INDEX OF 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.

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OCTOBER 24, 2012
STATE PROJECT NO. 92-549

SEA STREET SALT STORAGE FACILITY

City of New Haven

The State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004, as revised by the Supplemental Specifications dated July 2012 (otherwise referred to collectively as "ConnDOT Form 816") is hereby made part of this contract, as modified by the Special Provisions contained herein. The State of Connecticut Department of Transportation's "Construction Contract Bidding and Award Manual" ("Manual"), May 14, 2010 edition or latest issue, is hereby made part of this contract. If the provisions of this Manual conflict with provisions of other Department documents (not including statutes or regulations), the provisions of the Manual will govern. The Manual is available upon request from the Transportation Manager of Contracts. The Special Provisions relate in particular to the SEA STREET SALT STORAGE FACILITY in the City of New Haven.

CONTRACT TIME AND LIQUIDATED DAMAGES

One Hundred Seventy Nine (179) calendar days will be allowed for completion of the work on this project and the liquidated damages charge to apply will be One Thousand Nine Hundred Dollars ($1,900.00) per calendar day.

NOTICE TO CONTRACTOR - CONSTRUCTION COMPLETION DATE

Winter storm operations will be conducted from the Sea Street Maintenance Facility and Salt Shed. In order to facilitate winter storm operations for the 2013-2014 winter storm season, the Contractor shall complete construction activities on the new salt shed by November 1, 2013. All construction activities shall be completed by this date including the Contractor addressing any remaining "Punch List" items for the salt shed. The Contractor shall grant the Department occupancy and use of the salt shed in accordance with the provisions of the Contract.

NOTICE TO CONTRACTOR - PROJECT DESCRIPTION

The Project consists of the construction of a Salt Shed located at the Sea Street maintenance facility in New Haven, Connecticut as shown and described in the Contract.

Building work for the salt shed consists of the construction of a wooden superstructure on a reinforced concrete foundation. The work includes the structural glued laminated timber arch superstructure, asphalt shingle roofing, laminated tongue and groove wood decking, solid wood, wood siding, reinforced concrete foundation, roof accessories, sheet metal, electrical systems, and lighting.

Site work associated with the facility consists of excavation and grading work to accommodate the building; removal and disposal of existing pavement and other site elements; installation of a calcium chloride tank; regrading of site for storm runoff; installation of drainage structures and storm water basin; installation of utilities; installation of new pavement; the salt storage facility structure; curbing; fencing; landscaping; and exterior site lighting.

Environmental work associated with this facility includes work with polluted soils, as further specified in the NOTICE TO CONTRACTOR – ENVIRONMENTAL INVESTIGATIONS.

NOTICE TO CONTRACTOR - LIMITATION OF CONTRACTOR OPERATIONS

The Contractor is hereby advised that the existing Maintenance Facility is located on the same site as the Project. The Contractor shall not interfere with the Department's employee's performance of their assigned work. The existing facility, including all of its associated utilities, shall remain operational at all times unless otherwise noted.

The Contractor shall repair at its own expense any and all damage caused by construction operations to existing buildings unless said damage is scheduled as part of the Project work. The Contractor shall take all precautions necessary to protect the building and its occupants during the construction period.

The Contractor shall bid the Project accordingly.

NOTICE TO CONTRACTOR - ENVIRONMENTAL PERMITS

This project requires two Environmental permits from the Connecticut Department of Energy and Environmental Protection (ConnDEEP): Flood Management Certification, and Coastal Consistency Review. These permits were submitted to ConnDEEP in August 2012, and are outstanding at the time of advertising. The permit applications are included in the Contract bid documents.

The permits are anticipated to be approved by December 5, 2012. The Award will not be granted until these permits are approved.

Bidders are hereby notified of this condition of the contract.

NOTICE TO CONTRACTOR - HAZARDOUS MATERIALS INVESTIGATIONS

A hazardous building materials site investigation has been conducted at the Sea Street Salt Shed Facility in New Haven, Connecticut which is scheduled for demolition.

The results of this investigation indicated the presence of asbestos containing materials (ACM), lead based paint (LBP), and additional hazardous or otherwise regulated items (mercury, PCBs, tires, etc.). within proposed construction areas.

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

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

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

- Item No. 0020801A – Asbestos Abatement
- Item No. 0020902A – Lead Compliance for Building Renovation and Demolition
- Item No. 0101143A – Handling and Disposal of Regulated Items
- Item No. 0999001A – Disposal of Buildings

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

Information pertaining to the results of the hazardous building materials investigation discussed can be found in the documents listed below. These documents shall be available for review at the Office of Contracts, 2800 Berlin Turnpike, Newington, Connecticut.

- Pre-Demolition Investigative Survey for Hazardous Building Materials, Sea Street Salt Sheds, New Haven, Connecticut. TRC Environmental Corporation. April 2004.
- Supplemental Survey Data, TRC, September 2012.

NOTICE TO CONTRACTOR - ENVIRONMENTAL INVESTIGATIONS

Environmental site investigations have been conducted that involved the sampling and laboratory analysis of soil, and groundwater collected from various locations and depths within the project limits. The results of these investigations indicated the presence of detectable concentrations of extractable total petroleum hydrocarbons (ETPH), volatile organic compounds (VOC), semi-volatile organic compounds (SVOCs), pesticides, and total and leachable RCRA 8 metals in the soils within proposed construction areas. SVOCs and leachable lead were detected in soils at elevated concentrations exceeding the Connecticut Department of Energy and Environmental Protection (DEEP) Remediation Standard Regulations (RSRs). In addition, the results of the environmental investigations indicated that groundwater within the project limits has been impacted with total VOCs, total SVOCs, Dieldrin, polychlorinated biphenyls (PCBs) total arsenic, total lead, and dissolved arsenic that exceed the DEEP General Permit (GP) for the Discharge of Remediation Wastewater to Surface Water effluent limits. Low levels of ETPH were also detected in the groundwater within the project limits. The DEEP groundwater classification beneath the site is GB.

Based on these findings, one (1) Area of Environmental Concern (AOEC) for soil has been designated within the proposed project limits where compounds are present at concentrations exceeding the applicable DEEP RSR criteria. The entire project limits have also been designated a groundwater AOEC (GW AOEC) where compounds are present at concentrations exceeding the DEEP GP to Surface Water effluent limits. Based on the results of the environmental investigations, it is anticipated that contaminated groundwater may be discharged to sanitary sewer under DEEP's General Permit for the Discharge of Groundwater Remediation Wastewater Directly to Sanitary Sewer.

In addition, one (1) "Low Level" Area of Environmental Concern (LLAOEC) has been designated within the proposed project limits, where the compounds detected are present at concentrations below the numeric criteria. The presence of the compounds at these concentrations will not require material-handling measures beyond those required for normal construction operations. The presence of these compounds at these concentrations will require the disposition of soils excavated from these areas to be restricted as described herein. Material excavated from within the "Low Level" AOEC that cannot be reused within the Project limits will require disposal at an approved treatment/disposal facility in accordance with Item No. 0202315A - Disposal of Controlled Materials.

The Contractor is hereby notified that controlled 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 AOEC's. 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.

All suitable material excavated within the "Low Level" AOEC shall be utilized as fill/backfill within the project limits, in accordance with the following conditions: (1) such soil is deemed to be structurally suitable for use as fill by the Engineer; (2) such soil is not placed below the water table; 3) the DEEP groundwater classification of the area where the soil is to be reused as fill does not preclude said reuse; and (4) such soil is not placed in an area subject to erosion. Soils within the "Low Level" AOEC are to be reused on-site prior to the use of other soils and/or fill such that no excess soils requiring off-site disposal are generated from the "Low Level" AOEC.

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

- Item No. 0101000A - Environmental Health and Safety
- Item No. 0101130A – Environmental Work – Solidification
- Item No. 0101117A - Controlled Materials Handling
- Item No. 0202315A - Disposal of Controlled Materials
- Item No. 0202318A - Management of Reusable Controlled Material
- Item No. 0202640A – 2" Monitoring Well Abandonment
- Item No. 0204213A – Handling Contaminated Groundwater

The Contractor is alerted to the fact that a Department environmental consultant will be on site for excavation and dewatering activities within the AOEC's, to collect soil samples, observe contaminated groundwater sampling, and to observe site conditions for the State. **The WSA is located within the existing salt shed and is to be used exclusively for temporary stockpiling of excavated materials from within project AOEC and LLAOEC, which cannot be reused within the project limits, for determination of disposal classification.**
Information pertaining to the results of the environmental investigations discussed can be found in the documents listed below. These documents shall be available for review at the Office of Contracts, 2800 Berlin Turnpike, Newington, Connecticut.

· Task 210: Subsurface Site Investigation Report, Sea Street Salt Shed, New Haven, Connecticut, ConnDOT Project No. 92-549, Maguire Group Inc., May 23, 2011

NOTICE TO CONTRACTOR - BIDDER'S QUESTIONS

The Contractor is hereby notified that during the bidding period, bidder's questions shall be submitted by the Contractor in writing to the Transportation Manager of Contracts for the State of Connecticut Department of Transportation, according to the State of Connecticut "Construction Contract Bidding and Award Manual". Questions shall be E-mailed to the attention of the Manager of Contracts at DOTContracts@ct.gov, faxed questions will no longer be accepted.

The Department cannot ensure a response to inquiries received later than ten (10) days prior to the original scheduled opening of the related bid. ConnDOT will issue an addendum addressing all questions that are made part of the bidding documents.

Refer to Article 1.02.04 of the Standard Specifications for additional information.

NOTICE TO CONTRACTOR - STANDARD SPECIFICATIONS

Whenever and wherever "ConnDOT Form 816," "Form 816," "Standard Specifications" are referenced herein, this shall mean and refer to "State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges, and Incidental Construction, Form 816", including the Supplemental Specifications.

NOTICE TO CONTRACTOR - GENERAL REQUIREMENTS AND COVENANTS OF THE CONTRACT

Division I of the document entitled "State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges, and Incidental Construction, Form 816, 2004," including the Division I Supplemental Specifications, shall collectively be known as the "General Requirements and Covenants of the Contract."

The Contractor is hereby advised of the potential for conflicts between provisions contained within Section 1.20 of the Form 816 with other Division I Sections of the Form 816. Where the aforementioned conflicts occur, Section 1.20 shall govern.

NOTICE TO CONTRACTOR - MEASUREMENT AND PAYMENT

This Project is being bid with both lump sum and unit price items. The bid items include unit price and lump sum items which are IN ADDITION TO the Major Lump Sum Item (MLSI) of the Project, Item No. 0177100A, titled "Salt Shed and Environmental Site Improvements." These separate items will be measured for payment on a unit price or lump sum basis (whichever is applicable) for which a separate bid price is required, at the quantities as indicated in the Bid Proposal Form. Each item to be measured is more specifically described in a corresponding Form 816 Standard Specification related to that item, or a special provision, as applicable.

Standard Form 816 Items are referenced by their standard item numbers. Refer to the applicable article of Form 816 for the requirements for this item. Special Provisions included in this Contract are referenced by their item number followed by an "A" suffix. Refer to the Special Provisions contained within this Contract for requirements for this item.

All work depicted on the Contract Plans and described in the Contract Specifications, including mobilization, is included in the MLSI of the Project, with the exception of the unit price or other lump sum items listed in the Bid Proposal Form. Any work incidental to an item which is not specifically described or included in the item, but which is required for performance and completion of the work required under the Contract, is included in the MLSI.

NOTICE TO CONTRACTOR - FORM 816 REFERENCES ON STANDARD DRAWINGS

The Contract includes standard Connecticut Department of Transportation drawings with material and pay limit references to Form 816. For work shown on these drawings that is included under the Major Lump Sum Item (MLSI) for the Project, the Contractor shall disregard these references. Concrete shall comply with the requirements of CSI Specification Section 033000 under the MLSI.

Pay limits for unit price and lump sum items other than the MLSI shall be in accordance with Method of Measurement (Part 4), and Basis of Payment (Part 5) of the appropriate special provision section. Concrete for unit price items other than the MLSI shall be in accordance with Form 816, unless specifically noted otherwise.

NOTICE TO CONTRACTOR - NOTICE OF INTENT TO CONSTRUCT

The Contractor is hereby advised that a Notice of Intent to Construct (NOIC) will be issued as the Building Permit for this Project in accordance with CGS. The Contractor will not be required to apply for a Building Permit from the local Building Official.

NOTICE TO CONTRACTOR - BUILDING AND FIRE CODES

The Contractor is hereby advised of the requirement to purchase one set of all building and fire codes listed in Form 816 Article 1.20-1.02.13 for the Engineer's use. Upon receipt of a Notice to Proceed on the Project, these codes shall be provided to the Engineer. If any codes are not readily available, the Contractor shall provide the Engineer with a copy of the code order form along with an anticipated delivery date. At the end of the Project, the codes will remain the property of the Engineer. The Contractor shall bid the Project accordingly.

NOTICE TO CONTRACTOR - POTENTIAL FOR ASBESTOS CONTAINING MATERIALS

The Contractor is hereby advised that it is the expressed intent of the Department that no materials containing asbestos of any kind or amount be installed in Department facilities as a result of any work being performed under this Contract.

For all materials that have a probability of containing asbestos, the Contractor shall provide a certification letter on the manufacturer's letterhead along with the regular submittal package to prove that asbestos is not contained in the materials. These materials will not be approved without the required manufacturer certification letter. The manufacturer certification letter shall be formatted in the following manner:

[Addressed to:] Commissioner of Transportation
Department of Transportation
P.O. Box 317546
Newington, Connecticut 06131-7546

Project Title and Number

[We] hereby certify that all materials manufactured by [Insert Manufacturer Name] are asbestos-free.

[Signature:] [Name of authorized signatory]
[Title]

The Contractor shall submit manufacturer certification letters for all materials specified in the following Contract provisions (including CSI-formatted specifications contained within a particular special provision):

1. Division 7 Section 071113, "Bituminous Dampproofing."
2. Division 7 Section 071900, "Water Repellents."
3. Division 7 Section 073113, "Asphalt Shingles."
4. Division 7 Section 076200, "Sheet Metal Flashing and Trim."
5. Division 7 Section 079200, "Joint Sealants."
6. Division 26 Section 260519, "Low-Voltage Electrical Power Conductors and Cables."

The above list may not be all-inclusive and does not relieve the Contractor from its responsibility to provide manufacturer certification letters that are required under other Contract provisions. Furthermore, the Department may at any time require the Contractor to submit manufacturer certification letters proving that other materials do not contain asbestos.

Failure of the Contractor to provide the required documentation will result in the immediate removal of the material from the Project by the Contractor at its expense. The Contractor shall be responsible for all costs incurred as a result of such required action, and replacements thereof, in order to complete the Project.

Any asbestos containing material that is found to have been installed as a result of work performed under this Contract will be required to be removed by the Contractor at its expense as soon as such determination is made. The Contractor shall also replace the removed material with appropriate material that is in compliance with the Contract. The Contractor is also responsible to pay for any asbestos testing charges the Department incurred in order to prove that the material contains asbestos fibers. This obligation will extend throughout the one-year warranty period after the issuance of the Certificate of Compliance.

The Contractor shall complete and sign the attached certification form assuring the Department that no asbestos-containing materials have been used in the construction of this Project. This form shall be submitted prior to the Semi-Final Inspection. The Certificate of Compliance will not be issued without this completed and signed certification form.

CONTRACTOR CERTIFICATION:
RE/ ASBESTOS CONTENT OF MATERIALS

State of Connecticut
Department of Transportation
PO Box 317546
Newington, CT 06131-7546

1. Project Number: _____

2. Project Name: _____

3. Contractor Name: _____

4. This is to certify that I have read, understood, and complied with the terms and conditions identified under the "NOTICE TO CONTRACTOR – POTENTIAL FOR ASBESTOS CONTAINING MATERIALS" included in this Contract.

   I fully understand that it is the requirement of the Connecticut Department of Transportation that only materials that do not contain asbestos of any kind or amount are to be utilized in the construction of this Project.

   I therefore certify that, to the best of my knowledge, all materials installed under this Contract are asbestos-free.

   For the one-year warranty period after the issuance of the Certificate of Compliance, I agree to remove any asbestos-containing material identified by the Connecticut Department of Transportation and reinstall an approved, non-asbestos-containing material that is in compliance with the original Contract at no additional cost to the State.

5. Date of Certificate of Compliance: _____

6. Date of the Asbestos Certification: _____

7. Signature of Authorized Party Agreeing to the Terms & Conditions Identified Herein & as Further Stated in the Contract:

_____ _____
Signature Title

_____ _____
Printed Name Date

NOTICE TO CONTRACTOR - OFF-SITE STAGING AND STORAGE

The Contractor is hereby advised that due to the restrictive Project Limits and other operational constraints identified in the Contract, off-site staging and storage of materials and equipment may be required. Arrangement for off-site staging and storage of materials and equipment shall be the responsibility of the Contractor. Payment for off-site staging and storage of materials and equipment shall be in accordance with Form 816 Article 1.09.06. The Contractor shall bid the Project accordingly.

NOTICE TO CONTRACTOR - COLD WEATHER CONCRETE ACTIVITIES

The Contractor is hereby advised of the potential need for cold weather concrete activities. The Contractor shall strictly adhere to all required cold weather concrete procedures as specified within the Contract and conduct its activities accordingly. The Contractor shall bid the Project accordingly.

NOTICE TO CONTRACTOR - ENGINEER OCCUPANCY

The Engineer and the Department personnel will occupy the Project Site during the entire construction period.

The Engineer reserves the right to occupy and to place and install equipment in completed areas of the Facility, prior to Final Inspection and the issuance of the Certificate of Compliance provided that such occupancy does not interfere with completion of the Project. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Project. The Contractor shall allow and cooperate with such occupancy at no additional cost to the State.

1. The Engineer shall obtain from the Contractor written approval of such occupancy. The Engineer shall determine whether such occupancy or use is possible and, if so, will make arrangements for holding a job inspection with representatives of the Department and the Contractor.
2. Based on the inspection, a "Punch List" of outstanding or unacceptable work shall be developed.
3. The Contractor shall prepare a letter to the Engineer granting occupancy. The letter granting such occupancy shall state the terms and conditions of occupancy and include the status of completion of "Punch List" items.
4. Subsequent to the receipt of the letter granting occupancy, the Engineer shall notify the Contractor in writing that fire insurance coverage has been requested, and the effective date the Contractor may cancel the fire insurance coverage normally carried on the building by it.
5. Prior to partial Engineer occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy the Engineer will provide operation and maintenance of mechanical and electrical systems in occupied portions of the building.

NOTICE TO CONTRACTOR - LOCATING TRAILERS ON THE PROJECT SITE

The Contractor is hereby advised to locate the Contractor and Engineer office trailers as well as the related portable bathroom facilities in the bituminous parking area at the entrance to the site, or as directed by the Engineer.

The Contractor shall bid the project accordingly.

NOTICE TO CONTRACTOR - UTILITY SERVICE CONNECTIONS

The electric and telephone services to the Project Site require connections by the applicable utility company. Utility service connections are included as shown and described within the Contract.

The Contractor is responsible for notifying the utility companies prior to the need for the utility connection, and for coordinating the work with the utility companies. The Contractor shall coordinate with the following utility companies:

Electric: The United Illuminating Company (UI)
Telephone: American Telephone & Telegraph (AT&T)

An allowance is included in the Contract to reimburse the Contractor for the Electric service charges by UI. This amount shall be for all the utility's work required by the Contract. The Contractor shall include in its Contract bid the amount show under CSI Specification Section No. 262713. The Contractor is responsible for coordinating this work with the utility company and for administrative requirements for reimbursing the utility company. There are no charges for the work required by the Telephone service.

NOTICE TO CONTRACTOR - SUBMITTALS

Transmittal of Submittals: Unless otherwise stipulated, all submittals requiring review for conformance with the Contract shall be transmitted by letter and hand delivered or sent by mail directly to Mr. Theodore H. Nezames, P.E., Transportation Principal Engineer, Facilities Design, Bureau of Engineering and Construction, Connecticut Department of Transportation, 2800 Berlin Turnpike, P.O. Box 317546, Newington, CT 06131-7546, Room 3405.

Copies of the transmittal letter shall be sent to the Office of Property and Facilities Services, Bureau of Finance and Administration, Connecticut Department of Transportation, 2800 Berlin Turnpike, P.O. Box 317546, Newington, CT 06131-7546, Attention: Mr. Daniel J. Smachetti.

Copies of the transmittal letter shall be sent to the District 3 Administration Office, 140 Pond Lily Avenue, New Haven, CT 06515, Attention: Mr. Mark D. Rolfe, District Engineer.

Submittals requiring review for conformance with the Contract that shall be submitted directly to the District Engineer in lieu of the Designer are listed below. Copies of the transmittal letters shall be sent to the Transportation Principal Engineer, Facilities Design.

Concrete Mix Design Certifications.
Asphalt Mix Design Certifications.
Erosion Control Plan and Materials.
Demolition Plan.
Disposal Plan.
Certified Test Reports, Material Certificates, etc. from Form 816 Standard Items (non “A” Items from Bid List).

Submittals requiring review for conformance with the Environmental Contract work that shall be shall be transmitted by letter and hand delivered or sent by mail directly to Mr. Gregory Dorosh, Manager of Environmental Compliance, Bureau of Engineering and Construction, Connecticut Department of Transportation, 2800 Berlin Turnpike, P.O. Box 317546, Newington, CT 06131-7546, Room 3127. Copies of the transmittal letters shall be sent to the Transportation Principal Engineer, Facilities Design and to the District Engineer.

Health and Safety Plan.
Disposal Plan and Site.
Lead/Asbestos Abatement Plans.

Submittal Preparation and Processing: The Contractor shall provide the Designer with complete submittal packages (Product Data, Shop Drawings, Samples, and Quality Assurance Submittals, as applicable) for individual elements of Project work for a concurrent review of all information. Incomplete submittal packages will be returned to the Contractor without being reviewed.

Except as otherwise noted, the Contractor shall submit 8 copies of each required submittal for the Designer's review.

Shop Drawings: The Contractor shall submit 1 correctable translucent reproducible print and 7 blue- or black-line prints for the Designer's review. The Contractor shall add 1 blue- or black-line print for each of the above noted CSI Sections for outside agency review.

Samples: Where Samples are for selection of color, pattern, texture or similar characteristics from a range of choices, submit 2 full sets of the standard and custom choices for the material or product. Where Samples illustrate assembly details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit 1 sample (or set, if applicable).

Designer's Action: The Designer will return 3 copies marked with action taken and corrections or modifications required.

Shop Drawings: The Designer will return the reproducible print. One of the prints returned shall be marked-up and maintained as a "Record Document."

Samples: The Designer will return one set of samples marked with the action taken. The set of samples shall be maintained at the Project site when returned.

Maintenance manuals and warranties will not be returned unless they are Rejected.

NOTICE TO CONTRACTOR - EARLY SUBMITTALS

The Contractor is hereby advised that the Department has identified the potential need to order certain materials and equipment, and thereby submit certain submittals for approval early in the construction process to ensure the Project is completed within the allowable Contract Time. Submittals shall be in accordance with Form 816 Article 1.20-1.05.02. The following items have been identified as possibly requiring early ordering thereby requiring early submission of shop drawings and product data, including color selection charts and samples:

Glued-Laminated Timbers

The following items have been identified as possibly requiring early submission for purposes of project coordination and project work scheduling:

Baseline Critical Path Schedule
Contractor's Submittal Schedule

The lists above are not intended to be all-inclusive and do not relieve the Contractor from coordinating the activities of its subcontractors and suppliers. The Contractor will not be permitted to perform any physical work on the Project without the approval of the required submittals. Failure to properly plan for long lead items within the Contract schedule will not be justification for additional construction time.

It is recommended that the Contractor identify early in the construction sequencing process the subcontractors and suppliers associated with long lead-time items and submit the appropriate shop drawings and supporting data, including color selection charts and samples, for review upon Notice to Proceed.

NOTICE TO CONTRACTOR - PRE-INSTALLATION MEETINGS

The Engineer will conduct a pre-installation meeting at the Project Site before each of the following construction activities:

1. Concrete: CSI Division 3 Section 033000, “Cast-In-Place Concrete.”
2. Thermal and Moisture Protection: CSI Division 7 Section 073113, “Asphalt Shingles.”

The above list may not be all-inclusive and does not relieve the Contractor from its responsibility to provide pre-installation meetings that are required under other Contract provisions.

NOTICE TO CONTRACTOR - CLOSEOUT DOCUMENTS

General: The list of special provisions (including CSI-formatted specifications) in the Table below may not be all-inclusive and does not relieve the Contractor from its responsibility to provide spare parts, operation and maintenance manuals, training, and warranties that are required under other Contract provisions.

This Table will be forwarded to Mr. David A. Hartley, Office of Property and Facilities Services, for concurrence prior to the Semi-Final Inspection.

Spare Parts: The Contractor shall deliver spare parts on products listed in the Table below to the Project Site.

Operation and Maintenance Maunals: Submit 4 copies of each manual to the Designer. The Designer and Mr. David A. Hartley, Office of Property and Facilities Services, will review the manuals for conformance to the Contract. The manuals will be processed in accordance with Form 816 Article 1.20-1.05.02, with 3 copies being forwarded to Mr. Hartley and one copy being sent to the Engineer.

Materials and Finishes Maintenance Manual: The Contractor shall provide complete information in the materials and finishes manual on products listed in the Table below.

Equipment and Systems Maintenance Manuals: The Contractor shall provide complete information in the equipment and systems manual on products listed in the Table below.

Training: The Contractor shall provide training on products listed in the Table below.

Warranties: Submit 4 copies of written warranties, including special warranties to the Designer. The Designer and Mr. Hartley, will review the warranties for conformance to the Contract. The warranties will be processed in accordance with Form 816 Article 1.20-1.05.02, with 3 copies being forwarded to Mr. Hartley and one copy being sent to the Engineer.

The Contractor shall provide special warranties on products and installations listed in the Table below.

TABLE

Special Provision (including CSI-formatted Specifications)	Warranties	Spare Parts	Training	Operation and Maintenance Manuals
ITEM #0000172A – Roadway Deicing System				X
CSI Section 071900, “Water Repellents”	X			
CSI Section 073113, “Asphalt Shingles”	X	X		X
CSI Section 073129, “Wood Shingles and Shakes”		X		

Special Provision (including CSI-formatted Specifications)	Warranties	Spare Parts	Training	Operation and Maintenance Manuals
CSI Section 260923, “Lighting Control Devices”				X
CSI Section 262416, “Panelboards”		X		X
CSI Section 262713, “Electricity Metering”				X
CSI Section 262813, “Fuses”		X		X
CSI Section 265100, “Interior Lighting”	X	X		X
CSI Section 265600, “Exterior Lighting”	X	X		X
CSI Section 275116, “Public Address and Mass Notification Systems”			X	X

NOTICE TO CONTRACTOR - VOLUNTARY PARTNERING

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

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

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

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

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

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

NOTICE TO CONTRACTOR - 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 - GENERAL PERMIT FOR STORMWATER DISCHARGE

This notice is provided to summarize the requirements of the Connecticut Department of Environmental Protection's General Permit for the Discharge of Stormwater and Dewatering Wastewaters associated with Construction Activities (Permit) issued on April 9, 2010. When construction activities will result in the disturbance of a total of 1 acre (0.4047 ha) or more of land regardless of phasing, the Connecticut Department of Transportation (Department) will incorporate a Stormwater Registration (Registration) and Stormwater Pollution Control Plan (SWPCP) as part of the Contract documents in order to insure compliance with all conditions of this Permit. The Permit's 'Construction activities' means activities including but not limited to clearing and grubbing, grading, excavation, and dewatering.

The Registration and SWPCP addresses pollution caused by soil erosion and sedimentation during construction as well as the long term post-maintenance use of the facility after construction is completed. The Contractor and all subcontractors will be required to sign a certified statement to comply with all applicable conditions of the Registration and SWPCP. There will be no additional payment for the Contractor to sign the certification statement and no additional payment for the Contractor to comply with the conditions of the Registration and SWPCP.

The District Engineer is responsible to sign the Registration and will be the permittee for all Department construction projects. For all local town/municipal projects, the District Engineer is not responsible to sign the Registration as the local town or municipality will be the signed permittee.

If the Contractor requires a modification to the SWPCP, it shall be in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control and the 2004 Connecticut Stormwater Quality Manual or as revised or amended. The Department shall approve or reject the modification to the SWPCP and notify the Contractor in writing as to any revisions or additional information required for approval within 30 days of the date of the Contractor's submission. No damage for delays will be granted to the Contractor based on time taken by the Department to review the Contractor's proposal, or to apply for or secure the Permit amendment, modification or revision as per Section 1.10 - Environmental Compliance, of the Standard Specifications for Roads, Bridges, and Incidental Construction Form 816 and any Supplements thereto. At no time shall the Contractor proceed with the proposed Permit amendment, modification, or revision unless the Engineer approves, in writing, the Contractor's request.

At a minimum, the Contractor along with qualified personnel (provided by the permittee) shall inspect the site for non stabilized areas, structural control measures, and locations where vehicles enter or exit the site at least once every seven calendar days and within twenty four hours of the end of a storm that is 0.1 inches (2.54 mm) or greater. If a potential source of pollution is identified, pollution preventive measures shall be implemented within twenty four hours and the SWPCP must be amended within three calendar days.

In order for the Contractor to meet the requirements set forth in the SWPCP, the Contractor shall comply with additional erosion and sedimentation control provisions included in the project.

Erosion and Sedimentation Control Provisions:
Unless specifically outlined in the Contract Plans and/or SWPCP, the Contractor is not allowed to disturb more than two (2) acres (0.8094 ha) of erodible material per discharge point at any one time regardless of phasing. If the Contractor elects to deviate from the Contract Plans and/or SWPCP to disturb more than two (2) acres (0.8094 ha) of erodible material per discharge point at any one time regardless of phasing, the Contractor must provide a sequenced staging plan outlining the proposed disturbed activities. In all cases, the Contractor must meet the following conditions:

- *If the area of disturbance is maintained less than two (2) acres* (0.8094 ha) *per discharge point*, the Contractor may disturb additional areas if and only if the previously disturbed areas are temporarily or permanently stabilized using acceptable measures such as the standard controls which are provided in the SWPCP or as shown on the Contract Plans.

- *If the construction activities create an area of disturbance to be at least two (2) acres* (0.8094 ha) *per discharge point but no more than five (5) acres (2.0235 ha) per discharge point*, the Contactor must submit to the Engineer a revised SWPCP for review and approval. The SWPCP must include locations of the temporary sedimentation trap/temporary sedimentation basin per discharge point with a capacity to contain 134 cubic yards per acre (102.5 m^3 per 0.4047 ha) of material. The Contractor shall design and construct the temporary sedimentation trap/temporary sedimentation basin in accordance with the 2002 Connecticut Guidelines for Soil and Sediment Control. The Contractor shall provide an inspection and maintenance plan for the temporary sedimentation trap/temporary sedimentation basin as part of the amended SWPCP.

