

Article M.08.01 – Pipe:**Subarticle M.08.01-2 - Coated Corrugated Metal Pipe and Coated Corrugated Metal Pipe Elbows:**

Delete the first paragraph and table and replace with the following:

This pipe shall conform to the requirements of AASHTO M36, Type I, Type IR or AASHTO M245, Type I. AASHTO M36, Type I & IR includes pipe fabricated from zinc-coated steel sheet coated with bituminous material and aluminum-coated (Type 2) steel sheet. AASHTO M245, Type I is for pipe fabricated from metallic-coated and polymer-precoated steel sheet.

Add the following sentence after the first sentence of the first paragraph:

For either specification the Contractor shall submit manufacturer's and/or fabricator's certified test reports and material certifications, in accordance with Section 1.06.07.

The corrugation size and sheet thickness shall conform to the following:

<u>Nominal Inside Diameter (inches)</u>		<u>Specified Sheet Thickness (inches)</u>
6	1½" X ¼"	.052
8	Corrugations	.064
10		.064, .079
12		.064, .079
15		.064, .079, .109
18		.064, .079, .109
21	2 ⅔" X ½"	.064, .079, .109
24	Corrugations	.079, .109, .138
30		.079, .109, .138, .168
36		.079, .109, .138, .168
42		.109, .138, .168
48		.109, .138, .168
54		.064, .079, .109
60		.064, .079, .109
66	3" X 1"	.079, .109, .138
72	or	.079, .109, .138
78	5" X 1"	.109, .138, .168
84	Corrugations	.109, .138, .168
90		.109, .138, .168
96		.109, .138, .168

Nominal Inside
Diameter (inches)

Specified Sheet
Thickness (inches)

	<u>Steel</u>		<u>Aluminum</u>	
	18	.064,	.079	.060,
24	.064,	.079	.060,	.075
30	.064,	.079	.060,	.075
36	.064,	.079	.075,	.105
42	.079,	.109	.105,	.135
48	Helical Rib		.105,	.135
54	$\frac{3}{4}$ " X $\frac{3}{4}$ " X $7\frac{1}{2}$ "		.105,	.135
60				.135
66				.135
72				.135
78				.135
84				.135

Delete the second paragraph and replace with the following:

Aluminum pipe sheet thickness shall be .004 inches less than specified above for $1\frac{1}{2}$ " X $\frac{1}{4}$ ", $2\frac{2}{3}$ " X $\frac{1}{2}$ " and 3" X 1" corrugations. Helical Rib shall be as specified above.

Fourth paragraph, add the following:

Steel Sheet, Aluminum-Coated (Type 2) does not require a coating of bituminous material or paved invert.

Seventh paragraph, add the following:

Coupling bands for Steel Sheet, Aluminum-Coated (Type 2) pipe do not require a coating of bituminous material.

Subarticle M.08.01-3 - Perforated or Plain Coated Metal Pipe for Underdrains or Outlets:

Delete the first paragraph and replace with the following:

This pipe shall conform to the requirements of AASHTO M36, Type III or AASHTO M245, Type III. The specifications are further supplemented by the following:

Add the following sentence after the first sentence of the first paragraph:

For either specification the Contractor shall submit manufacturer's and/or fabricator's certified test reports and material certifications, in accordance with Section 1.06.07.

Subarticle M.08.01-3(b) - Coating:

First paragraph, add the following:

Steel Sheet, Aluminum-Coated (Type 2) does not require a coating of bituminous material.

Fifth paragraph, add the following:

Coupling bands for Steel Sheet, Aluminum-Coated (Type 2) do not require a coating of bituminous material.

Subarticle M.08.01-4 - Coated Corrugated Metal Pipe-Arches:

Delete the first paragraph and table and replace with the following:

These pipe-arches shall conform to the requirements of AASHTO M36, Type II, Type IIR or AASHTO M245, Type II. The corrugation size and sheet thickness shall conform to the following:

Add the following sentence after the first sentence of the first paragraph:

For either specification the Contractor shall submit manufacturer's and/or fabricator's certified test reports and material certifications, in accordance with Section 1.06.07.