- *If the area of disturbance has a potential to reach more than five (5) acres (2.0235 ha) per discharge point*, the Contactor must submit to the Engineer a revised SWPCP for review and approval. The SWPCP must include locations of the engineered sedimentation basin per discharge point with a capacity to contain 134 cubic yards per acre (102.5 m^3 per 0.4047 ha) of material. The Contractor shall design and construct the engineered sedimentation basin in accordance with the 2004 Connecticut Stormwater Quality Manual. The Contractor shall provide an inspection and maintenance plan for the engineered sedimentation basin as part of the amended SWPCP.

The permittee shall amend the SWPCP whenever there is a change in Contactors or subcontractors at the site, or a change in design, construction, operation, or maintenance at the site which has the potential for the discharge of pollutants. In all cases as described above, the amended SWPCP shall adhere to and comply with Section 1.10 - Environmental Compliance, of the Standard Specifications for Roads, Bridges and Incidental Construction Form 816 and any Supplements thereto. No additional payment will be made for any Permit amendment, modification, or revision which alters the Contract Plans, SWPCP, and/or estimated quantities as a result of the Department's approval of the modifications to the Contract by the Contractor. Changes or variations to the Contract Plans and/or SWPCP by the Contractor shall not result in any additional cost to the State.

NOTICE TO CONTRACTOR - GORE AREAS

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

NOTICE TO CONTRACTOR - VEHICLE EMISSIONS

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

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

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

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

(i) When a mobile source is forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control,

(ii) When it is necessary to operate defrosting, heating or cooling equipment to ensure the safety or health of the driver or passengers,

(iii) When it is necessary to operate auxiliary equipment that is located in or on the mobile source to accomplish the intended use of the mobile source,

(iv) To bring the mobile source to the manufacturer's recommended operating temperature,

(v) When the outdoor temperature is below twenty degrees Fahrenheit (20 degrees F),

(vi) When the mobile source is undergoing maintenance that requires such mobile source be operated for more than three (3) consecutive minutes, or

(vii) When a mobile source is in queue to be inspected by U.S. military personnel prior to gaining access to a U.S. military installation."

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

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

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

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

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

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

Mix Designation Equivalency Table

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

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

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

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

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

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

NOTICE TO CONTRACTOR - SUPERPAVE DESIGN LEVEL INFORMATION

Hot-Mix Asphalt (HMA) constructed according to the Superpave mix-design system is required to attain a Superpave Design Level and is required to use a Performance Graded (PG) binder. The Superpave Design Levels required for this project are listed in Table 1. The required PG binder is indicated for each mix with an "X" in the appropriate box in Table 1.

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

Project No. 92 - 549 will require the following Superpave Design Level(s):				
Mix Designation	**PG Binder**	**Route** _____ _____	**Route** _____ _____	**Route** _____ _____
	PG64-22	**Design Level**	**Design Level**	**Design Level**
HMA S0.25	-	-	-	-
HMA S0.375	-	2	-	-
HMA S0.5	-	2	-	-
HMA S1	-	2	-	-

NOTICE TO CONTRACTOR - TRAFFIC DRUMS AND TRAFFIC CONES

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

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

- 3M Scotchlite Diamond Grade Flexible Work Zone Sheeting, Model 3910 for the white stripes and Model 3914 for the orange stripes,

- Avery Dennison WR-7100 Series Reboundable Prismatic Sheeting, Model WR-7100 for the white stripes and Model WR-7114 for the orange stripes.

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

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

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

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

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

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

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

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

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

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

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

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

SECTION 1.01 - DEFINITIONS OF TERMS AND PERMISSIBLE ABBREVIATIONS

1.01.01--Definitions:

Delete the following term:

"**SHOP DRAWINGS:** Drawings, including . . . in the Contract." **[Redefined in 1.20-1.05.02]**

SECTION 1.03 - AWARD AND EXECUTION OF CONTRACT

1.03.07--Insurance:

Delete the Article in its entirety and replace with the following:

"Coverage shall be on a primary basis.

The Contractor shall carry and maintain at all times during the term of the Contract the insurance coverages required by this Article and any additional coverage(s) or higher minimum insurance coverage amount(s) required by the Special Provisions of the Contract. To the extent there is a conflict between this Article and the Special Provisions for the Contract, the Contractor shall comply with the more stringent requirement(s).

1. **Worker's Compensation Insurance:** With respect to all operations the Contractor performs and all those performed for it by subcontractors, the Contractor shall carry, and require each subcontractor to carry, Workers' Compensation insurance as required by the laws of the State of Connecticut.

Employer's Liability insurance shall be provided in amounts not less than $100,000 per accident for bodily injury by accident; $100,000 policy limit by disease and $100,000 per employee for bodily injury by disease. Each Workers' Compensation policy shall contain the U.S. Longshoreman's and Harbor Workers' Act endorsement when work is to be performed over or adjacent to navigable water.

2. **Commercial General Liability Insurance:** With respect to the operations the Contractor performs and also those performed for it by subcontractors, the Contractor shall carry, and require each subcontractor to carry, Commercial General Liability insurance, including Contractual Liability, Products and Completed Operations, Broad Form Property Damage and Independent Contractors.

Products and completed operations insurance for ongoing and completed operations shall be maintained for a period of one (1) year after the acceptance of the project by the Department in accordance with Article 1.08.14. See chart below for applicable minimum coverage amounts.

In case of Vertical construction projects, if underground work is to be undertaken, each policy shall have coverage for and exclusions removed for "Explosion, Collapse and Underground" ("XCU").

3. **Automobile Liability Insurance:** The Contractor shall obtain automobile liability insurance covering the operation of all motor vehicles, including those hired or borrowed, that are used in connection with the Project for all damages arising out of: (1) bodily injury to or death of all persons and/or (2) injury to or destruction of property; in any one accident or occurrence. This

policy shall not be subject to an annual aggregate limitation. See chart below for applicable minimum coverage amounts.

4. **Owner's and Contractor's Protective Liability Insurance for and in the Name of the State:** With respect to the Contractor's Project operations and also those of its subcontractors, the Contractor shall carry, for and on behalf of the State for each accident or occurrence resulting in damages from (1) bodily injury to or death of persons and/or (2) injury to or destruction of property. See chart below for applicable minimum coverage amounts.

Contract Amount ($)	Minimum Single Occurrence Amount ($)	Minimum Annual Aggregate Amount ($)
0 - 20 Million	1,000,000	1,000,000
20 Million - 50 Million	2,000,000	2,000,000
> 50 Million	4,000,000	4,000,000

5. **Railroad Protective Liability Insurance:** When the Contract involves work within fifty (50) feet of the railroad right-of-way or State-owned rail property, with respect to Project operations and also those of its subcontractors, the Contractor shall carry, and require each subcontractor to carry, Railroad Protective Liability Insurance providing coverage of at least $2,000,000 for each accident or occurrence resulting in damages from (1) bodily injury to or death of all persons and/or (2) injury to or destruction of property, and subject to that limit per accident or occurrence, an aggregate coverage of at least $6,000,000 for all damages during the policy period, and with all entities falling within any of the following listed categories named as insured parties: (i) the owner of the railroad right-of-way, (ii) the owner of any railcar licensed or permitted to travel within that affected portion of railroad right-of-way, and (iii) the operator of any railcar licensed or permitted to travel within that affected portion of the railroad right-of-way, and with the State, if not falling within any of the above-listed categories, also named as an insured party.

For additional insurance requirements for work in Metro-North Territory, see Paragraph 2.0 of "Special Requirements Regarding Work in Metro-North Territory" in Article 1.05.06.

For additional insurance requirements for work in AMTRAK Territory, is applicable, see the 'Temporary Permit to Enter Upon Property' in the NOTICE TO CONTRACTOR – WORK ON RAILROAD PROPERTY.

6. **Blasting:** When explosives are to be used in the Project, the Commercial General Liability insurance policy shall include XCU coverage, in the same limits as the per occurrence policy limits.

7. **Protection and Indemnity Insurance for Marine Construction Operations in Navigable Waters:** If a vessel of any kind will be involved in Project work, the Contractor shall obtain the following additional insurance coverage:

A. Protection and Indemnity Coverage of at least $500,000 per vessel or equal to at least the value of hull and machinery, whichever is greater.

B. If there is any limitation or exclusion with regard to crew and employees under the protection and indemnity form, the Contractor must obtain and keep in effect throughout the Project a worker's compensation policy, including coverage for operations under admiralty jurisdiction, with a limit of liability of at least $500,000 per accident or a limit equal to at least the value of the hull and machinery, whichever is greater, or for any amount otherwise required by statute.

8. **Builder's Risk Insurance:** The Contractors shall maintain comprehensive replacement cost builder's risk (completed value) insurance providing coverage for the entire work at the Project site, including all fixtures, machinery and equipment, any heating, cooling and constituting a permanent part of the building and shall cover portions of work located away from the site, but intended for use at the site. If it is determined that all or a portion of the project is located with an area designated as a Special Flood Hazard Area, the Contractor shall maintain flood insurance (no less than $10,000,000 sublimit). The State of Connecticut shall be named as Loss Payee. Equipment breakdown coverage may be sub limited to 50% of the project cost.

9. **Architects and Engineer's Professional Liability Insurance:** When the Contractor is specifically required to make submittals to the Department which require the stamp of a Professional Engineer licensed in the State of Connecticut, these submittals shall include a copy of the liability insurance policy for the Professional Engineer. The Professional Liability Insurance shall have a minimum of $1,000,000 coverage and shall be provided and maintained at no direct cost to the State. The policy shall be maintained for a period of the lesser of (1) a period of 3 years from the date of the acceptance of the Project by the Commissioner, as evidenced by the State of Connecticut, Department of Transportation form entitled "Certificate of Acceptance of Work and Acceptance of Project" issued to the Contractor; or (2) a period of 3 years after the termination of the Contract, subject to the continued commercial availability of such insurance.

10. **Umbrella Liability Insurance:** Contractor may satisfy the minimum limits required for Commercial General Liability and Automobile Liability Insurance using Umbrella Liability Insurance. In the event that the Contractor obtains Umbrella Liability Insurance to meet the minimum coverage requirements for Commercial General Liability or Automobile Liability Insurance coverage, the Umbrella Liability Insurance policy shall have an annual aggregate at a limit not less than twice the single occurrence and must specifically endorse the State of Connecticut as an additional insured. Specifically for Bridge Projects with a low bid equal to or higher than $80,000,000, the Umbrella Liability Insurance policy must have a minimum limit of at least $25,000,000.

11**. Certificate of Insurance.** Before the Contract is executed, the Contractor must provide to the Department a certificate of insurance acceptable to the Commissioner and executed by an insurance company or companies satisfactory to the State of Connecticut for the insurance coverage(s) required by this Article and the Special Provisions of the Contract. The Contractor shall maintain the required insurance coverage during the entire term of the Contract. The

certificate of insurance must clearly include the name of the insured and identify the project for which it is being issued.

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

13. **Sovereign Immunity.** The Contractor may not assert the defense of sovereign immunity in the adjustment of claims or in the defense of any claim or suit brought against the Contractor or the State, unless the State, in writing, requests that the Contractor do so or consents to its doing.

14. **Contractor Assumes Costs**. The Contractor shall assume and pay all costs and billings for premiums, deductibles, self-insured retentions and audit charges earned and payable under the required insurance.

15. **State Named as Additional Insured**. The State must be named as an additional insured party for the Commercial General Liability and Automobile Liability insurance policies required by this Article and the Special Provisions to the Contract, and any Umbrella Liability Insurance, as applicable, obtained in accordance with this Article. Each policy shall waive right of recovery (waiver of subrogation) against the State of Connecticut.

16. **Minimum Required Coverages**. With respect to Commercial General Liability, and Automobile Liability, the minimum required coverage, per occurrence and in the annual aggregate, are determined according to the Contract amount, according to the following chart:

Contract Amount ($)	Minimum Single Occurrence Amount ($)	Minimum Annual Aggregate Amount ($)
0-2,000,000	1,000,000	2,000,000
2,000,001-10,000,000	2,000,000	4,000,000
>10,000,000	4,000,000	8,000,000

17. **Termination or Change of Insurance:**

A. The Contractor shall notify the Department of any cancelation of insurance carrier or change to the required insurance coverage by submitting a new insurance certificate to the Department immediately following said cancelation or change in required coverage.

B. It is the responsibility of the Contractor to maintain evidence of a current insurance coverage with the Department for the duration of contract. It is the responsibility of the Contractor to file with the Department all renewals and new certificates of insurance issued due to changes in policy terms or changes in insurance carries prior to the expiration dates on the forms already on file with the Department.

18. **Duration of Coverage**. The Contractor shall keep all the required insurance in continuous effect until the date that the Department designates for the termination of the Contractor's responsibility, as defined by Article 1.08.14.

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

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

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

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

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

[Retain 1.03.08 below if there is no winter shutdown on the project.]

1.03.08--Notice to Proceed and Commencement of Work:

Delete the first paragraph and replace with the following:

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

SECTION 1.05 - CONTROL OF THE WORK

1.05.02--Plans, Working Drawings, and Shop Drawings:

Delete the entire subsection entitled "2. Working Drawings:"

Delete the entire subsection entitled "3. Shop Drawings:"

SECTION 1.06 - CONTROL OF MATERIALS

1.06.01--Source of Supply and Quality:

Delete the last paragraph: "When one manufacturer's product . . . and Materials Certificate."

1.06.08--Warranties, Guarantees and Instruction Sheets:

Delete the entire Article.

SECTION 1.07 - LEGAL RELATIONS AND RESPONSIBILITIES

Article 1.07.05 - Load Restrictions:

Delete all three paragraphs and replace them with the following:

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

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

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

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

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

Add the following after the only paragraph:

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

SECTION 1.08 - PROSECUTION AND PROGRESS

Article 1.08.01 – Transfer of Work or Contract: *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.

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.

1.08.01--Transfer of Work or Contract:

In the first sentence of the first paragraph which reads: "The Contractor shall perform . . . total Contract value.", change "50%" to "25%."

1.08.07 - Determination of Contract Time:

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

"When the Contract time is stated on a calendar-day basis, that time shall be the number of consecutive calendar days contained in the Contract period designated in the Contract, INCLUDING the time period from each December 1 through the following March 31. The Contract time will begin to run on the date designated in the Engineer's "Notice to Proceed" as the date for commencement of the Project, and the time will be computed as herein provided on a consecutive-day basis, including all Saturdays, Sundays, holidays, and non-work days."

1.08.08--Extension of Time:

Delete the last paragraph ("If an approved extension . . . until the following April 1.").

1.08.09--Failure to Complete Work on Time:

Delete the second paragraph ("If the last day of the initial . . . the Project is completed"), and replace with the following:

"Liquidated damages as specified in the Contract shall be assessed against the Contractor per calendar day from that day until the date on which the Project is substantially completed."

SECTION 1.20 - GENERAL CLAUSES FOR FACILITIES CONSTRUCTION

1.20-1.02.13—Knowledge of Applicable Laws:

Delete Item 5 and replace with the following:

"5. The 2009 International Energy Conservation Code, including the 2011 Connecticut Amendments."

SECTION 4.06 - BITUMINOUS CONCRETE

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

4.06.01—Description
4.06.02—Materials
4.06.03—Construction Methods
4.06.04—Method of Measurement
4.06.05—Basis of Payment

4.06.01—Description: Where reference is made to bituminous concrete, it shall also refer to hot-mix asphalt (HMA) mixtures using the Marshall or Superpave mix-design method.

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

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

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

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

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

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

Hot Mix Asphalt (HMA): A bituminous concrete mixture.

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

Marshall: A HMA mixture design designated as "Bituminous Concrete Class ( )".

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

Superpave: A HMA mixture design designated as "HMA S*". Where "S" indicates Superpave and * indicates the sieve related to the nominal maximum aggregate size of the mix. For example Superpave 0.50 inch is now designated as HMA S0.5.

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

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

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

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

1. Materials Supply: The HMA mixture must be from one source of supply and originate from one HMA Plant unless authorized by the Engineer.

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

4.06.03—Construction Methods:

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

Delivery tickets must include the following information:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Lighting: For paving operations, which will be performed during hours of darkness, the paving equipment shall be equipped with lighting fixtures as described below, or with approved lighting

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

Table 4.06-1: Paver Lighting

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

Table 4.06-2: Roller Lighting

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

*All fixtures shall be mounted above the roller.

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

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

Type C: The power beam holder shall have ribbed die cast aluminum housing and a clear tempered-glass lens to enclose the fixture. There shall be an arm fully adjustable for aiming, with a male-threaded mount with serrated teeth and lock nuts. There shall be a

120-volt heatproof socket with extended fixture wiring for an "Extended Mogul End Prong" lamp base. The fixture shall have gaskets, and shall be UL listed as suitable for wet locations. The lamps shall be 1000-watt quartz PAR64, both Q1000PAR64MFL (flood) and Q1000PARNSP (spot) will be required.

Material Transfer Vehicle (MTV): A MTV shall be used when placing a HMA surface course that is a minimum of 5,000 feet in length and on a roadway that has an overall width of 28 feet or more. A surface course is defined as the total thickness of the same HMA mix that extends up to and includes the final wearing surface whether it is placed in a single or multiple lifts, and regardless of any time delays between lifts.

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

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

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

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

- The final lift of HMA shall not be placed during the Extended Season.
- HMA mixes shall not be placed when the air or base temperature is below 40°F.

Additional Requirements for Extended Season:

- The minimum mixture temperature for all HMA mixtures when discharged into the paver or transfer vehicle hopper shall be 290°F. The temperature will be taken from the initial discharge of mixture from the truck. If found to be below the minimum requirement, the truck will not be allowed to unload remaining mixture.
- The Contractor shall use a minimum of 3 rollers with operators for paving lengths greater than 1000 feet. Two rollers must be capable of operating in the dynamic mode.
- The Contractor's Quality Control Plan shall include a section on Extended Season paving and address paver speed, roller patterns and balancing mixture delivery and placement operations to meet specification requirements.

5. Superpave Test Section: The Engineer may require the Contractor to place a test section whenever the requirements of this specification or Section M.04 are not met.
The Contractor shall submit the quantity of mixture to be placed and the location of the test section for review and acceptance by the Engineer. The equipment used in the construction of a passing test section shall be used throughout production.

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

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

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

a) Posted speed limit is greater than 35 MPH: 30 feet per inch of vertical change (thickness)

b) Posted speed limit is 35 MPH or less: 15 feet per inch of vertical change (thickness).

c) Bridge Overpass and underpass transition length will be 75 feet either
(1) Before and after the bridge expansion joint, or
(2) Before or after the parapet face of the overpass.

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

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

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

b) Posted speed limit is 35 MPH or less
(1) Leading and Trailing = 4 feet per inch of vertical change (thickness)

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

7. Spreading and Finishing of Mixture: Prior to the placement of the bituminous concrete, the underlying base course shall be brought to the plan grade and cross section within the allowable tolerance. Immediately before placing the mixture, the area to be surfaced shall be cleaned by sweeping or by other means acceptable to the Engineer. The HMA mixture shall not be placed whenever the surface is wet or frozen. The temperature of the mix at time of placement must be between 265°F and 325°F. The Engineer will verify the mix temperature by means of a probe or infrared type of thermometer. Rejection of mixture based on temperature will only be allowed if verified by means of a probe type thermometer.

Placement: The HMA mixture shall be placed and compacted to provide a smooth, dense surface with a uniform texture and no segregation at the specified thickness and dimensions indicated in the plans and specifications. The maximum paver speed during placement shall not exceed 40 ft/min unless authorized by the Engineer.

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

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

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

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

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

a) Thickness- Where the total thickness of the lift of mixture exceeds that shown on the plans beyond the tolerances shown in Table 4.06-3, the longitudinal limits of such variation

including locations and intervals of the measurements will be documented by the Engineer for use in calculating a HMA adjustment in Article 4.06.04.

TABLE 4.06-3 Thickness Tolerances

Mixture Designation	Lift Tolerance
Class 4 and HMA S1	+/- ⅜ inch
Class 1, 2 and 12 and HMA S0.25, S0.375, S0.5	+/- ¼ inch

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

b) Area- Where the width of the lift exceeds that shown on the plans by more than the specified thickness of each lift, the longitudinal limits of such variation including locations and intervals of the measurements will be documented by the Engineer for use in calculating a HMA adjustment in Article 4.06.04.

c) Delivered Weight of Mixture - When the delivery ticket shows that the truck exceeds the allowable gross weight for the vehicle type the quantity of tons representing the overweight amount will be documented by the Engineer for use in calculating a HMA adjustment in Article 4.06.04.

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

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

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

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

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

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

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

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

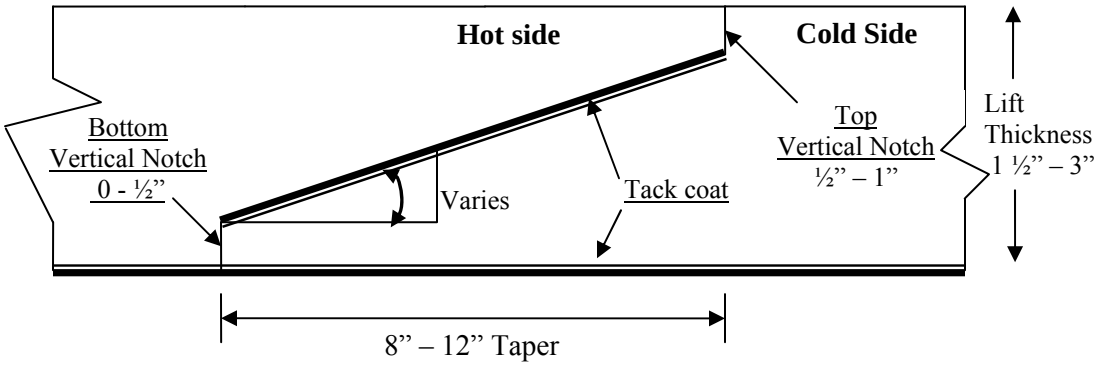
a) Smoothness- Each lift of the surface course shall not vary more than ¼ inch from a Contractor-supplied 10 foot straightedge. For all other lifts of HMA, the tolerance shall be ⅜ inch. Such tolerance will apply to all paved areas.

b) Uniformity- The paved surface shall not exhibit segregation, rutting, cracking, disintegration, flushing or vary in composition as determined by the Engineer.

8. HMA Longitudinal Joint Construction Methods: Unless noted on the plans or the contract documents or directed by the Engineer, the Contractor shall use Method I- Notched Wedge Joint (see figure 4.06-1) when constructing longitudinal joints where lift thicknesses are between 1½ and 3 inches, except for HMA S1 and Class 4 mixes. Method II Butt Joint (see figure 4.06-2) shall be used for lifts less than 1½ inches or greater than 3 inches and HMA S1 and Class 4 mixes. During placement of multiple lifts of HMA, the longitudinal joint shall be constructed in such a manner that it is located at least 6 inches from the joint in the lift immediately below. The joint in the final lift shall be at the centerline or at lane lines.

Method I - Notched Wedge Joint:

Figure 4.06-1



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

The taper portion of the joint must be placed over the longitudinal joint in the lift immediately below. The top vertical notch must be located at the centerline or lane line in the final lift. The requirement for paving full width "curb to curb" as described in Method II will be waived in those areas where the notched wedge joint is utilized.

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

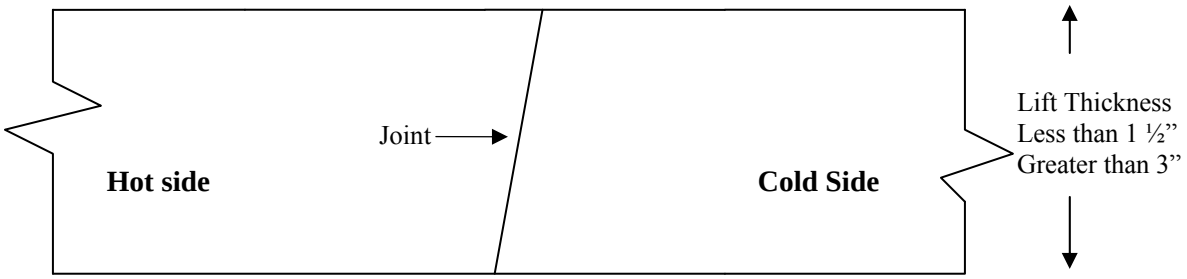
The existing pavement surface under the wedge joint must have an application of tack coat material. Prior to placing completing pass (hot side), an application of tack coat must be applied to the tapered section.

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

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

Method II - Butt Joint:

Figure 4.06-2

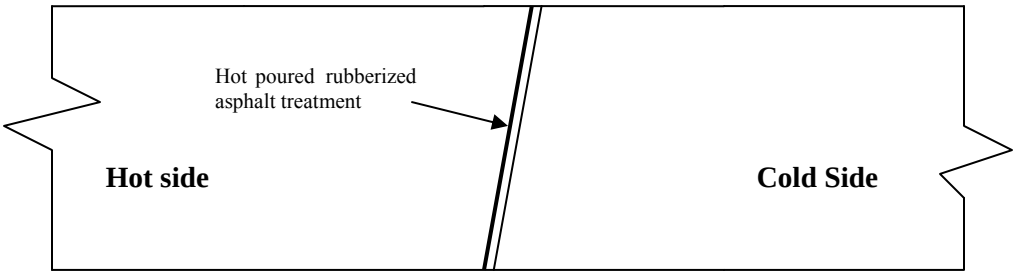


When adjoining HMA passes are placed, the Contractor shall utilize equipment that creates a near vertical edge (refer to figure). The completing pass (hot side) shall have sufficient mixture so that the compacted thickness is not less than the previous pass (cold side). The end gate on the paver should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

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

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

Figure 4.06-3



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

9. Contractor Quality Control (QC) Requirements for HMA Placement: A Quality Control Plan (QCP) shall be required for any project that has a total of 2500 tons or more of HMA. Quality Control is defined as all those planned and specified actions or operations necessary to produce bituminous concrete that will meet contract specification requirements. The Contractor shall be responsible for quality control throughout the production and placement operations. Therefore, the Contractor must ensure that the materials, mixture and work provided by Subcontractors, Suppliers and Producers also meet contract specification requirements.

Quality Control Plan: Prior to placement and production, the Contractor shall submit a QCP to the Engineer for approval. The QCP shall include separate sections; HMA Plant Production and HMA Placement. The sections shall describe the organization and procedures which the Contractor shall use to administer quality control. The QCP shall include the procedures used to control the HMA production and placement process, to determine when immediate changes to the processes are needed, and to implement the required changes. The QCP must address the actions, inspection, sampling and testing necessary to keep the production and placement operations in control, to determine when an operation has gone out of control and to respond to correct the situation and bring it back into control.

The QCP shall also include the name and qualifications of a Quality Control Manager. The Quality Control Manager shall be responsible for the administration of the QCP, including compliance with the plan and any plan modifications. The Quality Control Manager shall be directly responsible to the Contractor and shall have the authority to make decisions where the quality of the work or product is concerned. All sampling, inspection and test reports shall be reviewed and signed by the Quality Control Manager prior to submittal to the Engineer.

Approval of the QCP will be based on the inclusion of all of the required information. Approval of the QCP does not imply any warranty by the Engineer that adherence to the plan will result in production of HMA that complies with these specifications. It shall remain the responsibility of the Contractor to demonstrate such compliance. The Contractor may propose in writing a supplement to the QCP as work progresses and must propose a supplement whenever there are changes in production or placement of HMA or to quality control procedures or personnel. HMA production and placement may be suspended by the Engineer until the revisions to the QCP have been put into effect.

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

Quality Control Inspection, Sampling and Testing: The Contractor shall perform all quality control sampling and testing, provide inspection, and exercise management control to ensure that HMA production and placement conforms to the requirements as outlined in its QCP during all phases of the work.

a) Control Charts: The Contractor shall develop and maintain control charts and shall be distributed as directed by the Engineer. The control charts shall identify the project, test number, test parameter, applicable upper and lower specification limits, and test data. The control charts shall be used as part of the quality control system to document variability of the HMA production and placement process. The control charts shall be kept current. The control charts shall be updated each day of HMA production, and up-to-date copies shall be distributed prior to the beginning of the next day's production of HMA.

b) Records of Inspection and Testing: For each day of HMA production and placement, the Contractor shall document all test results and inspections on forms approved by the Engineer. The document shall be certified by the Quality Control Manager or his representative that the information in the document is accurate, and that all work complies with the requirements of the contract.

The Contractor shall submit sampling, testing and inspection documents to the Engineer within 24 hours or by noon of the next day's HMA production. If the document is incomplete or in error, a copy of the document will be returned to the Contractor with the deficiencies noted by the Engineer. The Contractor shall correct the deficiencies and return the updated document to the Engineer by the start of the following working day. When errors or omissions in the sampling, inspection or testing documents repeatedly occur, the Contractor shall correct the procedures by which the documents are produced.

If control charts, sampling, testing and inspection documents are not distributed or provided as required within the time specified the Engineer may require work to be suspended until the missing documents have been provided.

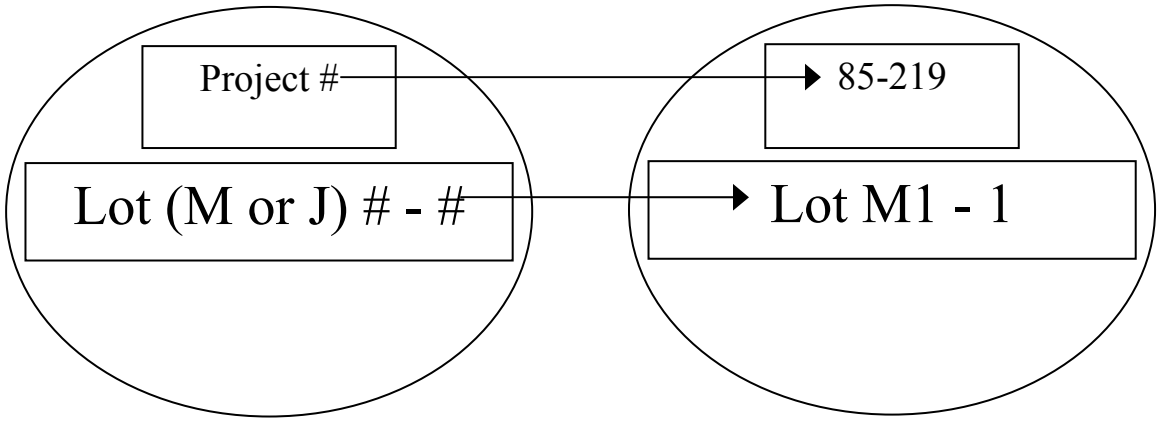
The contractor may obtain two cores per year, per mix, per project to assist with density quality control activities, provided this is detailed in the QCP.