<u>Pipe-Arch Size (inches)</u>	<u>Equivalent Diameter (inches)</u>	<u>Pipe-Arch Specified Sheet Thickness (inches)</u>
17 X 13	15	.064
21 X 15	18	.064
24 X 18	21	.064
28 X 20	24	.079
35 X 24	30	.079
42 X 29	36	.109
49 X 33	42	.109
57 X 38	48	.109
64 X 43	54	.138
71 X 47	60	.138
71 X 47	60	.168
66 X 51	60	.079
73 X 55	66	.079
81 X 59	72	.079
87 X 63	78	.109
95 X 67	84	.109
103 X 71	90	.109
112 X 75	96	.109

<u>Pipe-Arch Size (inches)</u>	<u>Equivalent Diameter (inches)</u>		<u>Pipe-Arch Specified Sheet Thickness (inches)</u>
20 X 16	18		.064
23 X 19	21		.064
27 X 21	24		.064
33 X 26	30	¾" X ¾" X 7½"	.079
40 X 31	36	Helical Rib	.079
46 X 36	42		.109
53 X 41	48		.109
60 X 46	54		.109
66 X 51	60		.109

Delete the second paragraph.

Fourth paragraph, add the following:

Steel Sheet, Aluminum-Coated (Type 2) does not require a coating of bituminous material or paved invert.

Eighth paragraph, add the following:

Coupling bands for Steel Sheet, Aluminum-Coated (Type 2) pipe arches do not require a coating of bituminous material.

Subarticle M.08.01-5 -- Coated Corrugated Structural Plates and Bolts:

Add the following sentence after the first sentence of the first paragraph:

For this specification the Contractor shall submit manufacturer's and/or fabricator's certified test reports and material certifications, in accordance with Section 1.06.07.

Subarticle M.08.01-6 (c) Quality Assurance Testing:

Delete the entire subarticle and replace with the following:

(c) Quality Assurance Testing: Circular and elliptical reinforced concrete pipe shall be tested by the three-edge bearing method prescribed in AASHTO T 280, except as follows:

- 1) Modified or special design pipe shall be tested to the 0.01-inch load and the ultimate load requirements as per AASHTO M 170 and M 207.
- 2) At the discretion of the Engineer, pipe of standard design, as specified in AASHTO M 170 and M 207, may be tested to the 0.01-inch requirement plus ten percent additional load in lieu of ultimate load testing. Test pipe attaining a 0.01-inch crack will not be acceptable for use on ConnDOT projects.

- 3) Cores for absorption and determination of steel reinforcement shall be taken on a random basis as determined by the Engineer. The cores shall be at least six (6) inches in diameter.

Subarticle M.08.01-6 (e) Preliminary Tests and Tests for Extended Deliveries:

Delete the second sentence and replace with the following:

These sample pipes shall be tested under Department supervision by the three-edge bearing method.

Subarticle M.08.01-7 (c) Strength Tests:

Delete the entire subarticle, including the title. Replace with the renumbered Absorption Tests (below).

Subarticle M.08.01-7 (d) Absorption Tests:

Delete the entire subarticle and replace with the following:

(c) Absorption Tests: Absorption testing shall be performed in accordance with the requirements of AASHTO T 280 and M 170.

Subarticle M.08.01 - 11 - Vacant:

Reassign as: 11 - Slotted Drain Pipe and include the following:

The pipe shall be asphalt coated and conform to Subarticle M.08.01-2. Concrete shall conform to Article M.03.01, Class "A" or pavement type. Concrete shall be cured in conformance with M.03.01. The inlet aperture shall be longitudinal on top of the pipe and may be continuous or intermittent. The opening in the pipe wall may be fabricated in the form of continuous bar risers and spacers or of intermittent cut-out segments with structural members supporting a continuous grating as indicated in the plans. End caps shall be as provided by the manufacturer.

Elastomeric polymer sealer shall meet the physical requirements of either Federal Specification SS-S-195B or ASTM D3406 and be accepted on manufacturer's certification.

The pipe shall be helically corrugated with a continuous welded or lock seam. Pipe ends shall have two (2) rolled annular corrugations on each end for jointing.

Bar Riser and Spacer Type: Riser assemblies shall be fabricated from structural steel, in accordance with the dimensions on the plans. The riser assemblies shall be hot dipped galvanized according to ASTM A-123. The assemblies shall be welded to the corrugated pipe on each side of the riser at the location of the solid web spacers. The riser shall terminate 1 inch from the ends of each pipe length to allow clearance for single bolt coupling bands. The ends of the riser shall be closed with a suitable welded plate where solid web spacers do not come to the ends of the riser.

The maximum deviation from straight in both the vertical and horizontal plane of the riser assembly shall not exceed 3/4 inch in a 20 foot length.