Additional requirements for HMA plant production are defined in Section M.04.

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

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

Figure 4.06-4



Frequency of sampling is in accordance with the following tables:

TABLE 4.06-4 - TESTING REQUIREMENT FOR BRIDGE DENSITY LOT

Length of Each Structure (Feet)	MAT – No. of Cores per Pass	JOINT - No. of cores per Joint
Less than 1000	1	2
1000 or greater	1 per 1000 feet or portions thereof	1 per 1000 feet or portions thereof

TABLE 4.06-5 – TESTING REQUIREMENT FOR NON-BRIDGE DENSITY LOT

Required Paver Passes for Full Width	No. of Mat Cores	No. of Joint Cores	Maximum Lot Length (Feet)
1(1)	4	0	10000
2(1)	4	4	5000
3(1)	4	4	2500
4(1)	4	4	2500
5(1)	4	4	1250
6(1)	4	4	1250

Note (1): The number of "Required Paver Passes for Full Width" shall be used to determine the "Maximum Lot Length".

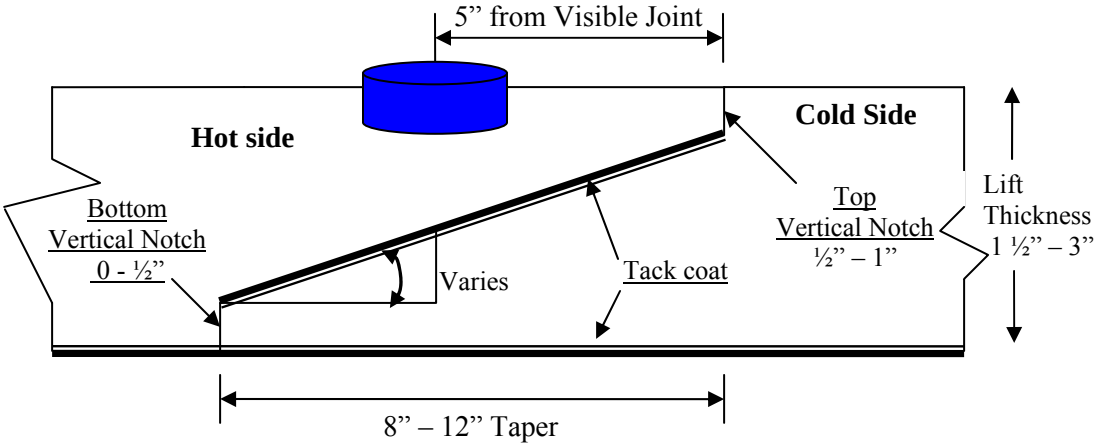
A density lot will be complete when the full designed paving width of the established lot length has been completed and shall include all longitudinal joints that exist between the curb lines regardless of date(s) paved. Prior to paving, the total length of the project to be paved shall be split up into equal lot sizes for testing purposes. Each lot should not exceed the lengths shown in table 4.06-5. One adjustment will apply for each lot. The tons shall be determined using the yield calculation in Article 4.06.04. The last lot shall be the difference between the total payable tons for the project and the sum of the previous lots.

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

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

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

Figure 4.06-5



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

Core holes shall be filled immediately upon core extraction by removing any free water, applying tack coat to the cut surface, filling with same HMA mixture, and compacting with hand compactor or other mechanical means to the maximum compaction possible. The HMA mixture shall be compacted to ⅛ inch above the finished pavement prior to opening the roadway to traffic.

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

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

HMA Plant Material Acceptance: The Contractor shall provide the required acceptance sampling, testing and inspection during all phases of the work in accordance with Section M.04.

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

12. Density Dispute Resolution Process: The Contractor and Engineer will work in partnership to avoid potential conflicts and to resolve any differences that may arise during quality control or acceptance testing for density. Both parties will review their sampling and testing procedures and results and share their findings. If the Contractor disputes the Engineer's test results, the Contractor must submit in writing a request to initiate the Dispute Resolution Process within 10 calendar days of the notification of the test results. No request for dispute resolution will be allowed unless the Contractor provides quality control results supporting its position. Should the dispute not be resolved through evaluation of existing testing data or procedures, the Engineer

may authorize the Contractor to obtain a maximum of four additional representative core samples per disputed lot. The core samples must be extracted no later than 30 calendar days from the date of Engineer's authorization. Core sample locations shall be established using ASTM D 3665 or a statistically based procedure of random sampling approved by the Engineer. Core samples shall be extracted and filled using the procedure outlined in Article 4.06.03. The results from the dispute resolution cores shall be added to the results from the acceptance cores and averaged for determining the final HMA density.

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

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

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

b) Perform all corrective work in accordance with the Contract and the approved corrective procedure.

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

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

4.06.04—Method of Measurement:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(1) *Marshall Design*- The tolerances shown in Table 4.06-6 for gradation and binder content will be used to determine whether a mixture adjustment will apply. If the mixture does not meet the requirements of Section M.04, an adjustment will be computed using the following formula:

Tons Adjusted for Marshall Design (T_{MD}) = M x 0.10

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

TABLE 4.06-6
TOLERANCES FOR CONSECUTIVE TESTS (MARSHALL)

Classes	Criteria	% Tolerances (+/-)
-	Binder	0.4
1, 2, 4, 5, 5A & 5B	#200	2.0
1, 2, 4	#50	4
1, 2, 5, 5A & 5B	#30	5
1, 2, 4, 5, 5A & 5B	#8	6
1, 2, 4, 5, 5A & 5B	#4	7
1, 2, 4, 5, 5A & 5B	⅜ & ½ inch	8

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

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

Percent Adjustment for Air Voids = $AdjAV_t = [AdjAV_1 + AdjAV_2 + AdjAV_i + \ldots + AdjAV_n)] /n$

Where: $AdjAV_t$ = Total percent air void adjustment value for the lot
$AdjAV_i$ = Adjustment value from Table 4.06-6 resulting from each sub lot
n = number of air void tests in a production lot

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

Adjustment Value ($AdjAV_i$) (%)	**HMA S0.25, S0.375, S0.5, S1 Air Voids (AV)**
+2.5	3.5 - 4.5
0.0	3.0 - 3.4 or 4.6 - 5.0
- 5.0	2.7 - 2.9 or 5.1 - 5.3
- 10.0	2.3 – 2.6 or 5.4 – 5.7
-20.0	$\leq$ 2.2 or $\geq$ 5.8

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

Where: $AdjPB_t$= Total percent liquid binder adjustment value for the lot
$AdjPB_i$ = Adjustment value from Table 4.06-7 resulting from each sub lot
n = number of binder tests in a production lot

TABLE 4.06-8

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

e) Density Adjustment: The quantity of bituminous concrete measured for payment for a specified lift of pavement 1½ inches or greater may be adjusted for density. Separate density adjustments will be made for each lot and will not be combined to establish one density adjustment.

Tons Adjusted for Density (T_D) = $[\{(PA_M \times .40) + (PA_J \times .60)\} / 100]$ X Density Lot Tons

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

TABLE 4.06-9
ADJUSTMENT VALUES FOR PAVEMENT MAT DENSITY

Average Core Result Percent Density	Percent Adjustment for non-bridge lots	Percent Adjustment for bridge lots
97.1 – 100	-2.5	- 2.5
94.5 – 97.0	+2.5	+2.5
92.0 – 94.4	0.0	0.0
91.0 – 91.9	-2.5	- 10.0
89.1 – 90.9	-15.0	- 30.0
87.0 – 89.0	-30.0	- 50.0
86.9 or less	Remove and Replace	Remove and Replace

TABLE 4.06-10
ADJUSTMENT VALUES FOR PAVEMENT JOINT DENSITY

Average Core Result Percent Density	Percent Adjustment for non-bridge lots	Percent Adjustment for bridge lots
97.1 – 100	-2.5	- 2.5
94.5 – 97.0	+2.5	+2.5
91.0 – 94.4	0.0	0.0
90.0 – 90.9	-7.5	- 7.5
89.0 – 89.9	-15.0	-15.0
87.0 – 88.9	-30.0	- 50.0
86.9 or less	Remove and Replace	Remove and Replace

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

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

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

5. Material for Tack Coat: The quantity of tack coat will be measured for payment by the number of gallons furnished and applied on the Project and approved by the Engineer.

Method of Measurement:

a. Container Method- Material furnished in a container will be measured to the nearest ½ gallon. The volume will be determined by either measuring the volume in the original container by a method approved by the Engineer or using a separate graduated container capable of measuring the volume to the nearest ½ gallon. The container in which the

material is furnished must include the description of material, including lot number or batch number and manufacturer or product source.

b. Truck Method- The Engineer will establish a weight per gallon of the bituminous material based on the specific gravity at 60ºF for the material furnished. The number of gallons furnished will be determined by weighing the material on scales furnished by and at the expense of the Contractor.

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

4.06.05—Basis of Payment:

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

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

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

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

Density Lot: T_D X Unit Price = Est. (D)

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

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

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

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

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

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

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

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

Pay Item*	Pay Unit*
Bituminous Concrete, Class ( )	ton
HMA S*	ton
HMA Adjustment Cost	est.
Material for Tack Coat	gal.
Material Transfer Vehicle	ton

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

SECTION 12.08 - SIGN FACE-SHEET ALUMINUM

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

General: Delete all references to parapet mounted sign supports.

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

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

SECTION M.04 - BITUMINOUS CONCRETE

M.04.01—Bituminous Concrete Materials and Facilities
M.04.02—Mix Design and Job Mix Formula (JMF)
M.04.03—Production Quality Control (QC) Testing and Control of Mixture

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

The Contractor shall submit to the Engineer all sources of coarse aggregate, fine aggregate, mineral filler and PG binder. The Contractor shall submit a Material Safety Data Sheet (MSDS) for each grade of binder to be used on the Project. The Contractor shall not change material sources without prior approval of the Engineer.

An adequate quantity of each size aggregate, mineral filler and bitumen shall be maintained at the HMA plant site at all times while the plant is in operation to ensure that the plant can consistently produce bituminous concrete mixtures that meet the job mix formula (JMF) as specified in Article M.04.02. The quantity of such material shall be reviewed by the Engineer on an individual plant basis and is dependent upon the plant's daily production capacity, but shall never be less than one day's production capacity. Less than one day's production capacity may be cause for the job mix formula to be rejected.

1. Coarse Aggregate:

a. Requirements: The coarse aggregate shall consist of clean, hard, tough, durable fragments of crushed stone or crushed gravel of uniform quality. Aggregates from multiple sources of supply must not be mixed or stored in the same stockpile.

b. Basis of Approval: The request for approval of the source of supply shall include a washed sieve analysis in accordance with AASHTO T 27. The Gsa, Gsb, and Pw_a shall be determined in accordance with AASHTO T 85. The coarse aggregate must not contain more than 1% crusher dust, sand, soft disintegrated pieces, mud, dirt, organic and other injurious materials. When tested for abrasion using AASHTO T 96, the aggregate loss must not exceed 40%. When tested for soundness using AASHTO T 104 with a magnesium sulfate solution, the coarse aggregate must not have a loss exceeding 10% at the end of 5 cycles.

For HMA mixtures, materials shall also meet the coarse aggregate angularity criteria as specified in Tables M.04.02-2 thru M.04.02-4 for blended aggregates retained on the #4 sieve when tested according to ASTM D 5821. The amount of aggregate particles of the

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

2. Fine Aggregate:

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

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

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

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

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

If Fine aggregate is tested by the CTDOT twice and does not meet above criteria.			
8	Pit/source Petrographic Analysis	C 295 (ASTM)	• Required to be performed by the Contractor at no expense to the Department. • Report assignable cause(s), corrective action taken to mitigate source and written request for resample. • If fine aggregate fails upon retest, Contractor may be permitted to request trial use on roadway for evaluation using the subject fine aggregate in HMA, to be monitored for no more than 48 months. • Evaluation location(s); mix size & level; terms and costs related to this application; determination of performance, and approval will be established at the sole discretion of the Engineer.

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

The Contractor shall submit all test results to the Engineer for review. The Contractor shall also include a washed sieve analysis in accordance with AASHTO T 27/T 11. Any fine aggregate component or final combined product shall have 100% passing the 3/8 inch sieve and a minimum of 95% passing the # 4. The Gsa, Gsb, and Pw_a shall be determined in accordance with AASHTO T 84.

The Contractor will be notified by the Engineer if any qualified source of supply fails any portion of Table M.04.01-1. One retest will be allowed for the Contractor to make corrections and/or changes to the process. If, upon retest, the material fails again, the use of the material will not be permitted without additional testing.

The Contractor may solicit additional testing by a third party acceptable to the Engineer to perform a Petrographic analysis (ASTM C 295), at its expense. The Contractor shall submit the results of the analysis with recommended changes to the manufacturing process to the Engineer. The Contractor shall submit fine aggregate samples for testing by the Engineer after the recommended changes have been made.

Upon review of the Petrographic analysis report and identified items that were corrected, the source may be re-sampled and tested by the Engineer.

c. The Contractor may request that the use of such material not meeting the requirements be considered on select project(s) for certain applications. HMA pavement incorporating such material will be monitored and evaluated for a period not to exceed 48 months, at the direction of the Department and at the expense of the Contractor. Terms of any evaluation and suitable application will be predetermined by the Engineer.

If the Engineer determines, upon evaluation, that the fine aggregate performance is adequate and not harmful to the pavement's serviceability, the Department may approve the material for use in HMA mixtures in similar applications.

3. Mineral Filler:

a. Requirements: Mineral filler shall consist of finely divided mineral matter such as rock dust, including limestone dust, slag dust, hydrated lime, hydraulic cement, or other accepted mineral matter. At the time of use it shall be freely flowing and devoid of agglomerations. Mineral Filler shall be introduced and controlled at all times during production in a manner acceptable to the Engineer.

b. Basis of Approval: The request for approval of the source of supply shall include the location, manufacturing process, handling and storage methods for the material. Mineral filler shall conform to the requirements of AASHTO M-17

4. Liquid Bituminous Materials:

a. Performance grade (PG) binder Requirements:

i. Binders shall contain uniformly mixed and blended liquid bituminous materials that are free of contaminants such as fuel oils and other solvents. Such binders shall be properly heated and stored to prevent damage or separation. A PG binder shall be classified by the supplier as a "Neat" binder for each lot and be so labeled on each bill of lading. Neat PG binders shall be asphalts free from modification with: fillers, extenders, reinforcing agents, adhesion promoters, thermoplastic polymers, acid modification and other additives, and shall indicate such information on each bill of lading and certified test report.

ii. The blending at mixing plants of PG binder from different suppliers is strictly prohibited. Contractors who blend PG binders will be classified as a supplier and will be required to certify the binder in accordance with AASHTO R-26(M). The asphalt binder shall be Performance Grade 64-22 Neat asphalt. The binder shall meet the requirements of AASHTO M-320(M) and AASHTO R-29(M). The Contractor shall submit a Certified Test Report and bill of lading representing each delivery in

accordance with AASHTO R-26(M). The Certified Test Report must also indicate the binder specific gravity at 77°F; rotational viscosity at 275°F and 329°F and the mixing and compaction viscosity-temperature chart for each shipment.

iii. The Contractor shall submit the name(s) of personnel responsible for receipt, inspection, and record keeping of PG binder materials. Contractor plant personnel shall document specific storage tank(s) where binder will be transferred and stored until used, and provide binder samples to the Engineer upon request. The person(s) shall assure that each shipment (tanker truck) is accompanied by a statement certifying that the transport vehicle was inspected before loading and was found acceptable for the material shipped and that the binder will be free of contamination from any residual material, along with two (2) copies of the bill of lading.

iv. Basis of Approval: The request for approval of the source of supply shall list the location where the material will be manufactured, and the handling and storage methods, along with necessary certification in accordance with AASHTO R-26(M). Only suppliers/refineries that have an approved "Quality Control Plan for Performance Graded Binders" formatted in accordance with AASHTO R-26(M) will be allowed to supply PG binders to Department projects.

b. Cut-backs (medium cure type)

i. Requirements: The liquid petroleum materials shall be produced by fluxing an asphalt base with appropriate petroleum distillates to produce the grade specified.

ii. Basis of Approval: The request for approval of the source of supply shall be submitted at least seven days prior to its use listing the location where the materials will be produced, and manufacturing, processing, handling and storage methods. The Contractor shall submit a Certified Test Report in accordance with Section 1.06 and a Material Safety Data Sheet (MSDS) for the grade to be used on the Project. The liquid asphalt shall be MC-250 conforming to AASHTO M-82.

c. Emulsions

i. Requirements: The emulsified asphalt shall be homogeneous and not be used if exposed to freezing temperatures.

ii. Basis of Approval**:** The request for approval of the source of supply must include the location where the materials will be produced, and manufacturing, processing, handling and storage methods.

1. Emulsified asphalts shall conform to the requirements of AASHTO M-140. Materials used for tack coat shall not be diluted and meet grade RS-1. When ambient temperatures are 80˚F and rising, grade SS-1 or SS-lh may be substituted if accepted by the Engineer. Each shipment shall be accompanied with a Certified Test Report listing Saybolt viscosity, residue by evaporation, penetration of residue, and weight per gallon.

2. Cationic emulsified asphalt shall conform to the requirements of AASHTO M-208(M). Materials used for tack coat shall not be diluted and meet grade CRS-1. The settlement and demulsibility test will not be performed unless deemed necessary by the Engineer. When ambient temperatures are 80˚F and rising, grade CSS-1 or CSS-lh may be substituted if accepted by the Engineer. Each shipment shall be accompanied with a Certified Test Report listing Saybolt viscosity, residue by evaporation, penetration of residue, and weight per gallon.

5. Reclaimed Asphalt Pavement (RAP):

a. Requirements: RAP shall consist of asphalt pavement constructed with asphalt and aggregate reclaimed by cold milling or other removal techniques approved by the Engineer. For bituminous mixtures containing RAP, the Contractor shall submit a JMF in accordance with Article M.04.02 to the Engineer for review.

b. Basis of Approval: The RAP material will be accepted on the basis of one of the following criteria:

i. When the source of all RAP material is from pavements previously constructed on Department projects, the Contractor shall provide a materials certificate listing the detailed locations and lengths of those pavements and that the RAP is only from those locations listed.

ii. When the RAP material source or quality is not known, the Contractor shall test the material and provide the following information along with a request for approval to the Engineer at least 30 calendar days prior to the start of the paving operation. The request shall include a material certificate stating that the RAP consists of aggregates that meet the specification requirements of subarticles M.04.01-1 through 3 and that the binder in the RAP is substantially free of solvents, tars and other contaminants. The Contractor is prohibited from using unapproved material on Department projects and shall take necessary action to prevent contamination of approved RAP stockpiles. Stockpiles of unapproved material shall remain separate from all other RAP materials at all times. The request for approval shall include the following:

1. A 50-pound sample of the RAP to be incorporated into the recycled mixture.
2. A 25-pound sample of the extracted aggregate from the RAP.
3. After recovery of binder from the RAP by AASHTO T 170(M), the viscosity test results shall be reported when tested at 140°F by AASHTO T 202 or T 316.
4. A statement that RAP material has been crushed to 100% passing the ½ inch sieve and remains free from contaminants such as joint compound, wood, plastic, and metals.

6. Crushed Recycled Container Glass (CRCG):

a. Requirements: The Contractor may propose to use clean and environmentally-acceptable CRCG in an amount not greater than 5% by weight of total aggregate.

b. Basis of Approval: The Contractor shall submit to the Engineer a request to use CRCG. The request shall state that the CRCG contains no more than 1% by weight of contaminants such as paper, plastic and metal and conform to the following gradation:

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

7. Joint Seal Material:

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

8. Plant production requirements

a. Storage Silos:

i. The Contractor may use silos for short-term storage of Superpave mixtures with prior notification and approval of the Engineer. A silo must have heated cones and an unheated silo cylinder if it does not contain a separate internal heating system. Prior approval must be obtained for storage times greater than those indicated. When multiple silos are filled, the Contractor shall discharge one silo at a time. Simultaneous discharge of multiple silos is not permitted.

Type of silo cylinder	Maximum storage time for all classes (hr)
Open Surge	4
Unheated – Non-insulated	8
Unheated – Insulated	18
Heated – No inert gas	To be determined by the Engineer

ii. For all classes of mixture sampled from hauling vehicles at the plant after storage in silos (virgin or mixture containing RAP) except 5, 5A, and 5B, the binder properties of the recovered asphalt shall meet the PG binder grade specified when recovered by AASHTO T 170(M) and tested in accordance with AASHTO R-29 and M-320(M).

iii. If mixture coming out of a silo continuously does not meet the requirements of M.04.03, or the binder does not meet the PG requirements, the Engineer shall deem that silo unacceptable for use.

b. Aggregates: The Contractor shall ensure that aggregate stockpiles are managed to provide uniform gradation and particle shape, prevent segregation and cross contamination in a manner acceptable to the Engineer. For drum plants only, the Contractor shall determine the percent moisture content a minimum of twice daily, prior to production and half way through production. The Contractor shall perform cold feed gradation analysis (AASHTO T 27(M) & T 11) for each component aggregate to ensure values remain

within the tolerances stated in Table M.04.02 when compared to the latest JMF for that class.

c. Mixture: The dry and wet mix times shall be sufficient to provide proper coating (minimum 95% as determined by AASHTO T 195(M)) of all particles with bitumen and produce a uniform mixture. The Contractor shall make necessary adjustments to ensure bituminous concrete mixtures are free from moisture throughout. The Contractor shall make necessary adjustments to ensure all types of bituminous concrete mixtures contain no more than 0.5% moisture throughout when tested in accordance with AASHTO T 329.

d. RAP: The Contractor shall indicate the percent of RAP, the moisture content (as a minimum, determined twice daily – prior to production and halfway through production), and the net dry weight of RAP added to the mixture on each truck ticket. For each day of production, the production shall conform to the job mix formula and RAP percentage and no change shall be made without the prior approval of the Engineer.

e. Documentation system: The mixing plant documentation system shall include equipment for accurately proportioning the components of the mixture by weight and in the proper order, controlling the cycle sequence and timing the mixing operations. Recording equipment shall monitor the batching sequence of each component of the mixture and produce a printed record of these operations on each truck ticket, as specified herein. Tolerance controls shall be automatically or manually adjustable to provide proportions within these tolerances for any batch size. The automatic proportioning system shall be capable of consistently delivering mixtures within these limits for the full range of batch sizes.

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

Each Aggregate Component:	±1.0 % total target batch weight
Mineral Filler	±0.5 % of the total batch
Bituminous Material	±0.1 % of the total batch
Zero Return (Aggregate)	±0.5 % of the total batch
Zero Return (Bituminous Material)	±0.1 % of the total batch

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

f. Field Laboratory:
The Contractor shall furnish the Engineer an acceptable field laboratory, to test bituminous mixtures during production and the Engineer shall have priority to use it for testing. The HMA plant production field laboratory shall have a minimum of 300 square feet, have a potable water source and drainage in accordance with the CT Department of Public Health Drinking Water Division, be equipped with all necessary testing equipment as well as with a PC, printer, and telephone with a dedicated hard-wired phone line. In addition, the PC shall have a high speed internet connection with a minimum upstream of 384 Kbps and a functioning web browser with unrestricted access to https://ctmail.ct.gov. This equipment shall be maintained in clean and good working order at all times and be made available for use by the Engineer.

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

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

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

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

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

a. Requirements: When specified, the Marshall method shall be employed to develop a bituminous concrete mix design that includes a JMF consisting of target values for gradation and bitumen content for each class of bituminous concrete designated for the project in accordance with the latest Asphalt Institute's MS-2 manual. Each class of bituminous concrete must meet the requirements as shown in Table M.04.02-1.

b. Basis of Approval: The Contractor shall submit to the Engineer a request for approval of the JMF annually in accordance with one of the methods described herein. Prior to the start of any paving operations, the JMF and production percentage of bitumen must be accepted by the Engineer, and the Contractor must demonstrate the ability to meet the accepted JMF and production percentage of bitumen for each class of mixture. Additionally, the fraction of material retained between any two consecutive sieves shall not be less than 4%.

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

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

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

c. Marshall mixture (virgin): For bituminous concrete mixtures that contain no recycled material, the limits prescribed in Table M.04.02-1 govern. The Contractor shall submit to the Engineer for approval, a JMF with the individual fractions of the aggregate expressed as percentages of the total weight of the mix and the source(s) of all materials. The JMF shall indicate two bitumen contents; the JMF target percentage and a production percentage (actual amount added to mix) of bitumen for each mix class by total weight. For surface course Class 1, a 0.45 power gradation chart shall also be submitted on which is plotted the percentage passing each sieve. The JMF shall also indicate the target temperature of completed mixture as it is dumped from the mixer and tested in accordance with Article M.04.03.

d. Marshall mixtures with RAP: In addition to subarticles M.04.02 – 1a through c, RAP in bituminous concrete shall comply with requirements stated in Article M.04.01, and as stated herein. Upon approval of the Engineer, a maximum of 15% RAP may be used with no binder grade modification. RAP material shall not be used with any other recycling option.
The Contractor may increase the RAP percentage in 5% increments up to a maximum of 30% provided a new JMF is accepted by the Engineer. The following information shall be included in the JMF submittal:
   - Gradation and asphalt content of the RAP.
   - Percentage of RAP to be used.
   - Virgin aggregate source(s).

- Total binder content based on total mixture weight.
- Production pull percentage of added virgin binder based on total mixture weight.
- Gradation of combined bituminous concrete mixture (including RAP).
- Grade of virgin added, if greater than 15% of total mix weight.

e. Marshall mixture with CRCG: In addition to subarticle M.04.02 – 1a through c, for bituminous concrete that contains CRCG, the Contractor shall submit a materials certificate to the Engineer stating that the mixture and its components comply with requirements stated in subarticle M.04.01 - (6). Additionally, 1% hydrated lime, or other accepted non-stripping agent, shall be added to all mixtures containing CRCG. CRCG material shall not be used with any other recycling option.

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

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

i. Class 5A mixture shall have 3/8 to ½ inch polypropylene fibers that have been approved by the Engineer added at a rate of 6 pounds per ton of mixture.

ii. Class 5B mixture shall have ¼ inch polyester fibers that have been approved by the Engineer added at the rate of 2 1/2 pounds per ton of mixture.

iii. Class 5 mixture shall not contain fibers.

b. Basis of Approval: The aggregates, fibers and binder (MC-250) shall meet the requirements as specified in subarticles M.04.01-1 through 4 and in Table M.04.02-1. The use of recycled material is not permitted with these classes of bituminous concrete. Mixtures not conforming to the binder content as shown in Table M.04.02-1 shall be subject to rejection. There is a two test minimum per day of production. Mixtures not conforming to the gradation as shown in Table M.04.02-1 shall be subject to payment adjustment as specified in Section 4.06.

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

Notes: (a) 75 blow (Marshall Criteria). (b) 3-6% when used for a roadway wearing surface. (c) For divided highways with 4 or more lanes, a stability of 1500 lbs is required. (d) Contains an accepted non-stripping compound. (e) To help prevent stripping, the mixed material will be stockpiled on a paved surface and at a height not greater than 4 feet during the first 48 hours. (f) As determined by AASHTO T 245(M). (g) The percent passing the #200 sieve shall not exceed the percentage of bituminous asphalt binder determined by AASHTO T 164(M) or AASHTO T 308(M). (h) Mixture with 5% or more aggregate retained on ¾" sieve. (i) Mixtures finer than condition (h) above. (j) Class 5 mixture shall contain no fibers. Class 5A mixture shall have 3/8 to ½ inch polypropylene fibers that have been previously accepted by the Engineer added at a minimum rate of 6 pounds per ton of mixture. Class 5B mixture shall have ¼ inch polyester fibers that have been previously accepted by the Engineer added at the minimum rate of 2 1/2 pounds per ton of mixture

CLASS	1	2	3	4	12	5 (e)(j)	5A (e)(j)	5B (e)(j)	JMF % Tol. (±)
Grade of PG Binder content %	PG 64-22 5.0 – 6.5	PG 64-22 5.0 – 8.0	PG 64-22 6.5 - 9.0	PG 64-22 4.0 - 6.0	PG 64-22 7.5 - 10.0	MC-250 (d) 6.0 - 7.5	MC-250 (d) 6.0 - 7.5	MC-250 (d) 6.0 - 7.5	0.4
Sieve Size	Percent Passing (%)								
# 200	3.0 – 8.0 (g)	3.0 – 8.0 (g)	3.0 – 8.0 (g)	0.0 – 5.0 (g)	3.0 – 10.0 (g)	0.0 - 2.5	0 .0- 2.5	0.0 - 2.5	2.0
# 50	6 – 26	8 – 26	10 - 30	5 - 18	10 - 40				4
# 30	10 - 32	16 - 36	20 - 40		20 - 60	2 - 15	2 – 15	2 - 15	5
# 8	28 - 50	40 - 64	40 - 70	20 - 40	60 - 95	10 - 45	10 – 45	10 - 45	6
# 4	40 - 65	55 - 80	65 - 87	30 - 55	80 - 95	40 - 100	40 – 100	40 - 100	7
¼"									
3/8 "	60 - 82	90 - 100	95 - 100	42 - 66	98 - 100	100	100	100	8
½ "	70 - 100	100	100		100				8
¾"	90 - 100			60 - 80					8
1"	100								
2"				100					
Additionally, the fraction of material retained between any two consecutive sieves shall not be less than 4%									
Mixture Temperature									
Binder	325°F maximum					140-185° F			
Aggregate	280-350° F					100-175° F			
Mixtures	265-325° F				275-325°F	120-175° F			25 °F
Mixture Properties									
VOIDS - %	3.0 – 6.0 (a)	2.0 – 5.0 (b)	0 – 4.0		0 - 5.0 (a)				
Stability (f) lbs. min.	1200 (c)	1000	1000		1000				
FLOW (f) in.	.08 - .15	.08 - .15	.08 - .18		.08 - .15				
VMA % - min.	15(h) :16 (i)								

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

a. Requirements: The Contractor or its representative shall design and submit Superpave mix designs annually for approval. The design laboratory developing the mixes shall be approved by the Engineer. The mix design shall contain the nominal maximum aggregate size and include a JMF consisting of target values for gradation and bitumen content for each HMA mix type designated for the project, as specified in Tables M.04.02-2 thru Table M.04.02-5 and in accordance with the latest requirements of AASHTO M 323(M) and AASHTO R 35(M).

The contractor shall provide a certified test report with supporting documentation from an accredited AASHTO Materials Reference Laboratory (AMRL) with the use of NETTCP Certified Technicians for aggregate consensus properties for each type & level, as specified in Table M.04.02-3. In addition the Gsa, Gsb, Pw_a shall also be provided for each component aggregate. New mixes shall be tested in accordance with AASHTO T 283(M) *Standard Method of Test for Resistance of Compacted Hot Mix Asphalt (HMA) to Moisture-Induced Damage.* The AASHTO T 283(M) test results and specimens shall be submitted by the Contractor for review. The tensile strength ratio must be greater than 80 percent, and the specimen shall not show more than minimal evidence of stripping as determined by the Engineer. The mix design shall conform to all criteria applicable to the selected traffic level equivalent single-axle loads (ESAL) as specified in this contract. Each HMA mix type must meet the requirements shown in Tables M.04.02-2 thru Table M.04.02-5.