Continuous Grating Type: The cut-out pipe segments shall provide a 2 inch wide slot of maximum length between the lock seams. The slot shall be left intact 1 inch on each side of the lock seam and this material shall be utilized to fasten the reinforcing bar in place.

A bent epoxy coated reinforcing bar shall cross the slotted opening on 6 inch centers. The reinforcing bar shall be an ASTM A615, No. 13 deformed bar epoxy coated with 7 mils of fusion bonded epoxy powder conforming to AASHTO M284.

Grating shall be furnished unless noted in the contract documents. Grating and all bearing bars, cross bars, and bent connecting bars shall be of welding quality, mild carbon steel conforming to ASTM A569 and to the dimensions shown on the plans.

Tie down bolts shall be J-Type bolts plated, ASTM A307 steel supplied with self-locking nuts.

Concrete forms shall be of cellular foam plastic base, fabricated as an integral part of the pipe and reinforcing bar assembly. The form shall be capped with a thick wood or plastic cap resting on top of the foam plastic and reinforcing bar.

The maximum deviation from straight in both the vertical and horizontal plane of the completed assembly shall not exceed 3/4 inch in 20 foot length. All grating and hardware shall be galvanized in conformance with Article M.06.03. Expansion joint filler shall conform to M.03.01-5(B).

Subarticle M.08.01-14 - Corrugated Aluminum Alloy Culvert Pipe:

Change the title of the Subarticle to:

14 - Corrugated Aluminum Pipe.

Delete the first and only paragraph and replace with the following:

This pipe shall conform to the requirements of AASHTO M196 Type I or Type IR. Sheet thickness shall conform to the requirements of M.08.01-2.

Add the following sentence after the first sentence of the first paragraph:

For this specification the Contractor shall submit manufacturer's and/or fabricator's certified test reports and material certifications, in accordance with Section 1.06.07.

Subarticle M.08.01-15 - Corrugated Aluminum Pipe for Underdrains and Outlets:

Delete the first paragraph and replace with the following:

This pipe shall conform to the requirements of AASHTO M196 Type III or Type IIIR. Sheet thickness shall conform to the requirements of M.08.01-2.

Subarticle M.08.01 - Semicircular Corrugated Metal Pipe for Underdrains and Outlets:

Delete in its entirety and replace with the following:

M.08.01-16 - Corrugated Aluminum Pipe Arches:

These pipe arches shall conform to the requirements of AASHTO M196 Type II or Type IIR.

Sheet thickness shall conform to the requirements of M.08.01-4.

Add the following sentence after the first sentence of the first paragraph:

For this specification the Contractor shall submit manufacturer's and/or fabricator's certified test reports and material certifications, in accordance with Section 1.06.07.

Subarticle M.08.01-17 - Perforated or Plain Corrugated Metal Pipe for Underdrains or Outlets:

Delete in its entirety and leave vacant. Rational - Duplicate of M.08.01-3

Subarticle M.08.01-18 - Cold Applied Bituminous Sealer

Replace the first sentence, "This material for ... the following requirements.", with the following:

This material, for use in sealing of joints in concrete and vitrified clay pipes, shall be free of asbestos and shall meet the following requirements:

In the table following, eliminate the entry; Organic Insoluble (AASHTO T 44).

Subarticle M.08.01-24 - Reinforced Concrete Ditch Liner:

Delete the entire subarticle. Replace with "Vacant"

Subarticle M.08.01-25 Corrugated Polyethylene Pipe:

Add the following:

Type D pipe shall have a smooth interior surface braced circumferentially or spirally with projections or ribs joined to a smooth outer wall. Both surfaces shall be fused to, or continuous with, the internal supports. Type D shall conform to AASHTO M 294.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.10
FENCE, RAILING AND POSTS**

Subarticle M.10.05 - Chain Link Fence:

Add the following:

- 5 -- Gates: Gates shall be of the same type of materials used for the chain link fence.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.11
MASONRY FACING
CEMENT AND DRY RUBBLE MASONRY
BRICK
MORTAR**

Subarticle M.11.01-2 - LEAD

Delete this subarticle and replace with "Vacant".

**CONNECTICUT
 SUPPLEMENTAL SPECIFICATION
 SECTION M.12
 BEARING AREAS
 RIPRAP
 SLOPE PAVING & SLOPE PROTECTION
 WATERPROOFING AND DAMPPROOFING
 STONE AND GRANITE SLOPE CURBING
 CALCIUM CHLORIDE FOR DUST CONTROL
 WOOD**

Subarticle M.12.02 - 4 - Special Riprap:

In the only sentence, "This material shall conform ... for two inch stone.", delete "two inch stone.", and replace with: "No. 3 stone."

Subarticle M.12.04 -1 -Waterproofing Asphalt:

Delete the first and second sentence of the first paragraph, "For woven cotton fabric ... Type B shall be used."

In the only sentence of the second paragraph, "Asphalt flashing cement ... Federal Specification SS-C-153, Type 1.", delete; "Federal Specification SS-C-153, Type 1", and replace with:

ASTM D 2822

In the only sentence of the third paragraph, "Primer for use ... requirements of AASHTO M 116.", delete; "AASHTO M116", and replace with:

ASTM D 41

Delete the fourth paragraph, "Waterproofing pitch shall conform ...requirements of AASHTO M 121."

Subarticle M.12.04 -2 - Fabric:

Delete the first paragraph, "Woven cotton fabric shall conform ... with the cementing material."

Delete the second paragraph, "Woven glass fabric ... shall be waived." and replace with the following:

Woven glass fabric saturated with asphalt shall conform to the requirements of ASTM D 1668.

Delete the third paragraph, "Resin-treated woven glass fabric ...asphalt and pitch.", and replace with the following:

Resin-treated woven glass fabric shall conform to the requirements of ASTM D 1668 and shall be compatible for use with asphalt.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATIONS
SECTION M.13
ROADSIDE DEVELOPMENT**

Subarticle M.13.06--Vacant:

Rename the subarticle and incorporate the following:

M.13.06--Compost: Compost shall be a stable, humus-like organic material produced by the biological and biochemical decomposition of source-separated compostable materials, separated at the point of waste generation, that may include, but are not limited to, leaves and yard trimmings, food scraps, food processing residuals, manure and/or other agricultural residuals, forest-residues and bark, and soiled or non-recyclable paper. Compost shall not be altered by the addition of materials such as sand, soil and glass. Compost shall contain no substances toxic to plants and shall not contain more than 0.1 percent by dry mass of man-made foreign matter. Compost shall pose no objectionable odor and shall not closely resemble the raw material from which it was derived. Compost shall have a minimum organic matter content of 30 percent dry unit weight basis as determined by loss on ignition in accordance with ASTM D 2974. Compost shall be loose and friable, not dusty, have no visible free water and have a moisture content of 35 - 60 percent in accordance with ASTM D 2974. The particle size of compost shall be 100 percent less than 1 inch in accordance with AASHTO T27 and shall be free of sticks, stones, roots or other objectionable elongated material larger than 2 inches in greatest dimension. The pH of compost shall be in the range of 5.5 - 8.0. The maturity of the compost shall be tested and reported using the Solvita Compost Maturity Test and must score 6 or higher to be acceptable. The soluble salt content of compost shall not exceed 4.0 mmhos/cm as determined by using a dilution of 1 part compost to 1 part distilled water. Compost may be either commercially packaged or used in bulk form. All compost shall be from DEP regulated, permitted or approved facilities. All compost material must be environmentally acceptable and must be accompanied by a Materials Certificate and Certified Test Report in accordance with Section 1.06.07. The Engineer reserves the right to draw samples and perform tests as may be deemed necessary to assure that the material conforms to these specifications.

Subarticle M.13.07.13--Peat:

The only existing paragraph becomes subsection (a). Add the following section:

(b) Compost conforming to Article M.13.06 may be substituted for peat.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.14
PRESTRESSED CONCRETE MEMBERS**

Article M.14.01

Subarticle M.14.01-2 -- Prestressing Steel:

Delete the entire second paragraph beginning with "Before incorporating ... in the work." and replace with the following:

Before incorporating the elements into the work, a minimum of one sample, seven (7) feet in length, shall be furnished to the Engineer for testing. When reel packs are identified with the same heat number, only one sample need be tested for every five (5) reel packs.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.15
HIGHWAY ILLUMINATION**

Article M.15.02 - Anchor Bolts

Subarticle 3 - Span Pole and Mast Arm Foundations

Delete the entire subarticle and replace with the following:

Anchor bolts shall meet the requirements of AASHTO Specification M 314. In addition, only Grade 55 or Grade 105 material may be used. The threaded end of Grade 55 material must be painted yellow. The threaded end of Grade 105 material must be painted red. Steel conforming to ASTM Specifications A 675 Grade 90, A 449 or A 687 is also acceptable and, if used, shall be clearly designated as such on the submitted shop drawings, and properly annotated on all certifications.