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

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

The percentage of aggregate passing each sieve shall be plotted on a 0.45 power gradation chart and shall be submitted for all HMA mixtures. This chart shall delineate the percentage of material passing each test sieve size as defined by the JMF. The percentage of aggregate passing each standard sieve shall fall within the specified control

points, but outside the restricted zone limits as shown in Tables M.04.02-2 thru Table M.04.02-5. Mixes with documented performance history which pass through the restricted zone may be permitted for use as long as all other physical and volumetric criteria meets specifications as specified in Tables M.04.02-2 thru Table M.04.02-5 and with prior approval from the Engineer. A change in the JMF requires that a new chart be submitted.

Superpave Mixtures with RAP: In addition to subarticles M.04.02 – 3 a through c, for HMA that contains RAP, the Contractor shall submit a materials certificate to the Engineer stating that the RAP complies with requirements stated in Article M.04.01. Upon approval of the Engineer, the use of RAP will be allowed with the following conditions:

- RAP amounts up to 15% may be used with no binder grade modification.

- RAP amounts up to 20% may be used provided a new JMF is approved by the Engineer. The JMF submittal shall include the grade of virgin binder added and test results that show the combined binder (recovered binder from the RAP and virgin binder at the mix design proportions) meets the requirements of the specified binder grade.

The RAP shall be crushed after milling or other removal method so that 100 % passes the 0.5 inch sieve. Also, under no circumstances shall the top-size aggregate in the RAP exceed the nominal maximum aggregate size allowed by the job mix formula for that mix. The Contractor shall assure that the RAP is free from contaminating substances such as joint seal compound. The aggregate type used, either gravel, trap rock or a blend of the two, shall be maintained and consistent throughout the entire roadway. The final Superpave mixture shall conform to specifications as amended herein. RAP material shall not be used with any other recycling option.

b. Basis of Approval: On an annual basis the Contractor shall submit to the Engineer a request for approval of the HMA mixture, the mix design, and JMF in accordance with one of the methods described herein. Prior to the start of any paving operations, the JMF must be approved by the Engineer, and the Contractor must demonstrate the ability to meet the accepted JMF and production percentage of bitumen for each type of mixture. HMA mixture supplied to the project without an approved mix design, JMF and approved facility will be rejected. The JMF shall also indicate the target temperature of completed mixture as it is dumped from the mixer and tested in accordance with Article M.04.03. Additionally, the fraction of material retained between any two consecutive sieves shall not be less than 4%.

HMA Plant Trials: Upon submittal and approval of the mix design by the Engineer, the Contractor shall test and evaluate plant-produced mixture (PPT) in accordance with these specifications when required.

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

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

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

The following information must be included in the mix design submittal:

a. Gradation, specific gravities and asphalt content of the RAP,
b. Material Certificate stating that all RAP inventory conforms to all material specifications,
c. Percentage of RAP to be used.

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

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

1) Rating Procedure: Ratings for each type are as follows:

"A" – Approved:
Rating assigned to a mixture type from a producer with a current rating of 70% or better based on specification compliance based on binder content (Pb), air voids (Va), maximum theoretical gravity (G_{mm}), and Voids in Mineral Aggregate (VMA).

"PPT" – Pre-Production Trial:
Rating assigned to a type of mixture when there is no production history from the previous year, has a change in one or more aggregate components from the JMF on record, a change in RAP percentage, or is a new JMF not previously on record.

HMA mixtures rated with a "PPT" cannot be shipped or used on Department projects. A passing "PPT" test shall be performed with NETTCP certified personnel on that type of mixture by the HMA producer and meet all specifications (Table M.04.02-2 thru Table M.04.02-5) before production shipment may be resumed. At no time shall mixture rated "PPT" be shipped to Department projects.

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

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

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

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

When Option (A) is used and the "PPT" test meets all specifications, the "PPT" test is considered a passing test and the rating for that mix is changed to "A". When the "PPT" test is not witnessed, the "PPT" Option (B) procedure must be followed and the mixtures along with the test results delivered to the Materials Testing Lab. The test results must meet the "B" tolerances established by the Engineer.

"U" – No Acceptable Mix Design on File:

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

TABLE M.04.02– 2: SUPERPAVE MASTER RANGE FOR MIXTURE DESIGN CRITERIA

Notes: (1) Minimum Pb as specified in Table M.04.02-5. (2) Voids in Mineral Aggregates shall be computed as specified herein. (3) Control point range is also defined as the master range for that mix. (4) Dust is considered to be the percent of materials passing the #200 sieve.

	S0.25				**S0.375**				**S0.5**				**S1**			
Sieve	CONTROL POINTS (3)		*RESTRICTED ZONE*		CONTROL POINTS(3)		*RESTRICTED ZONE*		CONTROL POINTS(3)		*RESTRICTED ZONE*		CONTROL POINTS(3)		*RESTRICTED ZONE*	
inches	Min (%)	Max (%)	*Max (%)*	*Min (%)*	Min (%)	Max (%)	*Min (%)*	*Max (%)*	Min (%)	Max (%)	*Min (%)*	*Max (%)*	Min (%)	Max (%)	*Min (%)*	*Max (%)*
2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.5	-	-	-	-	-	-	-	-	-	-	-	-	100	-	-	-
1.0	-	-	-	-	-	-	-	-	-	-	-	-	90	100	-	-
3/4	-	-	-	-	-	-	-	-	100	-	-	-	-	90	-	-
1/2	100	-	-	-	100	-	-	-	90	100	-	-	-	-	-	-
3/8	97	100	-	-	90	100	-	-	-	90	-	-	-	-	-	-
#4	-	90	-	-	-	90	-	-	-	-	-	-	-	-	*39.5*	*39.5*
#8	32	67	*47.2*	*47.2*	32	67	*47.2*	*47.2*	28	58	*39.1*	*39.1*	19	45	*26.8*	*30.8*
#16	-	-	*31.6*	*37.6*	-	-	*31.6*	*37.6*	-	-	*25.6*	*31.6*	-	-	*18.1*	*24.1*
#30	-	-	*23.5*	*27.5*	-	-	*23.5*	*27.5*	-	-	*19.1*	*23.1*	-	-	*13.6*	*17.6*
#50	-	-	*18.7*	*18.7*	-	-	*18.7*	*18.7*	-	-	*15.5*	*15.5*	-	-	*11.4*	*11.4*
#100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
#200	2.0	10.0	-	-	2.0	10.0	-	-	2.0	10.0	-	-	1.0	7.0	-	-
Pb (1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VMA (2) (%)	16.0 ± 1				16.0 ± 1				15.0 ± 1				13.0 ± 1			
VA (%)	4.0 ± 1				4.0 ± 1				4.0 ± 1				4.0 ± 1			
Gse	JMF value				JMF value				JMF value				JMF value			
Gmm	JMF ± 0.030				JMF ± 0.030				JMF ± 0.030				JMF ± 0.030			
Dust/Pbe(4)	0.6 – 1.2				0.6 – 1.2				0.6 – 1.2				0.6 – 1.2			
Agg. Temp	280 – 350F				280 – 350F				280 – 350F				280 – 350F			
Mix Temp	265 – 325 F				265 – 325 F				265 – 325 F				265 – 325 F			

TABLE M.04.02–3
SUPERPAVE MASTER RANGE FOR CONSENSUS PROPERTIES OF COMBINED AGGREGATE STRUCTURES

Notes: (1) If less than 25 % of a given layer is within 4 inches of the anticipated top surface, the layer may be considered to be below 4 inches for mixture design purposes.

Traffic Level	Design ESALs (80 kN)	Coarse Aggregate Angularity (1) ASTM D 5821	Fine Aggregate Angularity (7) AASHTO T 304	Flat or Elongated Particles ASTM D 4791	Sand Equivalent AASHTO T 176
-----	(million)			>#4	-----
1*	< 0.3	55/- -	40	10	40
2	0.3 to < 3.0	75/- -	40	10	40
3	≥ 3.0	95/90	45	10	45
	Design ESALs are the anticipated project traffic level expected on the design lane, projected over a 20 year period, regardless of the actual expected design life of the roadway.	Criteria presented as minimum values. 95/90 denotes that a minimum of 95% of the coarse aggregate, by mass, shall have one fractured face and that a minimum of 90% shall have two fractured faces.	Criteria presented as minimum percent air voids in loosely compacted fine aggregate passing the #8 sieve.	Criteria presented as maximum Percent by mass of flat or elongated particles of materials retained on the #4 sieve, determined at 3:1 ratio.	Criteria presented as minimum values for fine aggregate passing the #8 sieve.

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

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

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

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

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

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

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

M.04.03—Production Quality Control (QC) Testing, Approval and Control of Mixture: The Contractor shall submit a Quality Control plan for HMA production specifically for the plant producing the HMA mixture in accordance with subarticle 4.06.03-9 for review and approval of the Engineer. The plan must also include a list of sampling & testing methods and frequencies used during production, and the names of all Quality Control plant personnel and their duties. In addition;

i. All plant personnel involved with sampling and testing for Quality Control purposes must have a current certification as an NETTCP HMA Plant Technician or Interim HMA Plant Technician and be in good standing. Technicians found by the Engineer to be non-compliant with NETTCP and Department policies may be suspended by the Engineer from participating in the production of mixtures for Department projects until their actions can be reviewed by NETTCP.

ii. The Contractor shall maintain a list of laboratory equipment used in their quality control processes including but not limited to, balances, scales, manometer/vacuum gauge, thermometers, gyratory compactor, clearly showing calibration and/or inspection dates, in accordance with AASHTO R-18.

In addition, based on the mix design method the following also applies.

1. **Materials Sampling & Testing Methods for Marshall Mixes:** The Contractor shall furnish the Engineer a field laboratory accepted by the Engineer to test bituminous mixtures during production. Material samples will be obtained from the hauling vehicles by the Engineer at the plant during each day's production as indicated in the Department's "Schedule of

Minimum Requirements for Sampling Materials for Test." The following test procedures will be used:

AASHTO T 30(M)	Mechanical Analysis of Extracted Aggregate
AASHTO T 40(M)	Sampling Bituminous Materials
AASHTO T 164(M)/ AASHTO T 308(M)	Quantitative Extraction/Ignition Oven of Bitumen from Bituminous Paving Mixtures
AASHTO T 245(M)	Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
AASHTO T 209(M)	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
AASHTO T 269(M)	Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
AASHTO T 329	Moisture Content of Hot-Mix Asphalt (HMA) by Oven Method

a. Cessation of Supply: Marshall Mix Production shall cease for the Project from any plant that consistently fails to produce mixture that meets the JMF and volumetric properties. The criteria for ceasing the supply of a class of mixture from any plant are as follows:

   i. Off-Test Status: The results of AASHTO T 164(M) and T 30(M) will be used to determine if the mixture is within the tolerances shown in Table M.04.02-1. The Contractor will be notified that a plant is "off test" for a class of mixture when the test results indicate that any single value for bitumen content or gradation are not within the tolerances shown in Table M.04.02-1 for that class of mixture.
   ii. When multiple plants and silos are located at one site, mixture supplied to one project is considered as coming from one source for the purpose of applying the "off test" adjusted payment.
   iii. If a test indicates that the bitumen content or gradation are outside the tolerances, the Contractor may make a single JMF change on classes 1, 2, 3, 4 and 12 as allowed by the Engineer prior to any additional testing. A JMF change shall include the date and name of the Engineer that allowed it. Consecutive test results outside the requirements of Table M.04.02-1 JMF tolerances may result in rejection of the mixture.
   iv. The Engineer may cease supply of mixture from the plant when the test results from three non-consecutive samples of a class of mixture are not within the JMF tolerances or the test results from two non-consecutive samples not within the master range indicated in Table M.04.02-1 during any one production period, due to inconsistent production.
   v. Any modification to the JMF shall not exceed 50% of the JMF tolerances indicated in Table M.04.02-1 for any given component of the mixture without approval of the Engineer. When such an adjustment is made to the bitumen, the corresponding production percentage of bitumen shall be revised accordingly.

b. Adjustments for Off test Mixture under Cessation of Supply: The HMA plant shall cease supplying to the project:

i. When the test results from three consecutive samples are "off test" and not within the JMF tolerances or,

ii. The test results from two consecutive samples are "off test" and not within the ranges indicated in Table M.04.02 – 1 or,

iii. When the percent of material passing the minus #200 sieve material exceeds the percent of extracted bitumen content for three consecutive samples during any production period of the values stated in Table M.04.02-1:

a. The quantity of mixtures shipped to the project determined to be "off test" and outside the tolerances will be tabulated by the Engineer and will be adjusted in accordance with Section 4.06.

b. Following cessation, a trial production period will be required at the plant for that class of mixture. Use of that class of mixture from that plant will be prohibited on the Project until the plant has demonstrated the ability to consistently produce acceptable mixture.

c. When the Engineer has accepted the mixtures from the trial production period, the use of that mixture on the Project may resume.

2. Material Sampling & Testing Methods for Superpave Mixes:

a. Samples of mixtures will be obtained from the hauling vehicles at the plant during each day's production, as indicated in Table M.04.03– 1. The Contractor shall perform necessary moisture susceptibility testing annually or when material component sources change, and for all levels of HMA S0.5 plant produced mixtures, as specified in the latest version of AASHTO T 283(M). The AASHTO T 283(M) test results and specimens shall be submitted by the Contractor for approval. The tensile strength ratio must be greater than 80 percent, and the specimen shall not show more than minimal evidence of stripping as determined by the Engineer. This shall be completed within 30 days of beginning of production. Superpave mixtures that require anti-strip additives (either liquid or mineral) shall continue to meet all requirements specified herein for binder and HMA. The Contractor shall submit the name, manufacturer, percent used, and MSDS sheet for the anti-strip additive (if applicable) to the Engineer. In addition;

i. The Contractor shall maintain all testing equipment within a field laboratory in good working order.

ii. The Contractor shall not modify or use the equipment within the field laboratory without the consent of the Engineer. Any such action by the Contractor may be cause for the Engineer to re-inspect equipment, check calibrations, which could delay production at that facility until such checks are completed.

iii. The Contractor shall take immediate action to replace, repair, and/or recalibrate any piece of equipment that is deemed by the Engineer to be out of calibration, malfunctioning, or not in operation. If an acceptance test was performed using such

equipment, split test samples may be retrieved for verification at the discretion of the Engineer.

iv. Production without the use of required testing equipment will be permitted for only 1 hour. Additional production beyond the first hour may be considered by the Engineer. If permitted to continue production, box samples will be taken, tested, and incorporated as stated in Article M.04.03 and subarticle 4.06.04-1b. No production shall be permitted beyond that day until the subject equipment is repaired or replaced to the satisfaction of the Engineer.

v. Compaction of samples shall be accomplished utilizing an accepted Superpave Gyratory Compactor (SGC), supplied by the Contractor. The SGC shall be located at the HMA plant supplying mixture to the project.

vi. The Engineer is responsible for determining the acceptance of HMA and will perform verification testing on QC production samples in accordance with the Department's QA Program for Materials..

b. Additional QC plan Requirements for Plants producing Superpave Mix Design mixture:

i. The Contractor shall perform all listed component aggregates and Superpave mixture Quality Control testing in accordance with the test procedures and schedule listed in Table M.04.03-1, as a minimum, any day that Superpave mixtures are produced.

ii. The Contractor shall propose a QC test frequency for AASHTO T 27(M) on the cold feed material and AASHTO T 308 for RAP binder content.

iii. All process control (PC) test data shall be kept on file for the duration of the project for review by the Engineer.

c. Determination of Off-Test status:

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

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

1. The Contractor shall notify the Engineer (and project staff) when the plant is *"off test"* for a type of mixture. When multiple plants and silos are located at one site, mixture supplied to one project is considered as coming from one source for the purpose of applying the *"off test"* determination.

2. The Contractor must take immediate actions to correct the deficiency, minimize *"off test"* production to the project, and obtain an additional Process Control (PC) test after any corrective action to verify production is in conformance to the

specifications. A PC test will not be used for acceptance and is solely for the use of the Contractor in its quality control process.

d. Test Section:
The test section, as specified in Section 4.06, shall be considered acceptable if payment for HMA mixture tested at the plant is no less than 100% and the field density meets the specified requirements.

Table M.04.03– 1: Contractor Quality Control Testing Procedures & Minimum Frequency of Test

Protocol	Reference	Description	Frequency (min)
1	AASHTO T 27	Sieve Analysis of Fine and Coarse Aggregate	Determined by Contractor
2	AASHTO T 329	Moisture content of RAP (before start and halfway thru production - when used)	2/day
3	AASHTO T 255(M)	Moisture content of each cold feed aggregate (before start and halfway thru production - drum plants only)	2/day
4	AASHTO T 308(M)	Binder content of RAP by Ignition Oven method (before start of production when used)	Determined by Contractor
5	AASHTO T 168(M)	Sampling of HMA	See Note (3)
6	AASHTO T 308(M)	Binder content by Ignition Oven method (adjusted for aggregate correction factor)	See Note (3) & Note (4)
7	AASHTO T 30(M)	Gradation of extracted aggregate for HMA mixture	See Note (3)
8	AASHTO T 312(M)	(1)Superpave Gyratory molds compacted to N_{des}	See Note (3)
9	AASHTO T 166(M)	(2)Bulk specific gravity of HMA	See Note (3)
10	AASHTO R 35(M)	(2)Air voids, VMA	See Note (3)
11	AASHTO T 209(M)	Maximum specific gravity of HMA (average of two tests)	See Note (3)
12	AASHTO T 329	Moisture content of Production HMA	See Note (3)

Notes: **(1)** One set equals two six-inch molds. Molds to be compacted to N_{max} for PPTs $_{and}$ N_{des} for production testing
(2) Average value of one set of six-inch molds.
(3) Test frequency shall be based on HMA quantity produced per day. Table M.04.03-2 denotes the number of tests required for daily QC by the Contractor.
(4) The aggregate correction factor will be determined by the Engineer.

Table M.04.03 – 2: Contractor Acceptance Testing Required Based on Daily Production per Type/Level/Plant[1]

Daily quantity produced in tons	Minimum number of tests required[2]
0 to 150	No testing required (if mix already accepted) [3]
151 to 600	1 test
601 to 1,200	2 tests
1,201 to 1,800	3 tests
1,801 and greater [4]	4 tests

Notes:

(1) For the purpose of the Contractor complying with the number of tests stated in Table M.04.03-2, tons of the same type/level per plant shall be combined from multiple state projects. A minimum of one (1) acceptance test shall be performed for every four days of production for every same type/level mix (days of production may or may not be consecutive days). An acceptance test shall not be performed within 150 tons of production from a previous acceptance test unless approved by the Engineer.

(2) All testing shall be selected using stratified – random sampling of total estimated daily tons in accordance with ASTM D 3665, except that the first test shall be randomly taken from the first round of trucks, the first 151 tons sublot, or as otherwise ordered by the Engineer. QC samples shall be saved and stored at the HMA facility for 7 days for Engineer retrieval, after which they may be disposed of.

(3) When directed by the Engineer, a minimum of 1 test is required for bridge and critical areas.

(4) An additional random test shall be taken by the Contractor for each additional 600 tons.

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

An HMA production plant will be required to cease supplying mixtures to the project when:

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

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

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

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

An HMA production plant will be required to cease supplying mixtures to the project when:

1. The binder content (Pb) is below the requirements of Table M.04.03-5 on the ignition oven test result after two (2) consecutive tests, regardless of date of production.
2. Following cessation, the Contractor shall immediately make necessary material or HMA plant corrections and run a Pre-Production Trial (PPT) for that type of mixture. Use of that type of mixture from that plant will be prohibited to the Project until the plant has demonstrated the ability to consistently produce acceptable mixture. When the Contractor has a passing test and has received approval from the Engineer, the use of that mixture to the Project shall resume.

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

a. JMF changes to the G_{mm} or mix Absorption Correction Factor (A_{cf}) are only permitted prior to or after a production shift for all HMA types of mixtures and only when they:
   i. Are requested in writing and pre-approved by the Engineer;
   ii. Are based on a minimum of a two test trend;
   iii. Are documented with a promptly submitted revised JMF on form provided by the Engineer.
   iv. A revised JMF submittal shall include the date and name of the Engineer that allowed it.

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

Notes: (1) 300°F minimum after October 15. (2) Minimum Pb as specified in Table M.04.03-5 (3) Control point range is also defined as the master range for that mix. (4) JMF tolerances shall be defined as the limits for production compliance. VA & Pb payment is subject to adjustments, as defined in sub-article 4.06.04 - 2.

	S0.25		**S0.375**		**S0.5**		**S1**		**Tolerances**
Sieve	CONTROL POINTS (4)		CONTROL POINTS (4)		CONTROL POINTS (4)		CONTROL POINTS (4)		**JMF Limits** (4)
inches	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	±Tol
2.0	-	-	-	-	-	-	-	-	
1.5	-	-	-	-	-	-	100	-	
1.0	-	-	-	-	-	-	90	100	
3/4	-	-	-	-	100	-	-	90	
1/2	100	-	100	-	90	100	-	-	
3/8	97	100	90	100	-	90	-	-	
#4	-	90	-	90	-	-	-	-	
#8	32	67	32	67	28	58	19	45	
#16	-	-	-	-	-	-	-	-	
#200	2.0	10.0	2.0	10.0	2.0	10.0	1.0	7.0	
Pb(2)	-	-	-	-	-	-	-	-	note (2)
VMA (%)	16.0		16.0		15.0		13.0		1.0
VA (%)	4.0		4.0		4.0		4.0		1.0
Gmm	JMF value		JMF value		JMF value		JMF value		0.030
Agg. Temp	280 – 350F		280 – 350F		280 – 350F		280 – 350F		
Mix Temp	265 – 325 F (1)		265 – 325 F (1)		265 – 325 F (1)		265 – 325 F (1)		

TABLE M.04.03– 4: SUPERPAVE MASTER RANGE FOR TRAFFIC LEVELS AND DESIGN VOLUMETRIC PROPERTIES.

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

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

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

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

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

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

AASHTO Standard Specification	
Reference	**Modification**
AASHTO M 320	1. Mass change for PG 64-22 shall be a maximum loss of 0.5% when tested in accordance with AASHTO T 240. 2. The two bottles used for the mass change determination may be re-heated and used for further testing.
AASHTO Standard Methods of Test	
Reference	**Modification**
AASHTO T 27	Section 7.7 Samples are not washed
AASHTO T 30	Section 6.2 thru 6.5 Samples are not routinely washed
AASHTO M-156 /ASTM D 995	Section 8.7.3 *Accuracy: Batch Plants* The automation proportioning system shall be capable of consistently delivering mixtures within the full range of batch sizes within the following tolerances: *Total Batch Weight Of Paving Mix. %* *Batch aggregate component* ± 1.0% Note: AASHTO T 40 is modified as follows: Section 9.1.1 Sampling valve is located on bottom third of storage tank.
AASHTO T 164	Method A **APPARATUS:** Section 6. ConnDOT in addition to AASHTO apparatus includes infrared lamp and substitutes graduated cylinder with a 1000 ml flask. Section 7. Reagent. Must be Conn D.O.T. approved ******* Article 9.2.1 all classes of HMA except Class 4 are scooped from the sample container. Section 10.1 and 10.2 Moisture content is periodically determined on production samples as plant conditions require. Section 12.1 See Section 10 Section 12.5 Filter paper is dried and weighed in field using heat lamp or oven when an ash test is performed. Article 12.6.1 Extract is collected if an ash test is to be performed Article 12.6.2 Performed on selected samples only

	Article 12.6.3 A three test running average is used to correct for total binder in HMA.
AASHTO T 168	Samples are taken at one point in the pile. All types of bituminous concrete except Class 4 are scooped from the sample container instead of remixing and quartering. (Method verified by laboratory study). Samples from a hauling vehicle are taken from only one point instead of three as specified. Selection of Samples: Sampling is equally important as the testing, and the sampler shall use every precaution to obtain samples that are truly representative of the bituminous mixture. Box Samples: In order to enhance the rate of processing samples taken in the field by construction or maintenance personnel the samples will be tested in the order received and data processed to be determine conformance to material specifications and to prioritize inspections by laboratory personnel.
AASHTO T 170	Recovery of Asphalt from Solution by Abson Method Delete the referenced section and replace with the language shown: 5.0 Apparatus 5.1 Centrifuge- batch unit capable of exerting a minimum centrifugal force of 770 times gravity or a continuous unit capable of exerting a minimum force of 3000 times gravity. 5.2. Centrifuge tubes- a 250mL wide mouth bottles 5.3.1. Extraction Flasks- a 500mL three angle necks and joints flask with 24/40 side necks. 5.3.2. Glass Tubing- Heat resistant glass tubing, having 10mm inside diameter and a gooseneck shaped delivery tube, for connecting the flask to the condenser. 5.3.3. Inlet Aeration Tube- 180mm in length having a 6mm outside diameter with a 10-mm bulb carrying six staggered holes approximately 1.5 mm in diameter. 5.3.4. Electric Heating Mantle- Variable transformer to fit a 500 mL flask. 5.3.5 Water-jacketed Condenser- Allihn type, with 200 mm minimum jacket length. 5.3.6. Thermometer- an ASTM low distillation thermometer having a range of –2 to 300°C (30 to 580°F), respectively, and conforming to the requirements in ASTM specification E 1 5.3.7. Gas Flow Meter- A type capable of indicating a gas flow of up to 1000 mL per minute. 5.3.8. Corks- No. 20 5.3.9. Flexible Elastomeric Tubing 5.3.10. Separatory Funnel-500 ml capacity or larger 6.0. Reagents and Materials 6.1. Carbon Dioxide Gas- A pressurized tank, with pressure-reducing valve. The solvent for extracting the asphalt from the mixtures should be reagent grade

	trichloroethylene or methylene chloride. Other solvents may affect the bitumen to change its properties significantly from that as it exists in the mixture. 8. Sample 8.1. The sample shall consist of the solution from previous extraction of a sample of sufficient mass to result in approximately 105 to 110 g of recovered bitumen. 9. Procedure 9.1. The entire procedure, form the start of the extraction to the final recovery, must be completed within 8 hours. 9.2 Centrifuge the solution from the previous extraction for a minimum of 30 minutes at 770 times gravity (approx. 2700rpm) in 250 mL wide mouth bottles. Assemble the apparatus as shown in Figure 1 with the separatory funnel in the thermometer hole in the cork. Lower the aeration tube so that the bulb is in contact with the bottom of the flask. Fill the separatory funnel with the centrifuged solution and open the stopcock to fill the flask approximately one-half full of solvent mixture. Apply low heat to the flask and start distillation. Introduce carbon dioxide gas at a low rate (approx. 100mL/minute) to provide agitation and prevent foaming. Adjust the funnel stopcock to introduce fresh solvent at a rate that will keep the flask approximately one half full during distillation, adding additional solvent mixture to the funnel into all solvent has been introduced into the distillation flask. When the temperature reaches 157 to 160°C (315 to 320°F), increase the carbon dioxide gas flow to approximately 900mL/minute. Maintain this gas flow rate for 20 minutes while also maintaining the temperature of the residue in the flask at 160 to 166°C (320 to 330°F).
AASHTO T 195	Section 4.3 only one truck load of mixture is sampled. Samples are taken from opposite sides of the load.
AASHTO T 209	Article 9.5.1 Bowl is suspended 2 minutes prior to reading rather than 10 minutes. This makes no significant difference in results. Section 7.2 The average of two bowls is used proportionally in order to satisfy minimum mass requirements. 8.3 Omit Pycnometer method.
AASHTO T 245	Article 3.3.2 A compacting temperature of 140 to 146°C (284 to 295°F) is used Article 3.5.2 Seventy-five (75) blows per side are used on Classes 1 and 12, per ConnDOT design requirements Section 3.1 for production testing: one specimen is molded for each extraction test for production over 275 metric tons/day (300 tons/day). Other mixtures: two specimens per extraction test.

AASHTO T 283	This protocol shall be performed at the HMA plant in accordance with section 7 on HMA S0.5 (all design levels) by the Contractor or their representative at a time designated by the Division Chief. TSR testing is required on all classes and design levels during the design phase and on all HMA S0.5 design levels during the production phase.
AASHTO T 308	In addition to the standard testing procedure, the Department has adopted a procedure that addresses a correction factor that is calculated using the composite aggregate percentages (**C**omposite **A**ggregate **C**orrection **F**actor **M**ethod **(CACF)**). The aggregate is burned in compliance with the standard AASHTO procedure Method A exclusively. All modifications are listed for this method only. A2.2 Omit A2.3 Omit A2.4 Omit. Replace with: Determine an aggregate gradation for each aggregate component "blank" in accordance with T30. A2.5 Omit. Replace with: The individual aggregate samples are to be dried in an oven at a maximum temperature of 148 ± 5ºC (300 ± 9º F) to a constant weight. RAP samples are to be oven dried at a maximum temperature of 110 ± 5ºC (230 ± 9º F) to a constant weight. RAP samples will be burned for total binder content only and not to arrive at a correction factor for a mixture. A2.6 Omit. A2.7 Omit A2.8 Omit A2.8.1 Omit Note 2 A2.9 Omit. Replace with: Perform a gradation analysis on the residual aggregate in accordance with T30 and compare it to the gradation performed prior to burning. A2.9.1 Omit A2.9.2 Omit The correction factors for each size aggregate are provided by the Contractor to the Engineer prior to the Annual Plant Inspection. The Composite Aggregate Correction Factor (CACF) for any mixture may be calculated by summing the result of the correction factor for each individual aggregate multiplied by the percentage of that aggregate in the overall mixture. (Note: All correction factors must be re-calculated every time the percentage of any aggregate changes within the mixture.) In addition to the standard testing procedure, the Department has adopted a procedure that addresses the time involved between sampling the hot mix asphalt specimen and the beginning of the test. 6.3 Omit. Replace with: The test specimen must be ready to be placed in an approved ignition furnace for testing within ten minutes of being obtained from the hauling vehicle and the test shall start immediately after.

AASHTO T 331	6.1 Cores are dried to a constant mass prior to testing using a core-dry machine.