The chemical requirements for all categories are a maximum Phosphorous content of 0.04% and a maximum Sulfur content of 0.05%.

Anchor bolts shall have a diameter of at least 1-1/2 inches. The dimensions shall be as shown on the plans or as recommended by the manufacturer. Each anchor bolt shall be furnished with two nuts, two flat washers, and one lock washer. The threads, nuts and washers shall be hot-dip galvanized in accordance with the requirements for Class C of AASHTO M 232 (equivalent to ASTM A 153). The nuts shall conform to the requirements for nuts within AASHTO M 314.

Field welding and field bending of anchor bolts is prohibited. If anchor bolts do not fit with the baseplate, the Contractor shall replace the foundation or use a remedy recommended by the pole manufacturer and approved in writing by the Engineer.

The Contractor shall ensure plumbness of the hooked anchor bolts in the foundation. A minimum anchor bolt embedment of at least 4 feet is required. The amount of threading shall be as shown on the typical drawings.

Bolt Sampling Requirements:

1. Submit samples marked by manufacturer or fabricator.
2. Submit one sample of each size and heat number.
3. Submit a proper Materials Certificate for each sample.
4. Submit a proper Certified Test Report for each sample.

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.16
TRAFFIC CONTROL SIGNALS

Article M.16.03 - Pedestals

Subarticle 1 - Steel Poles

Delete the entire subarticle, including the title, and rename as VACANT.

Subarticle 2 - Aluminum Pedestals

Delete the first sentence of Section (a) Shaft, and replace with the following:

(a) Shaft: The shaft shall be made of ASTM B 210 Grade 6063-T6 or ASTM B 221 Grade 6005-T5 aluminum alloy and shall be either a seamless tapered tube with a 6 inch outside diameter at the base and a 4 ½ inch outside diameter at the top, or a seamless straight tube with a 4 ½ inch outside diameter.

Delete the second sentence of Section (b) Base, and replace with the following:

The tapered shaft shall be secured to the base by means of a circumferential fillet weld on the inside of the base top, and the straight shaft shall be secured by means of threads and machine screws, which when set, shall be flush with the base top.

Delete from the fourth sentence of Section (b) Base, the following:

... and the underside of the base shall be coated bituminous paint.

Article M.16.04 - Poles

In the first sentence of Subarticle 1-Steel Poles, Section (a) Round Continuously Tapered Shaft, delete the following:

... that will be ground or rolled flush.

Article M.16.05 - Mast Arm Assembly

Subarticle 1 - Aluminum

In the last sentence of Section (d) Transformer Base, delete the phrase:

... and shall be coated with bituminous paint.

Subarticle 2 - Steel

In the first paragraph of Section (a) Shaft, delete the second sentence and replace with the following:

There shall be a maximum of two longitudinal continuous arc welds.

In the first paragraph of Section (c) Mast Arm, delete the second sentence and replace with the following:

There shall be a maximum of two longitudinal continuous arc welds.

Article M.16.12 - Loop Vehicle Detector and Sawcut

Subarticle 1 - Loop Vehicle Detector

Add the following paragraph to Section C - Mechanical Requirements:

The loop identification tag shall be 3 inches x 5 inches, 10 mil thick plastic.

**CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.18
SIGNING**

Subarticle M.18.07 - 2. Metal Delineator Posts:

In the first sentence of the only paragraph, delete "ASTM A 499" and replace with:

ASTM A 36

Subarticle M.18.09.01 - Reflective Sheeting:

Delete the entire subarticle and replace with the following:

Reflective sheeting materials shall appear on the Department's Approved Product List for the application intended.

Subarticle M.18.09.02 - Reflective Sheeting: Type IV--Microprism

Delete the entire subarticle, including Tables I, II, III, IV, V, VI, VII, VIII, and IX, and replace with the following:

M18.09.02 - Reflective Sheeting: Bright Wide Angle Retroreflective

1. **Description:** The retroreflective sheeting shall have a smooth surface with a distinctive interlocking diamond seal pattern and datum orientation marks visible from the face. The sheeting shall be precoated with a pressure sensitive adhesive backing protected by a removable liner. Bright wide angle retroreflective sheeting material shall appear on the Department's Approved Product List for the application intended.
2. **General Characteristics and Packaging:** The retroreflective sheeting as supplied shall be of good appearance, free from ragged edges, cracks and extraneous materials, and shall be furnished in either rolls or sheets.