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

	(*derived from formula X1.2 APPENDIX X1 of AASHTO R 35)* for each class of material, in accordance with *Formula 5.16.1B.* *Formula 5.16.1B.* Determining the Density Factor *(D_f)* of mix design HMA: $$D_f = \left(\frac{Gse - Gsb}{Gsa - Gsb} \right)$$ Where: D_f = Density Factor or multiplier determined by AASHTO R-35(M) Gse = Effective Specific Gravity determined by AASHTO M-323 at plant Gsa = Apparent Specific Gravity determined by AASHTO T 84/85 of mix design Gsb = Bulk Specific Gravity determined by AASHTO T 84/85 of mix design
AASHTO **R 26**	Quality Control Plans must be formatted in accordance with AASHTO R 26, certifying suppliers of performance-graded asphalt binders, Section 9.0, Suppliers Quality Control Plan, and "NEAUPG Model PGAB QC Plan." 1. The Department requires that all laboratory technician(s) responsible for testing PG-binders be certified or Interim Qualified by the New England Transportation Technician Certification Program (NETTCP) as a PG Asphalt Binder Lab Technician. 2. Sampling of asphalt binders should be done under the supervision of qualified technician. NECTP "Manual of Practice," Chapter 2 Page 2-4 (Key Issues 1-8). 3. A copy of the Manual of Practice for testing asphalt binders in accordance with the Superpave PG Grading system shall be in the testing laboratory. 4. All laboratories testing binders for the Department are required to be accredited by the AASHTO Materials Reference Laboratory (AMRL). 5. Sources interested in being approved to supply PG-binders to the Department by use of an "in-line blending system," must record properties of blended material, and additives used. 6. Each source of supply of PG-binder must indicate that the binders contain no additives used to modify or enhance their performance properties. Binders that are manufactured using additives, modifiers, extenders etc., shall disclose the type of additive, percentage and any handling specifications/limitations required. Suppliers shall provide AASHTO M-320 Table 2 testing at a minimum of once per month on one sample of material. Each supplier shall rotate the PG grade each month (including PMA), so that data can be collected for all the grades produced.

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

Description

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

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

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

Funding

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

Minorities and Women

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

Assigning Training Goals

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

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

The dollar thresholds for training assignments are as follows:

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

Training Classifications

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

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

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

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

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

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

Records and Reports

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

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

Trainee Interviews

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

Trainee Wages

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

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

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

Achieving or Failing to Meet Training Goals

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

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

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

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

Measurement and Payment

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

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

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

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

www.ct.gov/dot

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

SMALL CONTRACTOR AND SMALL CONTRACTOR MINORITY BUSINESS ENTERPRISES (SET-ASIDE)

March, 2001

NOTE: Certain of the requirements and procedures stated in this "Special Provision" are applicable prior to the execution of the Contract.

I. GENERAL

A. The Contractor shall cooperate with the Connecticut Department of Transportation (CONNDOT) in implementing the required contract obligations concerning "Small Contractor" and "Small Contractor Minority Business Enterprise" use on this Contract in accordance with Section 4a-60g of the Connecticut General Statutes as revised. References, throughout this "Special Provision", to "Small Contractors" are also implied references to "Small Contractor Minority Business Enterprises" as both relate to Section IIA of these provisions. The Contractor shall also cooperate with CONNDOT 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.

B. For the purpose of this "Special Provision", the "Small Contractor(s)" and "Minority Business Enterprise(s)" named to satisfy the set-aside requirement must be certified by the Department of Administrative Services, Business Connections/ Set-Aside Unit [(860) 713-5236 www.das.state.ct.us/busopp.htm] as a "Small Contractor" and "Minority Business Enterprises" as defined by Section 4a-60g Subsections (1) and (3) of the Connecticut General Statutes as revised and is subject to approval by CONNDOT to do the work for which it is nominated pursuant to the criteria stipulated in Section IIC-3.

C. Contractors who allow work which they have designated for "Small Contractor" participation in the pre-award submission required under Section IIC to be performed by other than the approved "Small Contractor" organization and prior to concurrence by CONNDOT, will not be paid for the value of the work performed by organizations other than the "Small Contractor" designated.

D. If the Contractor is unable to achieve the specified contract goals for "Small Contractor" participation, the Contractor shall submit written documentation to CONNDOT's Manager of Construction Operations indicating his/her good faith efforts to satisfy goal requirements. Documentation is to include but not be limited to the following:

1. A detailed statement of the efforts made to select additional subcontract opportunities for work to be performed by each "Small Contractor" 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 contracts with each "Small Contractor", including the names, addresses, dates and telephone numbers of each "Small Contractor" contacted, and a description of the information provided to each "Small Contractor" regarding the scope of services and anticipated time schedule of items proposed to be subcontracted and the nature of response from firms contacted.

3. For each "Small Contractor" that placed a subcontract quotation which the Contractor considered not to be acceptable, provide a detailed statement of the reasons for this conclusion.

4. Documents to support contacts made with CONNDOT requesting assistance in satisfying the contract specified or adjusted "Small Contractor" dollar requirements.

5. Document other special efforts undertaken by the Contractor to meet the defined goal.

E. Failure of the Contractor to have at least the specified dollar amount of this contract performed by "Small Contractor" as required in Section IIA of this "Special Provision" will result in the reduction in contract payment to the Contractor by an amount equivalent to that determined by subtracting from the specific dollar amount required in Section IIA, the dollar payments for the work actually performed by each "Small Contractor". The deficiency in "Small Contractor" achievement, will therefore, be deducted from the final contract payment. However, in instances where the Contractor can adequately document or substantiate its good faith efforts made to meet the specified or adjusted dollar amount to the satisfaction of CONNDOT, no reduction in payments will be imposed.

F. All records must be retained for a period of three (3) years following completion of the contract and shall be available at reasonable times and places for inspection by authorized representatives of CONNDOT.

G. 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.

II. **SPECIFIC REQUIREMENTS**

In order to increase the participation of "Small Contractors", CONNDOT requires the following:

A. Not less than **25** (%) percent of the **final** value of this Contract shall be subcontracted to and performed by, and/or supplied by, manufactured by and paid to "Small Contractors" and/or "Small Contractors Minority Business Enterprises".

If the above percentage is zero (0%) AND an asterisk (*) has been entered in the adjacent brackets [ ], this Contract is 100% solely set-aside for participation by "Small Contractors" and/or "Small Contractors Minority Business Enterprises".

B. The Contractor shall assure that each "Small Contractor" will have an equitable opportunity to compete under this "Special Provision", particularly by arranging solicitations, time for the preparation of Quotes, Scope of Work, and Delivery Schedules so as to facilitate the participation of each "Small Contractor".

C. The Contractor shall provide to CONNDOT's Manager of Contracts within Seven (7) days after the bid opening the following items:

1. An affidavit (Exhibit I) completed by each named "Small Contractor" subcontractor listing a description of the work and indicating the dollar amount of all contract(s) and/or subcontract(s) that have been awarded to him/her for the current State Fiscal Year (July 1 - June 30) does not exceed the Fiscal Year limit of $10,000,000.00.

2. A certification of work to be subcontracted (Exhibit II) signed by both the Contractor and the "Small Contractor" listing the work items and the dollar value of the items that the nominated "Small Contractor" is to perform on the project to achieve the minimum percentage indicated in Section IIA above.

3. A certification of past experience (Exhibit III) indicating the scope of work the nominated "Small Contractor" has performed on all projects, public and private, for the past two (2) years.

4. In instances where a change from the originally approved named "Small Contractor" (see Section IB) is proposed, the Contractor is required to submit, in a reasonable and expeditious manner, a revised submission, comprised of the documentation required in Section IIC, Paragraphs 1, 2 and 3 and Section E together with documentation to substantiate and

justify the change, (i.e., documentation to provide a basis for the change) to CONNDOT's Manager of Construction Operations for its review and approval prior to the implementation of the change. The Contractor must demonstrate that the originally named "Small Contractor" is unable to perform in conformity to specifications, or 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 contract with another "Small Contractor" is not a valid basis for change. Documentation shall include a letter of release from the originally named "Small Contractor" indicating the reason(s) for the release.

D. After the Contractor signs the Contract, the Contractor will be required to meet with CONNDOT's Manager of Construction Operations or his/her designee to review the following:

1. What is expected with respect to the "Small Contractor" set aside requirements.

2. Failure to comply with and meet the requirement can and will result in monetary deductions from payment.

3. Each quarter after the start of the "Small Contractor" the Contractor shall submit a report to CONNDOT's Manager of Construction Operations indicating the work done by, and the dollars paid to each "Small Contractor" to date.

4. What is required when a request to sublet to a "Small Contractor" is submitted.

E. The Contractor shall submit to CONNDOT's Manager of Construction Operations all requests for subcontractor approvals on standard forms provided by the Department.

If the request for approval is for a "Small Contractor" subcontractor for the purpose of meeting the contract required "Small Contractor" percentage stipulated in Section IIA, a copy of the legal contract between the Contractor and the "Small Contractor" subcontractor must also be submitted at the same time. Any subsequent amendments or modifications of the contract between the Contractor and the "Small Contractor" subcontractor must also be submitted to CONNDOT's 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 both parties.

In addition, the following documents are to be attached:

(1) A statement explaining any method or arrangement for renting equipment. If rental is from a Contractor, a copy of Rental Agreement must be submitted.

(2) A statement addressing any special arrangements for manpower.

(3) A statement addressing who will purchase material.

F. Contractors subcontracting with a "Small Contractor" to perform work or services as required by this "Special Provision" shall not terminate such firms without advising CONNDOT, in writing, and providing adequate documentation to substantiate the reasons for termination if the designated "Small Contractor" firm has not started or completed the work or the services for which it has been contracted to perform.

G. Material Suppliers or Manufacturers

If the Contractor elects to utilize a "Small Contractor" supplier or manufacturer to satisfy a portion or all of the specified dollar requirements, the Contractor must provide the Department with:

1. An executed Affidavit Small Contractor (Set-Aside) Connecticut Department of Transportation Affidavit Supplier or Manufacturer (sample attached), and

2. Substantiation of payments made to the supplier or manufacturer for materials used on the project.

Brokers and packagers shall not be regarded as material Suppliers or manufacturer.

H. Non-Manufacturing or Non-Supplier "Small Contractor" Credit

Contractors may count towards its "Small Contractor" goals the following expenditures with "Small Contractor" firms 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, material or supplies necessary for the performance of the contract provided that the fee or commission is determined by the Department of Transportation 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 not also the manufacturer of or a regular dealer in the materials and supplies, provided that the fee is determined by the Department of Transportation to be reasonable and not excessive as compared with fees customarily allowed for similar services.

3. The fees or commissions charged for providing any bonds or insurance specifically required for the performance of the Contract, provided that the fee or commission is determined by the Department of Transportation to be reasonable and not excessive as compared with fees customarily allowed for similar services.

III. **BROKERING**

For the purpose of this "Special Provision", a "Broker" is one who acts as an agent for others in negotiating contracts, purchases, sales, etc., in return for a fee or commission. Brokering of work by a "Small Contractor" is not allowed and is a contract violation.

IV. **PRE-AWARD WAIVERS:**

If the Contractor's submission of the "Small Contractor" listing, as required by Section IIC indicates that it is unable, by subcontracting to obtain commitments which at least equal the amount required by Section IIA, it may request, in writing, a waiver of up to 50% of the amount required by Section IIA. To obtain such a waiver, the Contractor must submit a completed "Application for Waiver of Small Contractor Minority Business Enterprise Goals" to CONNDOT's Manager of Contracts which must also contain the following documentation:

1. Information described in Section ID.

2. For each "Small Contractor" contacted but unavailable, a statement from each "Small Contractor" confirming its unavailability.

Upon receipt of the submission requesting a waiver, the CONNDOT's Manager of Contracts shall submit the documentation to the Director of the Office of Contract Compliance who shall review it for completeness. After completion of the Director of Contract Compliance's review, she/he should write a narrative of his/her findings of the application for a waiver, which is to include his/her recommendation. The Director of Contract Compliance shall submit the written narrative to the Chairperson of the DBE Screening Committee at least five (5) working days before the scheduled meeting. The Contractor shall be invited to attend the meeting and present his/her position. The DBE Screening Committee shall render a decision on the waiver request within five (5)

working days after the meeting. The DBE Screening Committee's decision shall be final. Waiver applications are available from the CONNDOT Manager of Contracts.

EXHIBIT I Mar. 01

SMALL CONTRACTOR/*MINORITY BUSINESS ENTERPRISE
(* Delete if not Applicable)
SET-ASIDE PROGRAM
(QUALIFICATION AFFIDAVIT)

PROJECT(s) _____
(INCLUDING TOWN & DESCRIPTION)

STATE OF _____CONNECTICUT_____

COUNTY OF_____

I_____,ACTING IN BEHALF
NAME OF PARTY SIGNING AFFIDAVIT
OF_____,DO HEREBY CERTIFY
PERSON FIRM OR ORGANIZATION
AND AFFIRM THAT THE INFORMATION SET FORTH BELOW IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE. AS OF THIS DATE_____THE LIST OF SMALL CONTRACTOR SET-ASIDE PROGRAM - CONTRACTS AND/OR SUBCONTRACTS AWARDED DURING THE CURRENT FISCAL YEAR (JULY 1 - JUNE 30) 20_____ IS AS FOLLOWS:

Col. 1 TOWN AND PROJECT NUMBER	Col. 2 STATE AGENCY WHICH AWARDED CONTRACT	Col. 3 CONTRACT AMOUNT AWARDED UNDER THIS PROGRAM	Col. 4 AMOUNT OF WORK SUBCONTRACTED FROM OTHER FIRMS UNDER THIS PROGRAM	Col. 5 TOTAL AMOUNT OF ALL WORK UNDER THIS PROGRAM Col. 3 Plus Col. 4
	TOTALS	$	$	$

_____
NAME OF PERSON, FIRM OR ORGANIZATION

(FIRM SEAL)

_____
SIGNATURE & TITLE OF OFFICIAL

SWORN TO AND SUBSCRIBED BEFORE ME BY_____

WHO IS PERSONALLY KNOWN TO ME, THIS_____DAY OF_____, 20_____

_____
(NOTARY PUBLIC)

MY COMMISSION EXPIRES_____SEAL

PLEASE NOTE THAT ALL THE WORK AWARDED OR SUBCONTRACTED TO YOUR FIRM UNDER THE SET-ASIDE PROGRAM IN A FISCAL YEAR (JULY 1-JUNE 30) INCLUDING THIS PROJECT, CANNOT BE MORE THAN $10,000,000.00

Mar.01

EXHIBIT II

CERTIFICATION OF WORK TO BE SUBCONTRACTED
NOMINATED SMALL CONTRACTOR/*MINORITY BUSINESS ENTERPRISE

* Delete if not applicable

DEPARTMENT OF TRANSPORTATION
CONTRACT DIVISION
2800 BERLIN TURNPIKE
NEWINGTON, CT 06111

PLEASE INCLUDE A COPY OF CERTIFICATION LETTER

CONTRACTOR_____

ADDRESS_____

TOWN_____PROJECT NO._____

DESCRIPTION OF PROJECT_____

_____

CONTRACT BID AMOUNT $_____

DATE_____

Listed below is the Nominated Small Contractor/Minority Business Enterprise for the above project and the requested data:

Name, Address & Tel No. of the Nominated Firm	ITEM(s)NUMBER(s) and Description of the Item(s) to be performed by and paid to the Subcontractor	Quantities (indicate if partial)	Prime's Bid Amount For Item	Dollar Amount Subcontracted	Small Business Set-Aside Dollar Requirement

Signed By _____
Small Contractor/*Minority Business Enterprise
(Subcontractor)

Signed By_____
Contractor

Title_____

EXHIBIT III

Mar.01

CERTIFICATION
PAST CONSTRUCTION EXPERIENCE

SMALL CONTRACTOR / * MINORITY BUSINESS ENTERPRISES

* Delete if not applicable

PLEASE LIST ALL CONSTRUCTION PROJECTS YOUR ORGANIZATION HAS WORKED ON IN THE PAST TWO FISCAL YEARS

PROJECT LOCATION NUMBER AND DESCRIPTION APPLICABLE	CONTRACT AMOUNT	IF WORK PERFORMED AS PRIME GIVE OWNERS NAME IF WORK PERFORMED AS SUBCONTRACTOR GIVE CONTRACTORS NAME	START DATE	ACTUAL OR ESTIMATED COMPLETION DATE	NAME AND PHONE OF OWNER OR PRIME CONTRACTOR AS

SIGNED BY: _____

SMALL BUSINESS CONTRACTOR
*MINORITY BUSINESS ENTERPRISES

D.O.T. PROJECT NO. _____

* Delete if not applicable

MARCH, 2001

SMALL CONTRACTOR/SMALL CONTRACTOR MINORITY BUSINESS ENTERPRISE (MBE) (SET-ASIDE) CONNECTICUT DEPARTMENT OF TRANSPORTATION AFFIDAVIT – SUPPLIER OR MANUFACTURER

This affidavit must be completed by the State Contractor's designated Small Contractor/ Small Contractor Minority Business Enterprise (MBE), notarized and attached to the contractor's request to utilize a Small Contractor/Small Contractor Minority Business Enterprise (MBE) supplier or manufacturer as a credit towards its Small Contractor/Small Contractor Minority Business Enterprise (MBE) contract requirement; failure to do so will result in not receiving credit towards the contract Small Contractor/Small Contractor Minority Business Enterprise (MBE) requirement.

State Project No. _____
Federal Aid Project No. _____
Description of Project _____

I, _____, acting in behalf of _____
(Name of person signing Affidavit) (Small Contractor/Small Contractor MBE contractor person,
_____ of which I am the_____ affirm that _____
firm, association or certify and corporation) (Title of Person) (Small
_____is a certified Small Contractor/Small
Contractor/Small Contractor MBE person, firm, association or corporation)
Contractor Minority Business Enterprise, as defined by Section 4a-60g of the Connecticut General Statutes, as revised.

I further certify and affirm that _____
(Small Contractor/Small Contractor MBE person, firm, association or corporation)
will assume the actual and contractual responsibility for the provision of the materials and/or supplies sought by _____. If a manufacturer, I produce goods from raw
(State Contractor)
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 at Law (Sec. 53a-157, CGS, as revised).

_____
(Name of Small Contractor/Small Contractor MBE person, firm, association or corporation)

_____
(Signature and Title of Official making the Affidavit)

Subscribed and sworn to before me, the _____ day of _____ 200____.

_____
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)

(Corporate Seal)

ITEM #0000172A - ROADWAY DEICING SYSTEM

Description:

Under this item, the Contractor shall selectively demolish the existing calcium chloride storage and dispensing system and construct calcium chloride storage and dispensing system as shown on the plans and described herein.

The Owner will provide the following materials to the Contractor on the Project Site to incorporate into the work:

1. Tank support structure consisting of metal beam rail and stone.
2. Pumps, pipe, pipe fittings, and related accessories noted on the plans as "existing."

The Contractor shall submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS:

1. Product Data: For each type of product indicated. Include rated capacities of selected model clearly indicated, and installation and start-up instructions.
2. Shop Drawings: Include wiring diagrams that detail wiring for power, signal, and control systems and differentiate between portions of wiring that are factory-installed and portions to be field-installed.

Materials:

Aboveground Tank: Double-wall, 5,000 gallon primary capacity, for the storage of calcium chloride solution at atmospheric pressure.

Basis of Design: 5,000 Gallon Captor Containment System as manufactured by Snyder Industries, Inc. (www.snydernet.com), or an approved equal. Tank shall be:

1. Design: Industrial, upright, double wall, flat bottom storage tank assembly designed for above-ground, vertical installation, capable of containing calcium chloride solution at atmospheric pressure, specific gravity of 1.5.
2. Material: Linear high density polyethylene, containing a minimum U.V. 8 stabilizer for long-term outdoor service.
3. Construction: Each tank molded, one-piece seamless. Minimum of 3 lifting lugs integrally molded into the top head.
4. Fittings: Minimum (3) three 2" threaded bulkhead fittings, located above liquid level, constructed of polypropylene with minimum ¼" thickness gaskets made of 40-50 durometer EPDM or 60-70 durometer Viton.
5. Tank Accessories:

a. Bolted Sealed Top Manway: 24 in., constructed of polyethylene with polypropylene bolts and closed cell, polyethylene foam and Viton materials.
b. U-Vent: PVC u-vent with screen, complying with OSHA 1910.106(F)(iii)(2)(IV)(9) normal venting for atmospheric tanks.
c. Internal Down Pipes: (2) 2" Schedule 80 PVC down pipes, supported as per manufacturer's recommendations.

6. Pipe Support Bridge/Pipe Hangers:
   a. Structure for Pipe Bridge: 1-5/8", 12 gauge strut channel supports with standard fittings and fasteners as manufactured by Unistrut or an approved equal.
   b. Pipe hangers: MSS SP-58, Type 1 or Type 12 for horizontal piping and Type 4, Type 12, or Type 24 for vertical piping, with factory fabricated components and galvanized metallic coating. Include continuous-thread rod, nuts, and washers where required.

7. Level Indicator System: Basis of Design: DST-2000 Series Ultrasonic Sensor with Model DCR-1006 Ultrasonic Controller as manufactured by Automation Products Group, Inc., or an approved equal.

   a. Sensor: Ultrasonic, programmable, designed for tank level applications.

      1) Application: Wet corrosive.
      2) Operating range: 1 to 25 ft.
      3) Accuracy: 0.25% of detected range.
      4) Transducer Type: PVDF-faced ceramic.
      5) Temperature Compensation: Required.
      6) Output: Direct to controller.
      7) Housing: Polycarbonate/PET blend
      8) Operating Temperature: -40 to 140 degrees F.
      9) Mounting: 2 in. NPT.
      10) Cable: Two conductor shielded standard RG-6 coaxial, length as required for attachment to controller located in vendor fill box.
      11) Ratings: NEMA 4X.
      12) Certifications: CSA C/US Class 1, Div. 2.

   b. Controller: For remote-mount ultrasonic level sensor. Shall be programmed to display volume (in gallons) of fluid remaining in storage tank.

      1) Input: DST sensor.
      2) Output: 4-20mA.
      3) Response Time: Programmable.
      4) Resolution: 0.1 in.
      5) Display: Four character LCD.
      6) Adjustment: Programmable keypad.
      7) Supply Voltage: 240VAC.
      8) Housing: Polycarbonate.
      9) Operating Temperature: -22 to 140 degrees F.

10) Size: 6.3 in. wide, 3.15 in. tall.
11) Ratings: NEMA 4X.

Pipes, Tubes, and Fittings:

Single Wall Pipe and Fittings: PVC pipe, UV resistant, Schedule 80, ASTM D1785 with threaded ends and fittings.

Cam and Lever Couplers: Basis of Design: Cam & Groove Series Fittings as manufactured by BANJO Corporation (www.banjocorp.com), or an approved equal. Cam and Lever Couplers shall be:

1. Interchangeable with all types of cam and lever couplers
2. Body Material: Polypropylene with glass filled fiberglass
3. Cam Levers: Stainless steel.
4. Pins: Stainless steel.
5. Gaskets: EPDM

Flex Hose: Reuse existing.

Valves:

Ball Valves Smaller Than 2": Basis of Design: WV Series Spin Weld Ball Valve as manufactured by BANJO Corporation (www.banjocorp.com), or an approved equal. Ball valves shall be:

1. Maximum operating pressure: 150 psig at 70 deg F.
2. Body Design: Two piece.
3. Body Material: Polypropylene.
4. Ends: Threaded.
5. Seats: PTFE or TFE.
6. Hardware: Stainless steel.
7. Port: Full.

Ball Valves 2" and Larger: Basis of Design: VS Series Stubby Valve as manufactured by BANJO Corporation (www.banjocorp.com), or an approved equal. Ball valves shall be:

1. Maximum operating pressure: 100 psig at 70 deg F.
2. Body Design: Two piece.
3. Body Material: Polypropylene.
4. Ends: Threaded.
5. Seals: PTFE or TFE.
6. Hardware: Stainless steel.
7. Port: Full.

Solenoid Valve: Basis of Design: Series PS as manufactured by Plast-O-Matic Valves, Inc. (www.plastomatic.com), or an approved equal. Solenoid valve shall be:

1. Maximum operating pressure: 140 psig.
2. Design: Normally closed, in-line with bubble-tight shut-off.
3. Solenoid: W11, continuous duty, NEMA 4X.
4. Body Design: Full port.
5. Body Material: Natural polypropylene.
6. Ends: Threaded.
7. Seals: FKM or EPDM.
8. 240-V AC, 60 Hz
9. 2- 0.75 Amp slow blow fuses in NEMA 4X enclosure

Antisiphon Valve: Basis of Design: Spring-Loaded Y Check Valve as manufactured by HAYWARD Flow Control Systems (www.haywardflowcontrol.com), or an approved equal. Antisiphon valve shall be:

1. Maximum operating pressure: 150 psig.
2. Body Material: PVC or Polypropylene.
3. Spring: 2-15 psig hand adjustable opening pressure, stainless steel, with lock ring.
4. Seals: FPM or EPDM double seal design.
5. Ends: Threaded

Check Valves: Basis of Design: MCV Series Poly Check Valve as manufactured by BANJO Corporation (www.banjocorp.com), or an approved equal. Check valves shall be:

1. Maximum operating pressure: 150 psig.
2. Body Design: One piece.
3. Body Material: Glass reinforced polypropylene.
4. Spring: 1-2 psig, stainless steel.
5. Ends: Threaded adapter.
6. Gasket: EPDM.
7. Port: Full.

Three-Way Valves: Basis of Design: V Series 3-Way Poly Ball Valve as manufactured by BANJO Corporation (www.banjocorp.com), or an approved equal. Three-way valves shall be:

1. Maximum operating pressure: 100 psig.
2. Body Material: Glass reinforced polypropylene.
3. Ends: Threaded.
4. Seals: PTFE or FKM.
5. Hardware: Stainless steel.

Dry Disconnect Valves: Basis of design: DM Series Dry Mate as manufactured by BANJO Corporation (www.banjocorp.com), or an approved equal. Dry disconnect valves shall be:

1. Maximum operating pressure: 100 psig.
2. Design: Male and female halves with interlocking handles that cannot be uncoupled in open position.

Identification for Piping and Equipment:

Equipment Labels, Warning Signs and Labels:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.
2. Letter Color: White
3. Background Color: Blue
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
9. Label Content: Include equipment's Plan designation or unique equipment number for equipment labels. Include caution and warning information, plus emergency notification instructions for warning signs and labels.

Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

1. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
2. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
3. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Plans, pipe size, and an arrow indicating flow direction.
4. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
5. Lettering Size: At least 1-1/2 inches high

Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass wire-link or beaded chain; or S-hook.
3. Valve Schedules: For piping system, on 8-1/2-by-11-inch (A4) bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

    a. Valve-tag schedule shall be included in operation and maintenance manual and shall be framed and mounted on the wall in the Mechanical Room at a location determined by the Engineer.

Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.

1. Size: 3 by 5-1/4 inches minimum.
2. Fasteners: Brass grommet and wire.
3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Yellow background with black lettering.

Sleeves and Sleeve Seals for Piping:

Sleeves: Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.

Sleeve-Seal Systems: Basis of Design: MetraSeal Pipe Penetration Seal as manufactured by The Metraflex Company (www.metraflex.com), or an approved equal. Sleeve-Seal Systems shall be:

1. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
2. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Plastic.
4. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating of length required to secure pressure plates to sealing elements.

Miscellaneous Materials:

Pump Control Switch: Basis of Design: Momentary Contact 1262 as manufactured by Leviton, or an approved equal. Pump control switch shall be industrial grade momentary contact toggle switch rated for 30A with center-off position. Switch shall be silver alloy with wire terminals capable of receiving and holding proper wire size as indicated on the plans.

Weatherproof Wall Plate: Basis of design HBL1795 as manufactured by Hubbell Wiring Device-Kellems, or an approved equal. Wall pate shall be gasketed and shall have self closing hinged cover. Wall plate shall be suitable for corrosive conditions, for use with all AC toggle switches.

Weatherproof Electrical Box: Basis of design: B112HB as manufactured by Carlon, or an approved equal. Electrical box shall be suitable for corrosive conditions, single gang for use with standard switches.

Calcium Chloride motor receptacle: 250 volt, single phase, 30 amperes, two pole, three wire, grounding type NEMA Configuration L6-30R. Rated for 3HP.

Conduit: As indicated on the Plans. Minimum raceway size shall be 3/4-inch trade size. All conduit installed for the system shall be PVC Schedule 80 conduit unless otherwise indicated. NEMA TC2, Type EPC-80-PVC, UL 651, with matching fittings by same manufacturer as the conduit, complying with NEMA TC 3 and UL 514B. Liquidtight flexible metal conduit shall be provided from the calcium chloride motor to the junction box and from junction box to interior surface mounted switch and light fixture. LFMC: Liquid flexible steel conduit with PVC jacket.

Pull and Junction Boxes: Junction boxes shall be PVC inside the building. Exterior mounted enclosures shall be rated NEMA 4X. Boxes and fittings shall comply with the applicable provisions of NFPA 70, Article 314.

Hangers and Supports for Electrical Systems: Install conduit clamps within 3’ of boxes and at 10’ maximum distance between junction points. Hardware installed in corrosive areas shall be stainless steel. For areas inside use supports compatible with PVC Schedule 80 conduit. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4. Channel Dimensions: Selected for applicable load criteria. Raceway and Cable Supports: As described in NECA 1 and NECA 101. Conduit and Cable Support Devices: Hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following: Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used. Concrete Inserts: Stainless Steel.

Conductors: The general requirements for conductors and their type designations, insulations and markings, mechanical strengths, ampacity ratings and uses shall conform to the standards set in the National Electrical Code (NEC) Article 310. Grounding conductor shall be annealed concentric stranded, copper cable sized in accordance to ASTM 8 and Article 250 of the NEC. Conductors shall be copper, insulated, 600 Volt, unless otherwise noted. Wire size No.8 and smaller shall be type THHN-THWN, unless otherwise noted or shown; wire size No. 6 AWG and larger shall be type THWN or XHHW. Conductors shall be installed in concealed metal raceway. Conductors shall be insulated and shall be color coded 240/120 Volt

Phase A Black
Phase B Red
Neutral White
Ground Green

Miscellaneous Materials:

Valve Boxes: Surface-mounted, heavy gauge stainless steel and a standard solid door and pull handle for access without a key, as manufactured by Larsen's Mfg. (www.larsensmfg.com), or an approved equal.

Signs – Sequence of Operation Signs. Cast (not extruded or continuous cast) methyl methacrylate monomer plastic sheet, in sizes and thickness indicated, with a minimum flexural strength of 16,000 psi when tested according to ASTM D 790, with a minimum allowable continuous service temperature of 176 deg F and of the following general types:

1. Opaque Sheet: Provide plaque signs that are manufactured from 1/8" thick laminated engraving stock.
2. Engraved Copy: Engraved copy characters through the first background layer to expose the contrasting color of the inner core of the engraving stock.

    a. Panel Size: As required, with maximum size fitting on inside of valve box door.
    b. Engraving Stock Thickness: 1/8-inch minimum.
    c. Engraved Letter proportion: Letters and Numbers on signs shall have a width-to-height ratio between 3:5 and 1:1 and a stroke-width-to-height ratio between 1:5 and 1:10.
    d. Engraved Letter Size: Characters shall be 5/8 inch high.
    e. Background or first layer of engraving stock: Black
    f. Inner core of engraving stock: White
    g. Engraved letter style: Helvetica Medium with all upper case letters.
    h. Mounting Methods: As indicated in the Installation section of Construction Methods.

Miscellaneous materials and fasteners as required to complete the work shown on the plans and described herein.

Filling of Calcium Chloride Tank: The Department will fill the Calcium Chloride Tank. The Contractor shall provide to the Engineer 7 calendar days notice of its need to have the tank filled for testing purposes.

1. Ownership of all product within the tank will remain with the Department.
2. Liability related to tank/piping system/pump failures or leaks of product shall remain with the Contractor until the system is accepted by the Engineer. In the event of a leak, the Contractor is responsible for all costs related to the environmental cleanup, system repairs, as well as reimbursement of the product costs to the Department.

Construction Methods:

Selective Demolition: The Contractor shall disassemble the existing calcium chloride storage and dispensing system as shown on the plans and described herein. Materials, such as the 5,000 gallon storage tank, noted to be salvaged shall be turned over to the state.

The state will empty the existing storage tank upon request to do so by the Engineer. The Contractor shall notify the Engineer a minimum of 7 calendar days in advance of the need to empty the tank.

Installation: The Contractor shall install the calcium chloride storage and dispensing system where shown on the plans, described herein, as required by manufacturer installation instructions, and as directed by the Engineer.

The Contractor shall (1) use equipment of adequate size to lift and set the tank and containment structure without dragging or dropping them; and (2) advise the Engineer of any shipping or handling damage to the containment structure encountered.

The contractor shall relocate existing calcium chloride pump control switch and indicator light. Electrical components shall be salvaged or as directed by the Engineer. The solenoid valve shall be provided with electrical connection to the existing pump such that pressing and holding the pump control switch will provide necessary power to energize the solenoid valve and then the calcium chloride pump motor, ensuring that the solenoid valve is energized before the pump can operate. The contractor shall install all junction boxes, conductors, and miscellaneous components necessary to control the circuitry of the solenoid valve. The contractor shall install the calcium chloride pump control switch 48” AFG from the center of the switch at the location indicated on the plans.

Installation of Pipe Support Bridge/Pipe Hangers: Install pipe support as depicted on the Plans. Attach pipe support to Calcium Chloride storage tank per tank manufacturer’s recommendations. Attach pipe support to maintenance facility exterior wall with mechanical-expansion anchors. Comply with MSS SP-69 for pipe hanger installation.

Installation of Identification for Piping and Equipment:

1. Preparation: Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.
2. Equipment Label Installation: Install or permanently fasten labels on each major item of mechanical equipment and on each minor item of mechanical equipment as directed by the Engineer. Locate equipment labels where accessible and visible.
3. Pipe Label Installation: Color schedule shall be in accordance with ASME A13.1. Locate pipe labels as follows:

    a. Near each valve and control device.
    b. Near each branch connection, excluding short takeoffs. Where flow pattern is not obvious, mark each pipe at branch.
    c. Near penetrations through walls and inaccessible enclosures.
    d. Near major equipment items and other points of origination and termination.
    e. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.

4. Valve-Tag Installation: Install tags on valves and control devices in piping systems as directed by the Engineer, except check valves; valves within factory-fabricated equipment units; shutoff valves; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
5. Warning-Tag Installation: Write required message on, and attach warning tags to, equipment and other items where required.

Installation of Sleeves and Sleeve Seals: Install sleeves and sleeve seals for piping passing through walls. Select sleeves of size large enough to provide 1-inch annular clear space between piping and walls. Cut sleeves to length for mounting flush with both surfaces. Using grout, seal the space outside sleeves. Refer to CSI Division 03 Section 033000, “Cast in Place Concrete” for non-shrink grout. For sleeve seal, select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

Installation of Tank Level Indicator System: Sensor shall be located and installed in tank per sensor and tank manufacturer’s written instructions. Provide access for maintenance of sensor. Controller shall be mounted below plow truck fill valve box as shown on Contract Plan C-005.

Installation of Sequence of Operation Signs: Signs located on valve boxes shall be permanently adhered to the valve box as indicated, unless otherwise directed by the Engineer. Signs located on facility walls shall be permanently anchored with stainless steel fasteners. Signs located on valve handles shell be permanently adhered using manufacturer’s recommendations.

Calcium chloride dispensing system diagram with valve operation sign shall be located on the facility wall, near pump in an easily visible location. Sign shall be approximately 24”W x 20”H.

Refer to Dispensing System Diagram with Valve Operation Sign image at the end of this Item for information to be included on this sign.

Tank recirculation sequence of operation sign shall be located on the facility exterior wall, adjacent to the Plow Truck Fill valve box and include the following information:

TANK RECIRCULATION

1. Verify that dry disconnect valve in Plow Truck Fill valve box and ball valve in Vendor Fill valve box are in the closed position.

2. Set Valve #3 located inside salt shed to tank recirculation position.

3. Open Plow Truck Fill Valve Box.

4. Press and hold pump control switch located next to the valve box to operate pump. Release pump control switch when finished.

5. Close Plow Truck Fill Valve Box. Reset Valve #3 to tank dispense position.

Each respective valve box shall have a sign mounted to, and centered on, the front of the door, and include the following information:

VENDOR FILL

1. Attach vendor fill hose to cam lock fitting in valve box.

2. Open ball valve located in valve box.

3. Fill Calcium Chloride Tank.

4. Close ball valve located in valve box.

5. Remove vendor fill hose, close valve box.

PLOW TRUCK FILL

1. Attach female end of dry disconnect valve on flex hose to male end located inside valve box with both ends in closed position.

2. Attach required cam lock fitting to truck headboard or hanging tailgate Calcium Chloride tank.

3. Open both male and female ends of dry disconnect valve located in valve box and on flex hose

4. Open ball valve located on flex hose.

5. Press and hold pump control switch located next to the valve box to operate pump. Release pump control switch when finished.

6. Close valves and detach hose in reverse order. Close valve box.

PLOW TRUCK OFFLOAD

1. Refer to instructions located near pump for required interior valve positions.

2. Attach female end of dry disconnect valve on flex hose to male end located inside valve box with both ends in closed position.

3. Attach required cam lock fitting to truck headboard or hanging tailgate Calcium Chloride tank.

4. Open both male and female ends of dry disconnect valve located in valve box and on flex hose.

5. Open ball valve located on flex hose.

6. Press and hold pump control switch located in valve box to operate pump. Release pump control switch when finished.

7. Close valves and detach hose in reverse order. Close valve box.

Emergency shutoff valves shall have a sign located adjacently, on the facility wall, indicating “EMERGENCY SHUTOFF VALVES”. Sign shall be approximately 12”W x 12”H.

Valves #1, #2, and #3 shall have signs adhered directly and permanently to each handle, indicating “VALVE #1”, “VALVE #2”, or “VALVE #3”, respectively. Valve signs shall be

sized to fit on the valve handle. Valve #1 is the ball valve located near the pump inlet downstream of the calcium chloride tank. Valve #2 is the ball valve located near the pump inlet downstream of the plow truck offload valve box. Valve #3 is the three-way valve located downstream of the pump outlet.

Tests and Inspections:

Tanks: Minimum compressed-air test pressures for storage tanks: Isolate product piping from the tanks during testing. Minimum 3 psig and maximum 5 psig. Maintain the test pressure for one hour.

Piping: Minimum pneumatic test-pressures measured at highest point in system. Soap pipe fittings. Minimum 1.5 times the designed working pressure but not less than 5 psig for minimum 2 hours. Isolate storage tanks if test pressure in piping will cause pressure in storage tanks to exceed 10 psig.

Dispensing System: The Contractor shall provide to the Engineer 7 calendar days notice of its need to perform a system operational test. Methodically verify proper connection and integrity of each element of dispensing system before and during system operation test. Check for fluid leaks. Adjust antisiphon valve as per manufacturer's written instructions. Fill one of each type (Headboard and Hanging) of truck mounted calcium chloride tank. Empty each type of truck mounted calcium chloride tank back into the 5000 gallon storage tank and verify pump regains prime. Replace damaged or malfunctioning equipment and make any repairs required, and retest as specified above.

Conductor Tests: On installation of wires and cables and before electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

1. Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

2. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.
    a. Check for electrical continuity of circuits and for short circuits.
    b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
3. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.
    a. Verify grounding connections.

Method of Measurement:

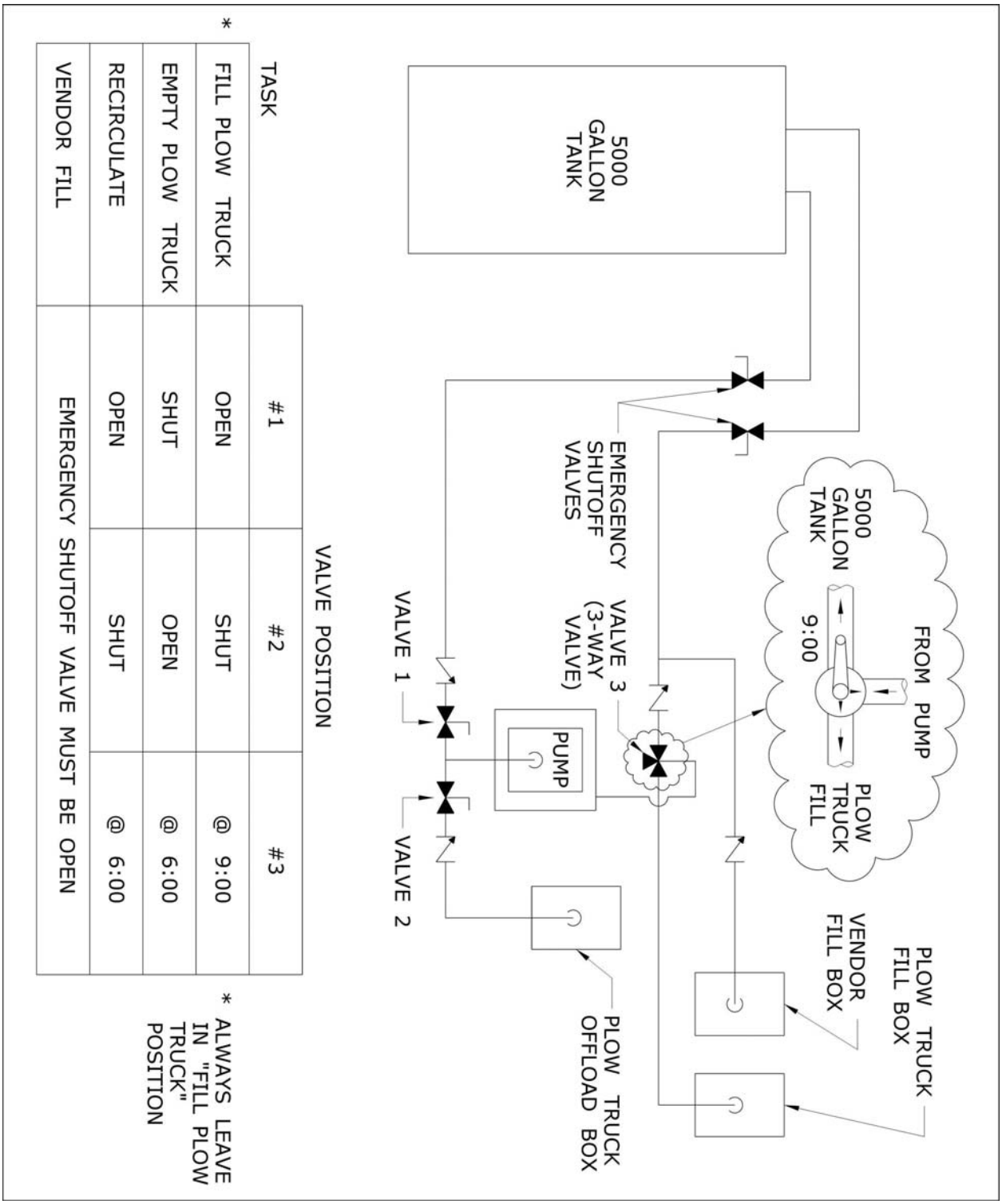
This item will be paid for at the contract lump sum price for "Roadway Deicing System" complete.

Basis of Payment:

This item will be paid for at the contract lump sum price for "Roadway Deicing System," which price shall include all administrative and procedural requirements, material, equipment, labor, and work incidental thereto.

PAY ITEM	PAY UNIT
Roadway Deicing System	LS

Dispensing System Diagram with Valve Operation Sign:



TASK	VALVE POSITION		
*	#1	#2	#3
FILL PLOW TRUCK	OPEN	SHUT	@ 9:00
EMPTY PLOW TRUCK	SHUT	OPEN	@ 6:00
RECIRCULATE	OPEN	SHUT	@ 6:00
VENDOR FILL	EMERGENCY SHUTOFF VALVE MUST BE OPEN		

* ALWAYS LEAVE IN "FILL PLOW TRUCK" POSITION

ITEM #0020801A - ASBESTOS ABATEMENT

Description:

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

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

The asbestos abatement work shall include the removal and disposal of all ACM as identified on the Contract Plans and Specifications prior to the planned renovation/demolition project.

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

The Contractor may elect to utilize an Alternative Work Practice (AWP), if approved by the CTDPH and the Engineer prior to the initiation of the abatement activities. An AWP is a variance from certain CTDPH asbestos regulatory requirements, which must provide the equivalent or a greater measure of asbestos emission control than the standard work practices prescribed by the CTDPH.

Materials:

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

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

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

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

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

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

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

Mechanical mastic removal equipment shall be suitable for the application and shall be operated in a manner which prevents damage to the underlying floor. Sanders, grinders, wire brushes and needle-gun type removal equipment shall be equipped with a High Efficiency Particulate Air (HEPA) filtered vacuum dust collection system.

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

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

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

Glovebag assembly shall be manufactured of six (6) mil transparent polyethylene or PVC with two (2) inward projecting long sleeve gloves, an internal pouch for tools, and an attached labeled receptacle for waste.

Mastic removal chemicals shall be low odor and non-citrus based, with a flash point in excess of 140° F.

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

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

Construction Methods:

(1) Pre-Abatement Submittals and Notices

(a) The Contractor shall submit, in accordance with CTDPH Standard 19a-332a-3, proper notification using the prescribed form, to the Commissioner, State of Connecticut, Department of Public Health not fewer than ten (10) days prior to the commencement of work as follows:

1. Asbestos abatement projects involving greater than ten (10) linear feet (LF) or twenty-five (25) square feet (SF) of ACM (friable or non-friable) within a facility (i.e. interior abatement) and/or greater than 10 LF or 25 SF of friable ACM outside a facility, require an Asbestos Abatement Notification.

2. At sites scheduled for demolition, asbestos abatement of exterior non-friable ACM or interior abatement involving less than 10 LF or 25 SF of ACM (friable or non-friable), and/or exterior abatement involving less than 10 LF or 25 SF of friable ACM require a Demolition Notification. In most cases, the Demolition Contractor is responsible for filing the Demolition Notification not fewer than ten (10) days prior to the commencement of demolition. However, if a portion of the demolition activities are scheduled to be conducted in conjunction with and/or under the supervision of an Asbestos Abatement Contractor (i.e. in the event of a structure which has been condemned, structurally damaged, and/or deemed unsafe for asbestos abatement activities); then it is the responsibility of the Asbestos Abatement Contractor to submit the Demolition Notification.

3. In the event that an Asbestos Abatement Notification has been submitted and the subject facility is scheduled for demolition, a separate Demolition Notification form does not need to be submitted. In such cases, the submission of the Asbestos Abatement Notification form shall be deemed as satisfying the requirement for the notification of the demolition of the facility.

4. The Contractor filing the proper notification is responsible for all associated fees.

5. If the Contractor intends to dispose of ACM waste within the State of Connecticut, a copy of the Asbestos Abatement/Demolition Notification must also be submitted to the Department of Environmental Protection, Solid Waste Management Unit, and the Contractor must obtain a CTDEP Special Waste Disposal authorization.

(b) Any AWP specifically described in these Specifications is pre-approved and is to be utilized at all times. Additional AWP methods may be used if approved by CTDPH and the Engineer. Should the Contractor desire to use AWP procedures that have not been pre-approved, the Contractor shall submit in writing a description of the proposed methods to the Engineer and CTDPH for review and approval. Alternative procedures

shall provide equivalent or greater protection than procedures which they replace. The Contractor is responsible for all fees associated with filing AWP applications which have not been pre-approved. Submission of AWP applications requires a CTDPH Project Designer License. The Contractor shall not proceed with any AWP other than those listed in this Specification without approval from both the CTDPH and the Engineer.

(c) Fifteen (15) working days prior to the commencement of asbestos abatement work, the Contractor shall submit to the Engineer for review and acceptance and/or acknowledgment of the following:

1. Copies of all required notifications.

2. AWP applications/approvals.

3. Permits and licenses for the removal, transport, and disposal of asbestos-containing or contaminated materials, including a CTDPH valid asbestos removal contractor's license.

4. Documentation dated within the previous twelve (12) months, certifying that all employees have received USEPA Model Accreditation Plan approved asbestos worker/supervisor training in the proper handling of materials that contain asbestos; understand the health implications and risks involved, including the illnesses possible from exposure to airborne asbestos fibers; understands the use and limits of respiratory equipment to be used; and understands the results of monitoring of airborne quantities of asbestos as related to health and respiratory equipment as indicated in 29 CFR 1926.1101 on an initial and annual basis, and copies of all employees CTDPH asbestos worker and/or supervisor licenses.

5. Documentation from the Contractor, typed on company letterhead and signed by the Contractor, certifying that all employees listed therein have received the following:

    a. medical monitoring within the previous twelve (12) months, as required in 29 CFR 1926.1101;
    b. respirator fit testing within the previous twelve (12) months as detailed in 29 CFR 1910.134 (for all employees who must also don a tight-fitting face piece respirator).

6. Copies of the EPA/State-approved certificates for the proposed asbestos landfill.

(d) No abatement shall commence until a copy of all required submittals have been received and found acceptable to the Engineer. Those employees added to the Contractor's original list will be allowed to perform work only upon submittal to, and receipt of, all required paperwork by the Engineer.

(2) Asbestos Abatement Provisions:

(a) General Requirements

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

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

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

The Contractor shall:

Shutdown and isolate heating, cooling, and ventilating air systems to prevent contamination and fiber dispersal to the other areas of the building.

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

Coordinate all power and fire alarm isolation with the appropriate representatives.

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

If sufficient electrical service is unavailable, the Contractor may need to supply electrical power to the site by fuel operated generator(s). Electrical power supply shall be sufficient for all equipment required for this project in operation throughout the duration of the project. If the Contractor elects to supply electrical power to the work site through the use of generators, the Contractor shall ensure that each work area is a manageable size such that removal, final

cleaning and reoccupancy testing can be accomplished within one work shift while negative air machines are operating.

Negative pressure must be continuously maintained in each work area, until the area achieves satisfactory reoccupancy criteria and is approved by the Project Monitor to be deregulated. If phases cannot be subdivided into manageable work areas that can be completed within one shift, negative air pressure must be maintained twenty-four (24) hours per day and the Contractor shall establish temporary electrical service to the site, rather than utilize generators.

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

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

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

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

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

(b) Set-Up

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

After pre-cleaning, movable objects shall be removed from the work areas with the utmost care to prevent damage of any kind and relocated to a temporary storage location coordinated with the

Engineer. The Contractor is responsible for protecting all fixed objects that are permanent fixtures or are too large to remove and remain inside the Regulated Area. Fixed objects shall be enclosed with one layer of six (6) mil polyethylene sheeting sealed with tape.

Where non-ACM insulation exists within a Regulated Area, the Contractor has the option of removing the non-ACM insulation material and disposing of as ACM debris, or decontaminating and protecting non-ACM insulation material with two (2) layers of six (6) mil polyethylene sheeting. Any non-ACM insulation removed shall be replaced with new material of equal or better quality at the Contractor's expense.

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

Access between rooms in the Worker Decontamination Enclosure System shall be through airlocks. Other effective designs are permissible. The Clean Room, Shower Room and Equipment Room located within the Worker Decontamination Enclosure, shall be contiguously connected with taped airtight edges, thus ensuring the sole source of airflow originates from outside the regulated areas, once the negative pressure differential within the Regulated Area is established.

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

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

The Contractor shall establish contiguous to the Regulated Area an Equipment/Waste Removal Decontamination Enclosure System consisting of two (2) totally enclosed chambers divided by a double flap curtained opening. Other effective designs are permissible. This enclosure must be constructed so as to ensure that no personnel enter or exit through this unit.

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

Seal off all windows, doorways, skylights, ducts, grilles, diffusers, vents, light fixtures, electrical receptacles, suspended ceiling tile systems and any other openings between the Regulated Area and the uncontaminated areas outside of the Regulated Area, including the outside of the building, with critical barriers consisting of a minimum of one (1) layer of six (6) mil polyethylene sheeting securing the edges with tape. Doorways and corridors which will not be used for passage during work and separate the regulated areas from occupied areas must be sealed with fixed critical barriers constructed of 2" x 4" wood or metal framing 16" O.C., with ½" plywood on the occupied side and two layers of six (6) mil polyethylene sheeting on the Regulated Area side to prevent unauthorized access or air flow.

The Contractor shall create a negative pressure differential in the range of 0.02 to 0.04 inches of water column between the Regulated Area and surrounding areas by the use of acceptable negative air pressure equipment. Exhaust air filtration units shall be equipped with HEPA filters capable of providing sufficient air exhaust to create a minimum pressure differential of 0.02 inches of water column, and to allow a sufficient flow of air through the area providing 4 air changes per hour. The Contractor shall provide a sufficient quantity of HEPA air filters to maintain the pressure differential throughout the duration of the project. An automatic warning system shall be incorporated into the equipment to indicate pressure drop or unit failure. Continuously monitor the pressure differential between the Regulated Area and surrounding area to ensure exhaust air filtration equipment maintains a minimum pressure differential of 0.02 inches of water column. The Contractor shall provide actual air flow measurement of filtration units while the unit is in place and calculate actual air exchange rates. No air movement system or air filtering equipment shall discharge unfiltered air outside the Regulated Area.

A Negative Pressure Enclosure (NPE) shall be constructed via covering of floor and wall surfaces with polyethylene sheeting sealed with tape. Polyethylene shall be applied alternately to floors and walls. Cover floors first, with a layer of six (6) mil polyethylene sheeting, so that polyethylene extends at least twelve (12) inches up on wall. Cover wall with a layer of four (4) mil polyethylene sheeting to twelve (12) inches beyond the wall/floor intersection, thus overlapping the floor material by a minimum of twenty-four (24) inches. Repeat the process for the second layer of polyethylene. There shall be no seams at wall-to-floor joints. Protect carpet and floor tile with two additional layers of six (6) mil reinforced polyethylene in addition to the prior two layers required.

Conspicuously label and maintain emergency and fire exits from the Regulated Area satisfactory to fire officials.

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

(c) **Alternate set up requirements for exterior non-friable asbestos abatement procedures**

In lieu of the establishment of a negative pressure enclosure (NPE) system as described by CTDPH Sections 19a-332a-5(c), 5(d), 5(e), and 5(h), non-friable ACM will be removed from exterior work areas within an outdoor Regulated Area(s). The regulated work area will be established by the use of appropriately labeled barrier tape and postings in compliance with CTDPH 19a-332a-5(a) as well as OSHA 29 CFR 1926.1101. A remote personnel decontamination unit as specified in Section 19a-332a-6 will be required. This method shall only be utilized provided exposure assessment air sampling data collected during the removal of the exterior non-friable materials indicates that the exposure levels during removal of such materials do not exceed 0.1 asbestos f/cc. Should exposure assessment air sampling data exceed this level, and engineering efforts to reduce the airborne fiber levels not be successful in reducing the levels to less than 0.1 f/cc, removal shall occur within these areas under full containment conditions.

(d) **Alternate set up requirements for "spot repair" asbestos abatement procedures on less than three (3) linear or square feet of asbestos containing material**

In lieu of the establishment of a negative pressure enclosure (NPE) system as described by CTDPH Sections 19a-332a-5(c), 5(d), 5(e), and 5(h), less than 3 LF or 3 SF of ACM will be removed as a "spot repair" in accordance with CTDPH Section 19a-332a-10. A regulated area will be established by the use of appropriately labeled barrier tape and postings in compliance with CTDPH 19a-332a-5(a) as well as OSHA 29 CFR 1926.1101. A remote personnel decontamination unit as specified in Section 19a-332a-6 will be required. Air-tight barriers will be constructed to assure that asbestos fibers released during abatement activities are contained within the work area. (Glovebags are permitted, as specified below.) ACM will be adequately wet prior to disturbance and remain wet until placed in leak-tight container. Following abatement, clean-up methods within the work area will include HEPA-filtered vacuuming or wet cleaning techniques until no visible residue remains.

Glovebags utilized to perform "spot repair" activities on asbestos containing pipe insulation/mudded fitting insulation, in conformance with OSHA 29 CFR 1926.1101(g)(5)(ii), shall be:

1. constructed of 6 mil poly, seamless at bottom, unmodified
2. installed so that it completely covers the circumference of pipe or other structure where work is to be done, with impermeable dropcloths placed on all surfaces beneath the work area
3. smoke-tested for leaks and sealed, as needed
4. used only once, may not be moved
5. used only on surfaces with temperatures <150ºF
6. collapsed by removing air via HEPA-vacuum, prior to disposal
7. adhered to surfaces which are intact, surfaces with loose and friable material shall be sealed in two layers of 6 mil poly or otherwise rendered intact
8. capable of sustaining integrity at connection site to attached waste bag, which must have equivalent of sliding valve for disconnection (as applicable)
9. performed by a minimum of two (2) persons

Glovebags may also be used for "spot repair" abatement procedures involving additional materials (e.g. floor tile/linoleum, transite, etc.) provided that the glovebag is capable of fully enclosing the material to be removed.

(e) Personnel Protection

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

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

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

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

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

(f) Asbestos Abatement Procedures

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

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

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

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

SEA STREET SALT SHEDS, NEW HAVEN, CONNECTICUT

Phase 1 - Exterior Caulking (Storage Shed 2)

Phase 1 includes the removal of:

- **Hard, tan caulk on the exterior of two (2) window openings**

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

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

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

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

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

area prior to exiting the regulated area. Wet clean each container thoroughly before moving to Holding Area.

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

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

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

The Contractor shall clean surfaces of contaminated containers and equipment thoroughly by vacuuming with HEPA filtered equipment and wet sponging or wiping before moving such items into the Equipment Decontamination Enclosure System for final cleaning and removal to uncontaminated areas.

The Contractor shall remove contamination from the exteriors of the air filtration devices, scaffolding, ladders, extension cords, hoses and other equipment inside the Regulated Area. Cleaning may be accomplished by brushing, HEPA vacuuming and/or wet cleaning. The Contractor shall wet wipe the Regulated Area beginning at the point farthest away from the negative air filtration units using cotton rags or lint free paper towels. Rags and towels shall be disposed of after each use. Workers should avoid the use of dirty rags to insure proper cleaning of surfaces. Mop the entire floor with a clean mop head and amended water. Water shall be changed frequently. For those Regulated Areas where lead is also disturbed, the cleaning shall also include a wet washing with a high phosphate detergent solution and HEPA vacuuming. Waste water shall be filtered using best available technology into leak-proof containers prior to being transported to a sanitary sewer for discharge.

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

Once the area has received a satisfactory post-abatement visual inspection, any equipment, tools or materials not required for completion of the work, shall be removed by the Contractor from the Regulated Area. Negative air filtration devices shall remain in place and operating for the remainder of the clean-up operation.

Following the post-abatement visual, the Contractor shall apply a lock-down encapsulant to all surfaces within the Regulated Area from which asbestos has been removed and the cleaned inner layer of polyethylene.

(g) Air Monitoring Requirements

1. The Contractor shall:

    a. Provide air monitoring equipment including sample filter cassettes of the type and quantity required to properly monitor operations and personnel exposure surveillance throughout the duration of the project.

    b. Conduct personnel exposure assessment air sampling, as necessary, to assure that workers are using appropriate respiratory protection in accordance with OSHA Standard 1926.1101. Documentation of air sampling results must be recorded at the work site within twenty-four (24) hours and shall be available for review until the job is complete.

2. The Project Monitor, acting as the representative of the Engineer during abatement activities, will:

    a. Collect air samples in accordance with the current revision of the NIOSH 7400 Method of Air Sampling for Airborne Asbestos Fibers while overseeing the activities of the Abatement Contractor. Frequency and duration of the air sampling during abatement will be representative of the actual conditions at the abatement site. The size and configuration of the asbestos project will be a factor in the number of samples required to monitor the abatement activities and shall be determined by the Project Monitor. The following schedule of samples may be collected by the Project Monitor:

        1. Pre-Abatement (Optional)
            a. Background areas
            b. Area(s) adjacent to Work Area(s)
            c. Work Area(s)

        2. During Abatement (Optional)
            a. At the exhaust of air filtering device
            b. Within Regulated Area(s)
            c. Area(s) adjacent to Regulated Areas(s)

(exterior to critical barriers)

d. At the Decontamination Enclosure System

3. Post-Abatement (reoccupancy air clearance testing) (**REQUIRED)**
   a. Interior Regulated NPE Area - At least five (5) per homogenous area

Abatement Activity	Pre-Abatement	During Abatement	Post-Abatement
Greater than 1500 SF/500 LF - Interior	PCM	PCM	TEM
Greater than 3 LF/3 SF and Less than 1500 SF/500 LF - Interior	PCM	PCM	PCM
Spot Repair and Glovebag Procedures (<3 LF/3 SF)	---	PCM	---
Exterior Friable/Non-Friable	---	PCM	---

If air samples collected outside of the Regulated Area during abatement activities indicate airborne fiber concentrations greater than original background levels, or greater than 0.1 f/cc, as determined by Phase Contrast Microscopy, whichever is larger, an examination of the Regulated Area perimeter shall be conducted and the integrity of barriers shall be restored. Cleanup of surfaces outside the Regulated Area using HEPA vacuum equipment or wet cleaning techniques shall be done prior to resuming abatement activities.

(h) Post-Abatement Reoccupancy Procedures

For interior NPE Regulated Areas, clearance air sampling will be performed by the Project Monitor as specified in the Air Sampling Schedule. Clearance sampling will be undertaken using aggressive sampling techniques. Sampling and analysis of clearance samples will follow State of Connecticut Regulations, Section 19a-332a-12. Areas which do not comply shall continue to be cleaned by and at the Contractors expense, until the specified Standard of Cleaning is achieved as evidenced by results of air testing. When the Regulated Area passes the re-occupancy clearance, controls established by these Specifications may be removed.