When furnished in continuous rolls, the average number of splices shall not be more than 3 per 54.7 yards of material with a maximum of 4 pieces in any 54.7 yard length. Splices shall be butted or overlapped and shall be suitable for continuous application as furnished. When furnished as cut sheets or sign faces, the sheeting shall be packaged flat in accordance with commercially accepted standards. The sheeting shall be packed in accordance with commercially accepted standards. Each carton shall clearly stipulate the brand, quantity, size, lot or run number and color. Stored under normal conditions the retroreflective sheeting as furnished shall be suitable for use for a minimum period of one year.

Subarticle M.18.10-2 – Encapsulated Lens:

Change the title to the following:

Subarticle M.18.10-2 – Type III Reflective Sheeting:

Delete the second sentence of the first paragraph and replace with the following:

The reflective sheeting shall conform to Section M.18.09.01

In Article M.18.10 add Subarticle M.18.10 - 3 to read as follows:

3 - Non-Reflective Plastic Sheeting:

Description: Demountable cutout letters, digits, border, corner radii and copy accessories shall consist of adhesive-coated, non-reflective plastic sheeting permanently adhered to flat aluminum backing.

The material shall consist of a flexible, pigmented, plastic film completely precoated with a solvent or heat-activated, tack-free adhesive. The adhesive shall be protected by a treated paper liner which shall be removable without soaking in water or other solvents. The non-reflective plastic sheeting shall conform to the following:

Property Requirements:

- A. Thickness: The thickness of the plastic film with adhesive shall be a minimum of 0.003 inch and a maximum of 0.004 inch.
- B. Film: The unapplied or applied film shall be readily processed with, and insure adequate adhesion of, process inks recommended by the manufacturer.
 - 1. Flexibility: The material shall be sufficiently flexible to permit application over and conform to moderately contoured surfaces.
 - 2. Gloss: The film shall have an initial 60-degree gloss value of 35 (minimum), when tested in accordance with ASTM D 523, measuring at least three portions of the film to obtain uniformity.
- C. Adhesive: The precoated adhesive shall form a durable bond to smooth, clean, corrosion and weather-resistant surfaces, shall be of uniform thickness, non-corrosive to applied surfaces and shall have no staining affect on the film.
- D. Adhesion: The material, applied according to Paragraph I "Preparation of Test Panels" shall have sufficient bond to prevent removal from the panel in one piece without the aid of a physical tool.

E. Exterior Exposure: The material shall withstand three years' vertical, south-facing exterior exposure at a sight acceptable to the Engineer, showing no appreciable discoloration, cracking, crazing, blistering, delamination, or loss of adhesion. A slight amount of chalking is permissible.

The film shall not support fungus growth.

F. Dimensional Stability: The material shall show no more than 0.02 inch shrinkage in any direction from edge of the panel when prepared in accordance with Paragraph I after being subjected to a temperature of 149 °F for 48 hours.

G. Heat Resistance: The material, applied according to Paragraph I, shall be heat-resistant enough to retain adhesion after one week at 149 °F.

H. Solvent and Chemical Resistance: The material, when prepared in accordance with Paragraph I, shall withstand immersion in the following liquids at 70-90 °F, showing no appreciable-decrease in adhesion, color or general appearance.

<u>Liquids</u>	<u>Time/Hours</u>
Reference Fuel (MIL-F-8799A) (15 parts xylol - 85 parts mineral spirits by weight)	1
Distilled Water	24
SAE #20 Motor Oil	24

I. Opacity: When applied, the material shall be sufficiently opaque to hide a contrasting black printed legend and white surface.

J. Preparation of Test Panels: Test panels shall be prepared using a 6.5 inch x 6.5 inch piece of the plastic film, applied to a clean 6.0 inch x 6.0 inch aluminum panel, premasked or as recommended by the manufacturer, trimmed evenly at the edge of the panel, and aged for 48 hours at 70-90 °F.

K. Shelf-Life Storage: The material shall withstand one year's shelf life when stored in a clean area free from exposure to excessive heat, moisture and direct sunlight.

L. General Characteristics and Packaging: The plastic film shall be furnished in rolls, cut sheets or characters, as may be specified. The film, as supplied, shall be free from ragged edges, streaks, blisters, foreign matter or other surface imperfections which would make it unsuitable for the intended usage, and shall be readily cut with scissors, knife, blade, shears or other production tools. Complete and detailed instructions for mounting the plastic film shall be supplied with each package of material.

M. Quality Assurance: For the non-reflective plastic sheeting a Certified Test Report conforming to 1.06.07 shall be submitted.