1. Air sampling will not begin until after the area has received an acceptable post abatement visual inspection, encapsulation has been completed, and no visible water, liquid encapsulant or condensation remain in the Regulated Area.

2. Sampling equipment will be placed at random throughout the Regulated Area.

3. The following aggressive air sampling procedures will be used within the Regulated Area during all air clearance monitoring:

a. Before starting the sampling pumps, direct the exhaust from forced air equipment (such as a 1 horsepower leaf blower) against all walls, ceilings, floors, ledges and other surfaces in the Regulated Area.
b. Pre-calibrate the sampling pump flow rates through the use of a rotameter calibrated to a primary standard.
c. Start the sampling pumps and sample for the required time.
d. Post-calibrate the sampling pump flow rates.

4. Air volumes taken for clearance sampling shall be sufficient to accurately determine (to a 95 percent probability) fiber concentrations to 0.010 f/cc of air (1,200 liters).

5. Analysis shall follow the requirements of CTDPH 19a-332a-12.

6. Each homogeneous Regulated Area which does not meet the clearance criteria shall be thoroughly recleaned using HEPA vacuuming and/or wet cleaning, with the negative pressure ventilation system in operation. New samples shall be collected in the Regulated Area as described above. The process shall be repeated until the Regulated Area passes the test, with the cost of repeat sampling being borne entirely by the Contractor.

7. For an asbestos abatement project with more than one homogeneous Regulated Area, the release criterion shall be applied independently to each Regulated Area.

8. These clearance sampling procedures may also be implemented for exterior NPE work areas at the discretion of the Engineer.

(i) Post Abatement Work Area Deregulation

The Contractor shall remove all remaining polyethylene, including critical barriers, and Decontamination Enclosure Systems leaving negative air filtration devices in operation. HEPA vacuum and/or wet wipe any visible residue which is uncovered during this process. All waste generated during this disassembly process shall be discarded as ACM waste.

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

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

(j) Waste Disposal

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

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

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

Waste haulers and disposal facilities utilized shall match those indicated on the submitted CTDPH notification.

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

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

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

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

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

(k) Project Closeout Data:

1. Provide the Engineer, within 30 days of completion of asbestos abatement, a compliance package; which shall include, but not be limited to, the following:

    a. Asbestos Abatement Site Supervisor job log;
    b. OSHA personnel air sampling data;

c. Completed waste shipment records.

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

Method of Measurement:

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

Basis of Payment:

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

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

Pay Item	Pay Unit
Asbestos Abatement	Lump Sum

ITEM #0020902A - LEAD COMPLIANCE FOR BUILDING RENOVATION & DEMOLITION

Description:

Work under this item shall include the special handling measures and work practices required for renovation and demolition (construction) activities that impact materials containing or covered by lead paint. Lead paint includes paint found to contain **any** detectable amount of lead by Atomic Absorption Spectrophotometry (AAS) or X-Ray Fluorescence (XRF).

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

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

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

Materials:

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

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

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

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

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

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

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

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

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

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

Construction Methods:

(1) Pre-Abatement Submittals and Notices

A. Prior to the start of **any** work that will generate hazardous lead waste above conditionally exempt small quantities (greater than 100 kg/month or greater than 1000 kg at any time), the Contractor shall obtain from the Engineer a temporary EPA Hazardous Waste Generators ID number, unless otherwise directed by the Engineer.

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

1. Work plan for work impacting lead paint including engineering controls, methods of containment of debris and work practices to be employed, as needed, to minimize employee exposure and prevent the spread of lead contamination outside the Regulated Area.

2. Copies of all employee certificates, dated within the previous twelve (12) months, relating to OSHA lead awareness and hazard communication training and training in the use of lead-safe work practices. SSPC training programs may be accepted as meeting these requirements if it can be demonstrated that such training addressed all required topics.

   This information shall be updated and resubmitted annually, or as information changes, for the duration of the lead renovation/demolition work to verify continued compliance.

3. Name and qualifications of Contractor's OSHA Competent Person under 29 CFR 1926.62, who will be on-site at all times that the work impacting lead paint is being performed.

4. Documentation from the Contractor, typed on company letterhead and signed by the Contractor, certifying that all employees listed therein have received the following, and are medically fit to perform the work impacting lead:

   a. medical monitoring within the previous twelve (12) months, as required in 29 CFR 1926.62;
   b. biological monitoring within the previous six (6) months, as required in 29 CFR 1926.62;
   c. respirator fit testing within the previous twelve (12) months, as required in 29 CFR 1910.134 (for those who don a tight-fitting face piece respirator)

   This information shall be updated and resubmitted annually, or as information changes, for the duration of the lead renovation/demolition work to verify continued compliance.

5. Name of proposed waste recycling facility for lead-painted asphalt, brick, stone, and concrete that meets CT Remediation Standard Regulations (RSR) GA/Residential Criteria. If these materials do not meet GA/Residential Criteria, they will be disposed of as a non-hazardous construction and demolition (C&D) waste.

6. Names of the proposed non-hazardous construction and demolition (C&D) lead debris bulky waste disposal facility (CTDEEP-permitted Solid Waste landfill)

7. Names of the proposed scrap metal recycling facilities. The Contractor shall submit to the Engineer all documentation necessary to demonstrate the selected facility is able to accept lead-painted scrap metal.

8. Negative exposure assessments conducted within the previous 12 months documenting that employee exposure to lead for each task is below the OSHA Action Level of 30 $\mu g/m^3$. If a negative exposure assessment has not been conducted, the Contractor shall submit its air monitoring program for the work tasks as part of the Work Plan. Until a negative exposure assessment is developed for each task impacting lead paint, the Contractor shall ensure that all workers and authorized persons entering the Regulated Area wear protective clothing and respirators in accordance with OSHA 29 CFR 1926.62.

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

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

(2) Lead Abatement Provisions

A. General Requirements:

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

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

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

As necessary, the Contractor shall:

Shut down and isolate heating, cooling, and ventilating air systems to prevent contamination and particulate dispersal outside the work area.

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

Coordinate all power and fire alarm isolation with the appropriate representatives.

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

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

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

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

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

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

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

B. Regulated Area

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

WARNING
LEAD WORK AREA
POISON
NO SMOKING OR EATING

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

C. Wash Facilities:

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

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

D. Personal Protection:

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

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

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

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

E. Air Monitoring Requirements

The Contractor shall:

1. Provide air monitoring equipment including sample filter cassettes of the type and quantity required to properly monitor operations and personnel exposure surveillance throughout the duration of the project.

2. Conduct initial exposure monitoring to determine if any employee performing construction tasks impacting lead paint may be exposed to lead at or above the OSHA Action Level of 30 micrograms per cubic meter. Monitoring shall continue as specified in the OSHA standard until a negative exposure assessment is developed.

3. Conduct personnel exposure assessment air sampling, as necessary, to assure that workers are using appropriate respiratory protection in accordance with OSHA Standard 1926.62. Documentation of air sampling results must be recorded at the work site within twenty-four (24) hours and shall be available for review until the job is complete.

F. Lead Abatement Procedures

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

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

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

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

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

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

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

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

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

SEA STREET SALT SHEDS, NEW HAVEN, CONNECTICUT

Phase 1 – Non-metallic Components To Be Impacted

- **Lead paint has been identified on non-metallic components of the Salt Shed (Shed 1) including exterior wood siding. Lead painted debris generated from the renovation/demolition of those materials, shall be containerized and stored on-site with the remainder of the non-metallic building waste materials.**

Phase 2 – Metal Components To Be Impacted

- **Lead paint has been identified on various metal interior and exterior components of the Salt Storage Shed (Shed 2) including metal columns.**

All scrap metal waste components generated from the renovation/demolition of the building shall be segregated and recycled as scrap metal at the Contractor's previously submitted scrap metal recycling facility. The recycling of scrap metal (regardless of lead paint concentration) is exempt from USEPA RCRA and CTDEEP Hazardous Waste Regulation.

The Engineer has previously characterized the non-metallic waste stream as C&D waste, which shall be disposed of as non-hazardous C&D bulky waste at the Contractor's previously submitted facility.

Salt Shed 1 & Storage Shed 2 demo debris (excluding metal and concrete/brick)	**1.7 mg/L TCLP**

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

Special Requirements:

1. Demolition/Renovation:

   a. Demolish/renovate in a manner which minimizes the spread of lead contamination and generation of lead dust.

   b. Implement dust suppression controls, such as misters, local exhaust ventilation, etc. to minimize the generation of airborne lead dust.

c. Segregate work areas from non-work areas through the use or barrier tape, drop cloths, poly criticals, etc.

d. Clean up immediately after renovation/demolition has been completed

2. Chemical Removal (if allowed project by project):

a. Apply chemical stripper in quantities and for durations specified by manufacturer.

b. Where necessary, scrape lead paint from surface down to required level of removal (i.e. stabilized surface, bare substrate with no trace of residual pigment, etc). Use sanding, hand scraping, and dental picks to supplement chemical methods as necessary.

c. Apply neutralizer compatible with substrate and chemical agent to substrate following removal in accordance with manufacturer's instructions.

d. Protect adjacent surfaces from damage from chemical removal.

e. Maintain a portable eyewash station in the work area.

f. Wear respirators that will protect workers from chemical vapors.

g. Do not apply caustic agents to aluminum surfaces.

3. Paint Stabilization:

Remove surface dust, dirt, mildew, scale, rust or other debris by scrubbing with detergent (lead-specific detergent solution) and rinsing. Remove loose paint using wet scraping methods until a sound surface is achieved. Remove unsound substrate not firmly adhered and repair with an appropriate patching material. All excess liquids must be collected for characterization by the Engineer prior to disposal.

4. Mechanical Paint Removal:

a. Provide sanders, grinders, rotary wire brushes, or needle gun removers equipped with a HEPA filtered vacuum dust collection system. Cowling on the dust collection system for orbital-type tools must be capable of maintaining a continuous tight seal with the surface being abated. Cowling on the dust collection system for reciprocating-type tools shall promote an effective vacuum flow of loosened dust and debris. Inflexible cowlings may be used on flat surfaces only. Flexible contoured cowlings are required for curved or irregular surfaces.

b. Provide HEPA vacuums that are high performance designed to provide maximum static lift and maximum vacuum system flow at the actual operating vacuum condition with the shroud in use. The HEPA vacuum shall be equipped with a pivoting vacuum head.

c. Remove lead paint from surface down to required level of removal (i.e. stabilized surface, bare substrate with no trace of residual pigment, etc). Use chemical methods, hand scraping, and dental picks to supplement abrasive removal methods as necessary.

d. Protect adjacent surfaces from damage from abrasive removal techniques.

e. "Sandblasting" type removal techniques shall be performed within full containment negative pressure enclosures.

5. Component Removal/Replacement:

a. Wet down components which are to be removed to reduce the amount of dust generated during the removal process.

b. Remove components utilizing hand tools, and follow appropriate safety procedures during removal. Remove the building components by approved methods which will provide the least disturbance to the substrate material. Do not damage adjacent surfaces.

c. Clean up immediately after component removals have been completed. Remove any dust located behind the component removed.

G. Prohibited Removal Methods:

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

The use of sand, steel grit, air, CO_2, baking soda, or any other blasting media to remove lead or lead paint without the use of a HEPA ventilated contained negative pressure enclosure is prohibited.

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

Compressed air shall not be utilized to remove lead paint.

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

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

Lead paint burning, busting of rivets painted with lead paint, welding of materials painted with lead paint, and torch cutting of materials painted with lead paint is prohibited. Where cutting, welding, busting, or torch cutting of materials is required, lead paint in the affected area must be removed first.

H. Clean-up and Visual Inspection:

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

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

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

All storage containers (roll offs or drums) shall have a protective liner and removable lid. These containers shall not have any indentations or damage that would allow seepage of the contained material.

I. Post-Work Regulated Area Deregulation:

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

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

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

J. Waste Disposal/Recycling:

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

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

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

K. Project Closeout Data:

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

1. Competent persons (supervisor) job log;
2. OSHA-compliant personnel air sampling data;
3. Completed waste shipment papers for non-hazardous lead construction and demolition (C&D) waste disposal or recycling and scrap metal recycling.

Method of Measurement:

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

Basis of Payment:

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

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

Pay Item	Pay Unit
Lead Compliance for Building Renovation & Demolition	Lump Sum

ITEM #0101000A - ENVIRONMENTAL HEALTH AND SAFETY

Description:

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

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

Materials:

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

Construction Methods:

1-Existing Information: The Contractor shall utilize all available information and existing records and data pertaining to chemical and physical hazards associated with any of the regulated substances identified in the environmental site investigations to develop the HASP. A list of documents containing this data is found in "Notice to Contractor – Environmental Investigations".

2-General: The requirements set forth herein pertain to the provision of workers' health and safety as it relates to proposed Project activities when performed in the presence of hazardous or regulated materials or otherwise environmentally sensitive conditions. THE PROVISION OF WORKER HEALTH AND SAFETY PROTOCOLS WHICH ADDRESS POTENTIAL AND/OR ACTUAL RISK OF EXPOSURE TO SITE SPECIFIC HAZARDS POSED TO CONTRACTOR EMPLOYEES IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.

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

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

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

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

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

5-HASP Provisions:

(a) General Requirements: The Contractor shall prepare a HASP covering all Project site work regulated by 29 CFR 1910.120(b)/ 1926.65(b) to be performed by the Contractor and all subcontractors under this Contract. The HASP shall establish in detail, the protocols necessary for the recognition, evaluation, and control of all hazards associated

with each task performed under this Contract. The HASP shall address site-specific safety and health hazards of each phase of site operation and include the requirements and procedures for employee protection. The level of detail provided in the HASP shall be tailored to the type of work, complexity of operations to be performed, and hazards anticipated. Details about some activities may not be available when the initial HASP is prepared and submitted. Therefore, the HASP shall address, in as much detail as possible, all anticipated tasks, their related hazards and anticipated control measures.

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

(b) Elements:

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

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

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

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

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

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

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

(A) Directing and implementing the HASP.

(B) Ensuring that all Project personnel have been adequately trained in the recognition and avoidance of unsafe conditions and the regulations applicable to the work environment to control or eliminate any hazards or other exposure to illness or injury (29 CFR 1926.21). All personnel shall be adequately trained in procedures outlined in the Contractor's written HASP.

(C) Authorizing Stop Work Orders, which shall be executed upon the determination of an imminent health and safety concern.

(D) Contacting the Contractor's HSM and the Engineer immediately upon the issuance of a Stop Work order when the HSO has made the determination of an imminent health and safety concern.

(E) Authorizing work to resume, upon approval from the Contractor's HSM.

(F) Directing activities, as defined in the Contractor's written HASP, during emergency situations; and

(G) Providing personal monitoring where applicable, and as identified in the HASP.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Method of Measurement:

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

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

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

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

(a) The lump sum development cost will be certified for payment.

(b) The Contractor shall demonstrate to the Engineer monthly that the HASP has been kept current and is being implemented and the monthly cost will be certified for payment.

(c) Any month where the HASP is found not to be current or is not being implemented, the monthly payment for the Environmental Health and Safety Item shall be deferred to the next monthly payment estimate. If the HASP is not current or being implemented for more than thirty calendar days, there will be no monthly payment.

(d) Failure of the Contractor to implement the HASP in accordance with this Specification shall result in the withholding of all Contract payments.

Basis of Payment:

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

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

ITEM #0101117A - CONTROLLED MATERIALS HANDLING

Description:

Work under this Item is intended to provide specific procedural requirements to be followed by the Contractor during the excavation of controlled materials from within any AOEC, as shown on the Project Plans. This supplements Specifications Section 2.02, 2.03, 2.05, and 2.06 and Contract Special Provisions for excavation wherever contaminated materials are encountered. Work under this item shall include transporting and stockpiling materials at the WSA; and covering, securing, and maintaining the stockpiled materials throughout the duration of the Project. All materials, excluding the existing pavement structure (asphalt and subbase), rock, ledge, and concrete excavated within AOEC(s) are to be considered controlled materials. If the vertical limits of the existing subbase cannot be determined visually, subbase will be presumed to extend 12" below the bottom of the existing pavement.

Controlled materials consisting of non-hazardous levels of regulated substances have been documented to exist within the Project. Such contamination is documented in the reports listed in the "Notice to Contractor – Environmental Investigations". 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.

Materials:

All materials shall conform to the requirements of the Contract.

Plastic Sheet: Polyethylene plastic sheeting for underlayment shall be at least 30 mil thick. Polyethylene plastic sheeting for covering excavated material shall be a thickness of 10 mil. Both shall be at least 10 feet wide.

Covers for roll-off/storage containers shall be made of polyethylene plastic, or similar water-tight material, that is of sufficient size to completely cover top opening and can be securely fastened to the container.

Sand Bags: Sandbags used to secure polyethylene covers shall be at least 30 pounds.

Sorbent Boom: Shall be 8 inches in diameter and 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.

Construction Methods:

A. General

When controlled materials are encountered during the course of the work, health and safety provisions shall conform to the appropriate sections of the Contract. Provisions may include implementation of engineering controls, air and personal monitoring, the use of chemical protective clothing (CPC), personal protective equipment (PPE), implementation of engineering controls, air and personal monitoring, and decontamination procedures.

Unless otherwise directed by the Engineer, materials removed from any excavation within an AOEC shall be transported directly from their point of origin on the Project to the WSA in the existing salt shed. The stockpiles of excavated controlled materials shall be maintained as directed by the Engineer. The Contractor shall plan excavation activities within AOEC(s) in consideration of the capacity of WSA, and the material testing and disposal requirements of the applicable Contract item. **No claims for delay shall be considered based on the Contractor's failure to coordinate excavation activities as specified herein.**

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

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:

- Transported controlled materials 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;

- All vehicles shall have secure, watertight containers free of defects for material

transportation;

- 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.

Construction of the WSA within the existing salt shed shall be completed prior to the initiation of construction activities generating Controlled Materials. Plastic polyethylene sheeting shall underlay all excavated controlled materials. Measures shall be implemented to divert rainfall away from the WSA.

Placement of sorbent boom along the perimeter of the WSA shall be conducted when soil is saturated with petroleum product.

Excavated materials shall be staged as directed by the Engineer.

C. WSA Maintenance

The Contractor shall provide all necessary materials, equipment, tools and labor for anticipated activities within the WSA. Such activities include, but are not limited to, handling and management of stockpiles and drummed CPC/PPE; maintenance of WSA; replacement of damaged components (i.e. sand bags, plastic polyethylene sheeting, etc.); and waste inventory record management. The Contractor shall manage all materials in the WSA in such a way as to minimize tracking of potential contaminated materials across the site and off-site, and minimize dust generation.

The staged stockpiles shall be inspected at least daily by the Contractor to ensure that the containment has not been damaged and that there is no apparent leakage from the pile. If there is evidence of leakage from the piles, the Contractor shall immediately replace the containment as needed to prevent the release of materials to the environment from the piles.

An inventory of stockpiled materials and drummed CPC/PPE shall be conducted on a daily basis. Inventory records shall indicate the approximate volume of material/drums stockpiled per day; the approximate volume of material/drums stockpiled to date; material/drums loaded and transported off-site for disposal; any materials loaded and transported for on-site reuse; and identification of stockpiles relative to their points of generation.

Following the removal of all stockpiled controlled materials, residuals shall be removed from 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. Residuals shall be disposed of as Controlled Materials.

D. Dewatering

Dewatering activities shall conform to Items in pertinent articles of the Contract.

E. Decontamination

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

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

Dry decontamination procedures are recommended. Residuals from dry decontamination activities shall be collected and managed as Controlled Materials. If dry methods are unsatisfactory as determined by the Engineer, the Contractor shall modify decontamination procedures as required subject to the Engineer's approval.

F. Dust Control

The Contractor shall implement a fugitive dust suppression program in accordance with the Contract to prevent the off-site migration of particulate matter and/or dust resulting from excavation, loading and operations associated with Controlled Materials. It shall be the Contractor's responsibility to supervise fugitive dust control measures and to monitor airborne particulate matter. The Contractor shall:

1. Employ reasonable fugitive dust suppression techniques.
2. Visually observe the amounts of particulate and/or fugitive dust generated during the handling of controlled materials. If the apparent amount of fugitive dust and/or particulate matter is not acceptable to the Engineer, the Engineer may direct the Contractor to implement corrective measures at his discretion, including, but not limited to, the following:

    (a) apply water to pavement surfaces
    (b) apply water to equipment and excavation faces; and
    (c) apply water during excavation, loading and dumping.

G. Permit Compliance

The Contractor shall comply with the terms and conditions of the DEEP "General Permit for Contaminated Soil and/or Sediment Management (Staging and Transfer)", including the General Operating Conditions and the Specific Operating Conditions, except that the Engineer will conduct all soil/sediment characterization and perform all record keeping. In particular, the Contractor shall:

1. Operate, maintain and repair the WSA in conformance with the requirements of the General Permit.
2. Maintain a communications system capable of summoning fire, police, and/or other emergency service personnel.
3. Prevent unauthorized entry onto the stockpiles by the use of fences, gates, or other natural or artificial barriers.
4. Separate incidental excavation waste to the satisfaction of the receiving facility or to an extent that renders the contaminated soil and/or sediment suitable for its intended reuse.
5. Isolate and temporarily store incidental waste in a safe manner prior to off-site transport to a facility lawfully authorized to accept such waste.
6. Not store more that 100 cubic yards of incidental waste at any one time.
7. Sort, separate and isolate all hazardous waste from contaminated soil and/or sediment.
8. Prevent or minimize the transfer or infiltration of contaminants from the stockpiles to the ground as detailed in "B. Transportation and Stockpiling" above.
9. Minimize wind erosion and dust transport as detailed in "F. Dust Control" above.
10. Use anti-tracking measures at the WSA to ensure the vehicles do not track soil from the WSA onto a public roadway at any time.
11. Instruct the transporters of contaminated soil and/or sediment of best management practices for the transportation of such soil (properly covered loads, removing loose material from dump body, etc.).
12. Control all traffic related to the operation of the facility in such a way as to mitigate the queuing of vehicles off-site and excessive or unsafe traffic impact in the area where the facility is located.
13. Ensure that except as allowed in section 22a-174-18(b)(3)(C) of the Regulations of Connecticut State Agencies, trucks are not left idling for more than three (3) consecutive minutes.

Method of Measurement:

The work of Controlled Material Handling will be measured for payment by the number of cubic yards of controlled material excavated within the AOEC(s) and taken to the WSA. This measurement shall be in accordance with and in addition to the quantity measured for payment of the applicable excavation item in Specification Sections 2.02, 2.03, 2.05, 2.06, or the Contract Special Provisions, as applicable. Excess excavations made by the Contractor beyond the payment limits specified in the Contract will not be measured for payment and the Contractor assumes all costs associated with the appropriate handling, management and disposal of this material.

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

Basis of Payment:

This work shall be paid for at the Contract unit price, which shall include all transportation from the excavation site to the WSA, including any intermediate handling steps; stockpiling controlled materials at the WSA; securing, and maintaining the individual stockpiles within the WSA throughout the duration of the Project; and all tools, equipment, material and labor incidental to this work.

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

All materials, labor and equipment associated with compliance with the General Permit for Contaminated Soil and/or Sediment Management (Staging and Transfer) will not be measured separately, but will be considered incidental to the item “Controlled Materials Handling”.

Handling and disposal of contaminated groundwater will be paid for under Item 0204213A. Payment for dust control activities shall be made under the appropriate Contract items.

Pay Item	Pay Unit
Controlled Materials Handling	C.Y.

ITEM #0101130A - ENVIRONMENTAL WORK - SOLIDIFICATION

Description:

Under this item, the Contractor shall be responsible for the solidification of controlled materials containing free draining liquids, as may be necessary during the performance of work operations prior to off-site disposal. Materials shall be dewatered prior to the addition of solidification material.

The Contractor shall submit within seven (7) days of the Notice to Proceed, 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 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:

Submittals:
The Contractor shall submit for the Engineer's review, a plan showing the location of solidification material storage and proposed mixing location as well as a detailed narrative describing the equipment, materials and methodology to be used. The Contractor shall also include its 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 controlled materials prior to the addition of solidification materials to the satisfaction of the Engineer. All dewatering fluids shall be handled in accordance with the Contract. 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, the Contractor shall submit methods for the removal of free-standing water. The Contractor shall also submit the additional costs of the 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 will be measured for payment as the actual weight 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.

If no certified scale is available, the Engineer may allow for the calculation of the weight by a summation of sealed, pre-measured bags.

Basis of Payment:

This work will be paid for at the Contract unit price for solidification material used and accepted by the Engineer. Such price shall include all labor, materials, tools, and equipment incidental to the work including transportation of the materials to the Project and the addition of solidification material to excavated materials.

Pay Item	Pay Unit
Environmental Work - Solidification	Ton

ITEM #0101143A - HANDLING AND DISPOSAL OF REGULATED ITEMS

Description:

Work under this item shall include the management (handling and disposal) of regulated items and all associated work by persons who are employed by a CTDEP permitted Spill Contractor and trained/certified in accordance with OSHA Hazard Communication regulations. Regulated items include hazardous and other materials and wastes, the disposal of which is restricted by Federal and/or State laws and regulations, and which may be a component of equipment or other items located on-site. Regulated items include those listed herein, or additional similar items identified on site by the Engineer. Work under this item does not include asbestos containing materials, lead paint, contaminated or hazardous soils.

Activities shall be performed in accordance with, but not limited to, the current revision of the USEPA & DEP Hazardous Waste Regulations (40 CFR 260-282, 22a-209 and 22a-449(c)), USEPA PCB Regulations (40 CFR 761), USEPA Protection of Stratospheric Ozone (40 CFR 82), OSHA Hazard Communication (29 CFR 1910.1200), OSHA Hazardous Waste & Emergency Response Regulations (29 CFR 1910.120), USDOT Hazardous Materials Regulation (49 CFR 171-180), OSHA, RCRA, CERCLA, CAA, TSCA, and all other laws and regulations.

The work activities include the removal, handling, packing, labeling, transport, manifesting, and recycling or disposal of various regulated items at the Project site prior to beginning planned renovation/demolition activities.

The Contractor is responsible for verifying actual locations and quantities of the items with hazardous/regulated material/waste constituents and for their proper handling and disposal. The recycling or proper disposal, as appropriate, of all regulated items shall be completed prior to the initiation of any demolition or renovation activities.

Materials:

All materials shall be suitable for the management of regulated items and shall meet all applicable federal, state and local regulations. Such materials include, but are not limited to, proper containers, packing materials, labels, signs, shipping papers, personnel protective equipment (PPE) and spill kits.

Construction Methods:

(1) Allowable Disposal/Recycling Facilities

Disposal facilities for RCRA-hazardous, TSCA-hazardous, Connecticut Regulated, and Universal wastes shall be chosen from among those listed below. No other facility shall be used for these types of wastes without the written approval of the Engineer.

Allied Waste Niagara Falls Landfill, LLC
5600 Niagara Falls Blvd. Niagara, NY 14304
Phone: (716) 285-3344 Fax: (716) 285-3398
Non-hazardous waste, industrial solid waste, municipal sewage treatment sludge, contaminated soil & debris, asbestos waste, C&D debris, industrial process sludge

American Lamp Recycling, LLC
26 Industrial Way
Wappingers Falls, NY 12590
Phone: (845) 896-0058 Fax: (845) 896-1520
Mercury containing device, universal waste

Bridgeport United Recycling, Inc.
50 Cross Street, Bridgeport, CT 06610
Phone: (203) 334-1666 Fax: (203) 334-1439
RCRA & CRW waste oil, fuel, wastewater

Clean Earth of Philadelphia, Inc.
3201 South 61 St., Philadelphia, PA 19153
Phone: (215) 724-5520 Fax: (215) 724-2939
Petroleum contaminated soil

Clean Earth of New Jersey, Inc. (aka CENJ)
115 Jacobus Ave, South Kearny, NJ 07105
Phone: (973) 344-4004 Fax: (973) 344-8652
RCRA liquid and solid, asbestos

Clean Earth of Southeast Pennsylvania, Inc.
7 Steel Road, Morrisville, PA 19067
Phone: (215) 428-1700 Fax: (215) 428-1704
Petroleum contaminated soil

Clean Harbors Environmental Services, Inc.
2247 South Hwy. 71, Kimball, NE 69145
Phone: (308) 235-1012 Fax: (308) 235-4307
RCRA liquid, solid & sludge

Clean Harbors Environmental Services, Inc.
2900 Rockefeller Ave., Cleveland, OH 44115
Phone: (216) 429-2401 Fax: (216) 883-1918
RCRA liquid: aqueous organic & inorganic wastewater

Clean Harbors of Baltimore, Inc.
1910 Russell St, Baltimore, MD 21230
Phone: (410) 244-8200 Fax: (410) 752-2647
RCRA liquid: aqueous organic & inorganic wastewater

Clean Harbors of Braintree, Inc.
1 Hill Avenue, Braintree, MA 02184
Phone: (781) 380-7134 Fax: (781) 380-7193
RCRA & TSCA liquid & solid

Clean Harbors of Connecticut, Inc.
51 Broderick Road, Bristol, CT 06010
Phone: (860) 583-8917 Fax: (860) 583-1740
RCRA & CRW liquid

Clean Harbors of Woburn (Murphy's Waste Oil Services, Inc.)
252 Salem Street, Woburn, MA 01801
Phone: (781) 935-9066 Fax: (781) 935-8615
RCRA liquid: oil, oil/water mixtures; CRW oil filters, oily soil & debris, F001/F002 contaminated oils, antifreeze

Cumberland County Landfill (aka Community Refuse Services – Managed by Interstate Waste Services)
135 Vaughn Road, Shippensburg, PA 17257
Phone: (717) 729-2060 Fax: (717) 423-6822
Municipal solid waste, non-hazardous waste

Cycle Chem (aka General Chemical Corp.)
217 South First Street, Elizabeth, NJ 07206
Phone: (908) 355-5800 Fax: (908) 355-0562
RCRA, TSCA liquid and solid

Environmental Quality Company:
Wayne Disposal Facility (aka EQ Michigan Disposal Waste Treatment Plant and Wayne Disposal Inc. Site #2)
49350 North I-94 Service Drive
Belleville, MI 48111
Phone: (734) 697-2200 Fax: (734) 699-3499
RCRA & TSCA liquid and solid

Environmental Quality Detroit Inc.
1923 Frederick Street, Detroit MI 48211
Phone: (734) 329-8017 Fax: (313) 923-3375
RCRA & CRW liquid wastewater

EQ Pennsylvania (formerly Envirite of PA)
730 Vogelsong Road, York, PA 17404
Phone: (717) 846-1900 Fax: (717) 854-6757
RCRA liquid & solid

Environmental Soil Management of New York, LLC (ESMI of New York)
304 Towpath Road, Fort Edward, NY 12828
Phone: (518) 747-5500 Fax: (518) 747-1181
Petroleum contaminated soil

Environmental Soil Management of NH
67 International Dr., Loudon, NH 03307
Phone: (603) 783-0228 Fax: (603) 783-0104
Petroleum contaminated soil

EnviroSafe Corporation Northeast (formerly Jones Environmental Services, soon to be Triumvirate)
263 Howard Street, Lowell, MA 01852
Phone: (978) 453-7772 Fax: (978) 453-7775
RCRA & TSCA liquid and solid

Greenwood Street Landfill
(NEWS of Worcester, LLC/Casella)
30 Nipp Napp Trail, Worcester, MA 01607
Phone: (508) 755-4604 Fax: (508) 755-8587
Non-hazardous solid waste including contaminated soils

Hazelton Creek Properties, LLC*
(Hazelton Mine Reclamation Project)
280 South Church St., Hazelton, PA 18201
Phone: (570) 574-1010 Fax: (570) 457-3395
Fresh, brackish or marine dredge material, coal ash, cement kiln dust, lime kiln dust, co-gen ash, regulated fill
*Please note that if this facility is to be used, each bin letter will require an additional 10 day (or more) waiting period on top of the 15 day lab period designated in the specs to allow for PADEP review.

Moretown Landfill
(Managed by Interstate Waste Services)
187 Palisades Park, Waterbury, VT 05676
Phone: (802) 244-1100 x226
Fax: (802) 244-5133
Municipal solid waste, non-hazardous waste

Mostoller Landfill
(Managed by Interstate Waste Services)
7095 Glades Pike, Summerset, PA 15501
Phone: (717) 729-2060 Fax: (814) 444-0127
Municipal solid waste, C&D debris, residual waste, sewage sludge, incinerator ash, asbestos

Northampton Landfill
(Operated by Solid Waste Solutions, LLC)
170 Glendale Road, Florence, MA 01062
Phone: (413) 498-0099 Fax: (413) 498-0267
Municipal solid waste, non-hazardous waste, contaminated soil

Northeast Lamp Recycling, Inc.
250 Main Street, East Windsor, CT 06088
Phone: (860) 292-1992 Fax: (860) 292-1114
CRW solid waste, mercury containing devices & universal waste

Northland Environmental, LLC
(aka PSC Environmental Systems)
275 Allens Ave., Providence RI 02905
Phone: (401) 781-6340 Fax: (401) 781-9710
RCRA liquid and solid

Ontario County Landfill
(Managed by Casella Waste)
3555 Post Farm Road, Stanley, NY 14561
Phone: (585) 526-4420 Fax: (585) 526-5459
Municipal solid waste, non-hazardous waste solid, special wastes including asbestos, ash from boilers/incinerators, contaminated soil, demo debris

Paradise Heating Oil, Inc.
Quimby Street, Ossining, NY 10562
Phone: (631) 926-2576 Fax: (718) 294-2226
CRW waste oil liquid

Phoenix Soil Inc.
130 Freight Street, Waterbury, CT 06721
Phone: (203) 759-0053 Fax: (203) 757-4933
Soil contaminated with virgin petroleum, waste oil or coal tar residue

Republic Environmental Systems (aka Philip Services Corporation (PSC) Republic)
2869 Sandstone Dr., Hatfield PA 19440
Phone: (215) 822-8995 Fax: (215) 997-1293
RCRA & TSCA industrial solid & sludge, aqueous waste, contaminated soil, PCB waste, oil & petroleum waste, organic waste

Soil Safe, Inc.
378 Route 130, Logan Township,
Bridgeport NJ 08085
Phone: (410) 872-3990 x1120
Fax: (410) 872-9082
Soil contaminated with petroleum or metals, some industrial waste solids

South Hadley Landfill, Inc.
(Operated by Interstate Waste Services)
12 Industrial Dr, South Hadley, MA 01075
Phone: (413) 535-3095 Fax: (413) 535-2147
Petroleum contaminated soil (limited)

Stablex Canada, Inc.
760 Industrial Blvd.
Blainville Quebec J7C 3V4
Phone: (450) 430-9230 Fax: (450) 430-4642
RCRA liquid and solid, industrial wastes

Ted Ondrick Company, LLC
58 Industrial Road, Chicopee, MA 01020
Phone: (413) 592-2566 Fax: (413) 592-7451
Petroleum contaminated soil

Tunnel Hill Reclamation
2500 Township Road, 205 Route 2
New Lexington, OH 43764
Phone: (914) 713-0203 Fax: (914) 713-0672
Municipal solid waste, non-hazardous waste, contaminated soils

United Oil Recovery, Inc.
(aka United Oil Recycling)
136 Gracey Avenue, Meriden, CT 06451
Phone: (203) 238-6745 Fax: (203) 630-4415
Liquid: RCRA & CRW waste oil & fuel, wastewater

Upton Site Remediation, LLC
(formerly Upton Landfill)
Maple Avenue, Upton, MA 01568
Phone: (413) 522-3688 Fax: (413) 522-3330
Contaminated soil for use as cover material under MADEP COMM-97 policy

Waste Management of NH
TLR III Refuse Disposal Facility
90 Rochester Neck Road, PO Box 7065
Rochester, NH 03839
Phone: (603) 330-2197 Fax: (603) 330-2130
Solid: MSW, C&D, PCB remediation waste (<50ppm), virgin petroleum contaminated soil, CRW solid waste

Waste Management: (Connecticut Valley Sanitary Waste Disposal, Inc. (CVSWD), Chicopee Sanitary Landfill & Waste Management of MA, Inc.)
161 New Lombard Rd Chicopee, MA 01020
Phone: (413) 534-8741 x222
Fax: (413) 493-1547
CRW solid waste, contaminated soil

Waste Management (aka CWM Chemical Services, LLC, Chemical Waste Management of NY) Model City Facility
1550 Balmer Road, Model City, NY 14107
Phone: (800) 843-3604 Fax: (716) 754-0211
RCRA & TSCA liquid and solid

Waste Management:
Granby Sanitary Landfill
11 New Ludlow Rd., Granby, MA 01033
Phone: (413) 467-3200 Fax: (413) 467-3400
CRW solid waste, contaminated soil

The category of material accepted by each facility listed above is for informational purposes only. The Contractor shall verify facility acceptance of each type of regulated item.

(2) Submittals

Thirty (30) days prior to commencement of work involving the management of regulated items, the Contractor shall submit to the Engineer for approval, the following documentation:

1. Copy of Spill Contractor Permit registration issued by the DEP.
2. Ozone depleting substance service technician certification (as applicable).
3. Hazard communication training for all employees performing this work.
4. Names of the treatment facilities, recycling facilities and/or disposal facilities the Contractor intends to use to receive each type of regulated item.
5. Hazardous Material Transporter USDOT Certificate of Registration for each transporter.
6. Hazardous Waste Transporter Permit for the State of Connecticut, the destination state(s), and all other applicable states for each transporter.
7. Request for an EPA Hazardous Waste Generators ID number, for use in manifesting hazardous waste above conditionally exempt small quantities (as applicable).

(3) Regulated Item Management Provisions

(a) General Requirements

The Contractor's OSHA Competent Person shall be in control on the job site at all times during hazardous material management work activities. This person must be capable of identifying existing hazards, possess the authority to implement corrective measures to reduce/eliminate the hazards, comply with applicable Federal, State and Local regulations that mandate work practices, and be capable of performing the work of this contract. All employees who perform regulated material management related work shall be properly trained and qualified to perform such duties.

All labor, materials, tools, equipment, services, testing, insurance, and incidentals which are necessary or required to perform the work in accordance with applicable governmental regulations, industry standards and codes, and these specifications, shall be provided by the Contractor.

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

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

Inventory data from investigative surveys throughout the buildings are included herein and are presented for informational purposes only. Under no circumstances shall this information be the sole means used by the Contractor for determining the quantities or extent of the regulated items to be managed. The Contractor shall be responsible for verification of all field conditions affecting performance of the work. The Contractor shall submit to the Engineer for concurrence any additional items not listed herein that it believes to be regulated items included under this item. However, compliance with applicable requirements is solely the responsibility of the Contractor.

The Engineer will provide a Project Monitor to monitor the activities of the Contractor and inspect the work required. Environmental sampling shall be conducted as deemed necessary by the Engineer. Spill areas shall be cleaned by the Contractor until accepted by the Engineer. The Engineer may sample the spill area to demonstrate Contractor compliance with an acceptable standard.

(b) Personnel Protection

Prior to commencing work, the Contractor shall provide hazard communication training to all employees as necessary in accordance with OSHA 29 CFR 1926.59 and 29 CFR 1910.1200 and instruct all workers in all aspects of personnel protection, work procedures, emergency

procedures and use of equipment including procedures unique to this project. Worker health and safety protocols that address potential and/or actual risk of exposure to site specific hazards are solely the responsibility of the Contractor.

The Contractor shall provide respiratory protection that meets the requirements of OSHA as required in 29 CFR 1910.134 and 29 CFR 1926.1000. A formal respiratory protection program, including appropriate medical surveillance, must be implemented in accordance with OSHA standards. The Contractor shall, as necessary, conduct exposure assessment air sampling, analysis and reporting to ensure the workers are afforded appropriate respiratory protection.

The Contractor shall provide and require all workers to wear appropriate personnel protective equipment, including protective clothing and respiratory protection, as required, within regulated work areas which exceed OSHA Personnel Exposure Limits (PELs) or when handling hazardous materials.

(c) Regulated Item Management Work Procedures

The Contractor shall not begin work until the Project Monitor is on-site.

Prior to beginning work on-site, the Contractor shall prepare waste characterization profile forms for each type of waste stream to be generated and forward such forms to the Engineer for review, approval and signature. Upon approval, the Contractor shall forward such forms to the appropriate disposal facilities for acceptance.

The Contractor shall utilize all appropriate engineering controls and safety and protective equipment while performing the work in accordance with OSHA, USEPA, USDOT, DEP and Connecticut Department of Public Health DPH regulations.

The Contractor shall employ work practices so as to minimize the disturbance of the constituents in the regulated items, and prevent breakage and spills. In the event of a spill, the Contractor shall cordon off the area and notify the Engineer. The Contractor is responsible to have spills and the effected areas decontaminated to the acceptance of the Engineer by personnel trained in hazardous waste operator emergency response.

The Contractor shall carefully and properly remove, handle, pack, label and manifest all of the regulated items in waste containers specified and suitable to contain the waste in accordance with all federal and state regulations.

Prior to transportation and recycling and/or disposal, all proper USEPA, OSHA, DEP and USDOT labels and placards shall be affixed to the waste containers and hazardous materials shipping papers such as waste manifests/bills of lading shall be completed.

Prior to demolition; properly remove, handle, pack, label, transport, manifest and recycle or dispose of the regulated items from those listed below:

Salt Shed 1

- **Universal Waste (UW) – Mercury Lamps from halogen light fixtures**
- **Connecticut Regulated Waste (CRW) – PCB/DEHP ballasts from halogen light fixtures**

Storage Shed 2

- **CTDEEP Special Waste - Tires**

Upon discovery of any previously unidentified regulated items during demolition/renovation activities, the Contractor shall immediately notify the Engineer and work shall cease in that area until the Engineer can determine the extent of any impact and proper handling procedures are implemented.

(d) Waste Disposal

Efforts shall be made to recycle the constituents of the regulated items rather than dispose of them in accordance with the waste minimization efforts required under RCRA.

RCRA hazardous waste shall not be stored on the job site in excess of 90 calendar days from the accumulation start date.

Connecticut Regulated Waste shall not be transported to a RCRA or TSCA permitted facility for disposal, unless otherwise allowed by the Engineer in writing.

All non-RCRA hazardous waste materials, regulated waste materials and recyclable waste items shall be manifested separately from RCRA and TSCA hazardous waste, and documented properly on non-hazardous waste manifests, waste shipment records, bills of lading or other appropriate shipping papers for transportation to the recycling and/or disposal facility.

The Contractor shall prepare each lab pack list and shipping document (manifests, waste shipment records, bills of lading, etc.) with all of the required information completed (including types of waste, proper shipping name, categories, packing numbers, amounts of waste, etc.) in accordance with applicable federal and state regulations. The document will be signed by an authorized agent representing ConnDOT as the Generator for each load that is packed to leave the site.

The Contractor shall forward the appropriate original copies of shipping papers to the Engineer the same day the regulated items leave the project site.

All vehicles departing the site transporting hazardous materials shall display proper USDOT placards, as appropriate for the type of waste being transported.

(e) Project Closeout Documents:

Within thirty (30) days after completion of the on-site project work, the Contractor shall submit to the Engineer copies of the following completed documents:

1. Hazardous Waste Manifests
2. Waste Shipment Records/Bills of Lading
3. Recycling Receipts

Documents 1. through 3. must include the signature of an authorized disposal facility representative acknowledging receipt of hazardous materials.

Method of Measurement:

The work of "Handling and Disposal of Regulated Items" shall be provided for in accordance with Article 1.04.05 – Extra Work.

Basis of Payment:

The work of "Handling and Disposal of Regulated Items" shall be paid for in accordance with Article 1.04.05 – Extra Work, which price shall include the management, removal, handling, packing, labeling, transport, manifesting, recycling or disposal of the regulated constituents in the specific equipment/items scheduled for impact at the project site, and all equipment, materials, tools and labor incidental to the work.

Final payment will not be made until completed copies of the Project Closeout Documents have been provided to the Engineer. Once completed and facility-signed copies have been received in their entirety, the Engineer will make the final payment.

Pay Item	Pay Unit
Handling and Disposal of Regulated Items	Estimate

ITEM #0177100A - SALT SHED AND ENVIRONMENTAL SITE IMPROVEMENTS

Description: Under this item, the Contractor shall complete all work depicted on the Contract Plans and described in the CSI-formatted Specifications that make up this Major Lump Sum Item (MLSI). Refer to Form 816 Article 1.20-1.02.04 for additional information in this regard.

Any work incidental to another bid item which is not specifically described or included in the bid item, but which is required for performance and completion of the work required under the Contract, shall be considered to be included under this item.

Materials: All materials shall be as required by the Contract Plans and as described in the CSI-formatted Specifications that make up this MLSI.

Construction Methods: All methods of construction shall conform to the requirements as stipulated in the CSI-formatted Specifications that make up this MLSI.

Method of Measurement: This item will be paid for at the contract lump sum price for "Salt Shed and Environmental Site Improvements" complete.

Basis of Payment: This item will be paid for at the contract lump sum price for "Salt Shed and Environmental Site Improvements", which price shall include all administrative and procedural requirements, material, equipment, labor, and work incidental thereto.

PAY ITEM	PAY UNIT
Salt Shed and Environmental Site Improvements	LS

ITEM #0202315A - DISPOSAL OF CONTROLLED MATERIALS

Description:

Work under this item shall consist of the loading, transportation and final off-site disposal/ recycling/treatment of controlled materials (excluding dewatering fluids) that have been generated from various excavations within the AOEC(s), brought to the WSA and determined to be contaminated with regulated substances at non-hazardous levels. This contamination is documented in the reports listed in the "Notice to Contractor – Environmental Investigations". The controlled materials, after proper characterization by the Engineer, shall be taken from the WSA, loaded, transported to and treated/recycled/disposed of at a permitted treatment/recycle/disposal facility listed herein.

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

Phoenix Soil LLC P.O. Box 1750 Waterbury, CT 06721 (800) 586-4774; Sue Brenner	Ted Ondrick Company, LLC 58 Industrial Road Chicopee, MA 01020 (413) 592-2566; Alan Desrosiers
ESMI of New York 304 Towpath Road Fort Edward, New York 12828 (800) 511-3764; Peter Hanson	Waste Management of New Hampshire P.O. Box 27065 97 Rochester Neck Road Rochester, NH 03839 (603) 330-2170; Ellen Bellio
ESMI of New Hampshire 67 International Drive Loudon, NH 03307 (603) 783-0228; Stephen Raper	Greenwood Street Landfill 30 Nipp Napp Trail Worcester, MA 01067 (508) 755-4604; Scott Sampson
South Hadley Landfill, LLC 12 Industrial Drive South Hadleym MA 01075 413-535-3095	Waste Management – Chicopee Sanitary Landfill 161 New Lombard Road Chicopee, MA 01020 413-534-8741
Waste Management – Granby Sanitary Landfill 11 New Ludlow Road Granby, MA 01033 413-467-3200	Upton Landfill – Upton Site Remediation, LLC Maple Avenue Upton, MA 413-522-3688

Northampton Landfill 170 Glendale Road Florence, MA 01062 413-498-0099	

Construction Methods:

A. Submittals

The apparent low bidder shall submit in writing, within fourteen days after Bid opening, (1) a letter listing the names of the treatment/recycle/disposal facilities (from the list above) which the bidder, if it is awarded the Contract, will use to receive controlled material from this Project, (2) a copy of the attached "Disposal Facility Material Acceptance Certification" form from each facility, which shall be signed by an authorized representative of each treatment/recycle/disposal facility, and (3) a copy of the facility acceptance criteria and facility sampling frequency requirements from each facility.

Any other Contractor which the Department may subsequently designate as the apparent low 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 low 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.

Failure to comply with all of the above requirements may result in the rejection of the bid.

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

Disposal Facility Materials Acceptance Certification

Project Number _____

Project Location_____

Facility Name_____ Telephone_____

Facility Address_____ Fax_____

_____

_____

The Contractor has supplied the analytical data contained in the report concerning the site investigation performed by the Designer. I have personally reviewed this data and intend to accept the following:

Controlled materials as described in Item # 202315A Disposal of Controlled Materials for the subject Project at a cost of $_____ per ton for treatment/disposal and an additional $_____ per ton for transportation from the Project to the facility (if applicable).

This intent to accept the material 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.

Authorized Facility
Representative_____/_____
Printed/Typed Name Title

_____/_____
Signature Date

Note: The facility shall attach the acceptance criteria and facility sampling frequency requirements to this document.

DO NOT ALTER FORM IN ANY WAY. FORM MUST BE COMPLETED IN ENTIRETY.

B. Material Disposal

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

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

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

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

C. Material Transportation

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

· Transported controlled materials are to be covered sufficiently to preclude the loss of

material during transport prior to leaving the site and are to remain covered until the arrival at the selected treatment/recycling/disposal facility.

- All vehicles departing the site are to be properly logged to show the vehicle identification, driver's name, time of departure, destination, and approximate volume, and contents of materials carried.

- No materials shall leave the site unless a treatment/recycling/disposal facility willing to accept all of the material being transported has agreed to accept the type and quantity of waste.

D. Equipment Decontamination

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

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

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

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

Method of Measurement:

The work of "DISPOSAL OF CONTROLLED MATERIALS" will be measured for payment as the actual net weight in tons of material delivered to the treatment/recycling/disposal facility. Such determinations shall be made by measuring each hauling vehicle on the certified permanent scales at the treatment/recycling/disposal facility. Total weight will be the summation of weight bills issued by the facility specific to this Project. Excess excavations made by the Contractor beyond the payment limits specified in Specification Sections 2.02, 2.03, 2.05, 2.06, or the Contract Special Provisions (as appropriate) will not be measured for payment and the Contractor assumes responsibility for all costs associated with the appropriate handling, management and disposal of this material.

The disposal of excavated materials, originally anticipated to be controlled materials, but determined by characterization sampling not to contain concentrations of regulated chemicals (non-polluted or "clean" materials) will not be measured for payment under this item but will be considered as surplus excavated materials and will be paid in accordance with Article 1.04.05.

Any materials, which are determined through characterization sampling to be contaminated but reusable in accordance with the Remediation Standard Regulations, and which are reused within Project limits, will not be measured for payment under this item. This material will be paid for under Item 0202318A – Management of Reusable Controlled Material or in accordance with Article 1.04.05 in the item's absence.

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

Basis of Payment:

This work will be paid for at the Contract unit price, which shall include the loading and transportation of controlled materials from the WSA to the treatment/recycling/disposal facility; the fees paid to the facility for treatment/recycling/disposal; the preparation of all related paperwork; and all equipment, materials, tools, and labor incidental to this work. **This unit price will be applicable to all of the Contractor-selected disposal facilities and will not change for the duration of the Project.**

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

Pay Item	Pay Unit
Disposal of Controlled Materials	Ton

ITEM #0202318A - MANAGEMENT OF REUSABLE CONTROLLED MATERIAL

Description:

Work under this item shall include all materials, equipment, tools and labor required to load, transport from the WSA, place, and compact reusable controlled materials in fill areas located within the Project limits. "Reusable controlled material" is soil that contains contaminant concentrations above analytical detection limits, but below the applicable regulatory criteria.

Construction Methods:

Controlled material stored within the WSA which is determined to be reusable following analytical testing shall be loaded, transported, placed and compacted at fill areas located within the Project limits in accordance with the following conditions: (1) such soil is deemed to be structurally suitable for use as fill by the Engineer; (2) such soil is not placed below the water table; 3) the DEP groundwater classification of the area where the soil is to be reused as fill does not preclude said reuse; and (4) such soil is not placed in an area subject to erosion.

Method of Measurement:

"Management of Reusable Controlled Material" will be measured for payment by the number of cubic yards of material loaded and transported from the WSA and placed at fill areas located within the Project limits in accordance with the Contract.

Basis of Payment:

"Management of Reusable Controlled Material" will be paid for at the Contract unit price, which shall include all materials, equipment, tools and labor necessary to load and transport reusable controlled materials from the WSA to fill areas located within the Project limits and to place and compact the reusable material. This price shall include any decontamination of soil handling equipment, and the treatment/recycling/disposal of wastes generated in conjunction with such decontamination.

No separate payment will be made for consolidating previously tested individual stockpiles that have been deemed reusable, but shall be considered incidental to the work.

The disposal of any reusable controlled material that fails to meet material testing requirements for the intended use in accordance with the Contract requirements, as well as any excess reusable material, will be paid under Item 202315A, "Disposal of Controlled Material".

Pay Item	Pay Unit
Management of Reusable Controlled Materials	C.Y.

ITEM #0202640A - 2" MONITORING WELL ABANDONMENT

Description:

Work under this item shall consist of the abandonment of 2 inch monitoring wells by a registered well driller at locations shown on the Plans or as directed by the Engineer. The well driller must be registered in the State of Connecticut.

Materials:

The grout used to seal the ground water monitoring wells shall be a bentonite cement grout complying with RCSA 25-128-36(E). The mix shall be comprised of one ninety-four (94) pound bag of portland cement, an equal volume of dry sand, and five to six gallons of water with ten percent (10%) bentonite added to reduce shrinkage. The Contractor shall not use admixtures to decrease the set time of the grout.

Construction Methods:

The Contractor shall submit the name of the registered driller and a copy of their Certificate of Registration, as indicated in the Connecticut Department of Consumer Protection Regulations Section 25-129, at least fourteen (14) days prior to starting well abandonment work.

Wells shall be abandoned prior to the commencement of any earthwork. The Contractor shall coordinate the work of monitoring well abandonment with the Engineer. No such work shall be performed without the Engineer present to verify abandonment procedures.

Wells shall be abandoned in accordance with the Connecticut Department of Consumer Protection Regulations, particularly Sections 25-128-56 and 25-128-57. In the event of any conflict between the regulations and this specification, the more stringent shall apply.

Well Abandonment Procedure:

1. The well shall be plugged to prevent the entrance of surface water, circulation of water between or among producing zones, or any other process resulting in the contamination or pollution of ground water resources.
2. The well shall be chlorinated prior to abandonment using a chlorine solution with a minimum concentration of 150 ppm of chlorine.
3. The well shall be checked from land surface to the entire depth of the well before it is sealed to ensure against the presence of any obstruction that will interfere with sealing operations.
4. The well bore shall be completely filled and sealed with bentonite cement grout.
5. The grout material shall be placed in such a way to prevent voids in the grout or dilution of the grout.

6. Any test well or bore shall be abandoned in such a manner that it does not become a channel for the vertical movement of water or other substance to the potable ground water resources.
7. Upon completion of abandonment of the well, the top of the casing and grout material shall not be terminated more than four feet below the ground surface of the final grade.

Method of Measurement:

Monitoring well abandonment will be measured for payment by the number of 2" ground water monitoring wells abandoned at locations shown on the Plans and directed by the Engineer.

Basis of Payment:

This work will be paid for at the Contract unit price per well abandoned. This unit price shall include all equipment, materials and labor, including the furnishing of specialty services and specialized equipment, backfilling, excavation, and implementation of health and safety provisions incidental to the abandonment of the ground water monitoring wells.

Pay Item	Pay Unit
2" Monitoring Well Abandonment	Ea.

ITEM #0204213A - HANDLING CONTAMINATED GROUNDWATER

Description:

Under this Item, the Contractor shall collect, manage, treat, and dispose of contaminated groundwater generated during dewatering operations within the designated Groundwater Area of Environmental Concern (GW AOEC) within the project limits.

Contaminated groundwater is defined as "groundwater which has been generated from excavations within the designated GW AOEC containing substances at concentrations that exceed the effluent limits for the DEEP General Permit for the Discharge of Groundwater Remediation Wastewater Directly to Surface Water". The presence of contaminants removable through control of settleable solids does not constitute contaminated groundwater. Groundwater contamination caused by the Contractor's activities or work practices is also not considered contaminated groundwater.

The contamination and groundwater depth at the time of the investigation is documented in the reports listed in the "Notice to Contractor – Environmental Investigations". Contaminants and depth to groundwater is provided for the Contractor's information and may be influenced by factors such as seasonal groundwater table changes, tidal changes, drought or flooding conditions, local withdrawals from the aquifer, local construction, etc. Additional information with regard to soil descriptions and groundwater observations may also be available if geotechnical investigations were conducted for the project. The Contractor shall contain contaminated groundwater and 1) treat it on-site prior to discharge to sanitary sewer; 2) treat it on-site prior to discharge to surface water; or 3) transport water to an off-site treatment/disposal facility.

This Item does not apply to the possible diversion of existing storm water flow around the construction site during Project activities. Diversion of existing storm water or surface flows shall be completed in accordance with the Contract and all applicable permits. This item also does not include process water or wastewater generated by the Contractor's work activities.

Construction Methods:

A. General

It is the Contractor's responsibility to determine the expected groundwater generation rate from construction activities, select the appropriate groundwater management method, and size its system capacity to meet those dewatering needs.

All equipment required as a part of this Item shall be installed in a location and manner acceptable to the Engineer and in accordance with the manufacturer's recommendations. Equipment shall be decontaminated prior to arrival at the Project, decontaminated prior to

being moved to another area of the project, and then decontaminated before it leaves the Project, at no additional cost to the State. Solids (soil or sediment) generated by on-site dewatering activities shall be brought to the Waste Stockpile Area (WSA) for testing and characterization by the Engineer.

The Contractor is responsible for operating and maintaining the equipment at all times when dewatering in the GW AOEC occurs. This includes providing appropriate supervision during evenings, weekends, and holidays. If the system is intended to operate unattended, a remote alarm system acceptable to the Engineer shall be installed to monitor critical system operating parameters and the Contractor shall be responsible for providing rapid emergency response during non-working hours in the event a system malfunction occurs. A list of names and phone numbers shall be displayed in the immediate vicinity of the system for emergency contacts.

The Contractor shall report releases from the groundwater treatment system due to overfilling or equipment/piping failure to the DEEP Spill Response Unit in accordance with RCSA 22a-450 and provide the Engineer with all information, including the DEEP case number. All costs related to spill response associated with the Contractor's on-site containment or treatment system will be the responsibility of the Contractor.

The Contractor shall collect all samples related to permit compliance in the presence of the Engineer. The Contractor shall provide informational copies of all groundwater analytical results and discharge monitoring reports to the Engineer as they are generated.

The Contractor shall operate the dewatering equipment at a rate that removes the groundwater that naturally infiltrates the excavation. The Contractor shall not cause a hydraulic gradient that draws groundwater into the excavation at an excessive rate. Additional treatment required due to the mobilization of off-site contaminants caused by the Contractor dewatering at an excessive rate will be the responsibility of the Contractor.

Additional treatment related to the Contractor's work activities (i.e. treatment or increased charges due to changes in pH or introduction of different contaminants into the groundwater) and management and disposal of excess water related to the Contractor's process water or waste water will not be included under this item but will be considered a part of the Contractor's cost for the item under which the work is being performed.

B. Groundwater Management Methods

The Contractor shall use one or more of the following methods for the management and disposal of contaminated groundwater. Based on project specifics and site constraints, the Contractor may choose to use more than one of the following methods on a single project. All methods may not be possible at the site due to sanitary sewer or permitting restrictions.

1. On-Site Treatment System with Discharge to Sanitary Sewer

a. Contractor Submittals

At least 14 days prior to any submittal to the Publicly Owned Treatment Works (POTW) or DEEP, the Contractor shall submit the treatment system design, which has been sealed by a Professional Engineer licensed in the State of Connecticut to the Engineer for review and comment. Equipment shall prevent sediments and solids, as well as contaminants in excess of the permit allowable effluent concentrations, from entering the sanitary sewer. This submittal shall include a schematic or diagram that shows all treatment system equipment, well point locations, pump set-ups in excavations, sedimentation control methods, system location, method of conveyance, flow rates, pipe sizes, valve locations, sampling ports, discharge locations, electrical power connection, etc.

The Contractor shall submit the manufacturer's data sheets, assembly details and performance data on all treatment equipment. If dewatering equipment is to remain on site between October 15 and April 15, the Contractor shall include its method to prevent the treatment system equipment from freezing (heat tape, immersion heaters, etc.).

The Contractor shall detail its method to collect and contain water in its excavations. The Contractor shall also describe in detail its methods for limiting the quantity of water entering the excavation, including shoring, location of well points, limiting excavation size, preventing entry of surface water into the excavation, etc. The Contractor shall also include its assumptions and flow rate calculations related to the sizing of the system.

It is the Contractor's responsibility to design and properly size the system to accommodate the anticipated contaminants and dewatering rates based on its construction activities, POTW limitations, and permit requirements. The Contractor is alerted that construction activities may be limited based on permit restrictions or POTW limitations.

No claim for delay or request for additional time will be considered based upon the Contractor's failure to accommodate the review process.

b. Permits

Groundwater generated by construction activities within a GW AOEC shall be appropriately treated and discharged to the sanitary sewer system within Project limits. Management and discharge of contaminated groundwater shall be accomplished in accordance with a DEEP General Permit and POTW requirements. The Contractor shall be responsible for registering under the General Permit, any other necessary State or local permits, and all associated fees.

The DEEP General Permit for the Discharge of Groundwater Remediation Wastewater to Sanitary Sewer is available at www.ct.gov/dep. The Contractor shall submit the most current permit registration form to the DEP. A minimum lead-time of six (6) weeks can

be expected to process and submit the registration, in addition to coordination time with the POTW. **No claim for delay or request for additional time will be considered based upon the Contractor's failure to accommodate the permitting process.** The Contractor shall not submit the permit registration to the DEEP prior to the Engineer's review of and comment on the treatment system.

The Contractor shall submit a copy of the DEEP permit certificate of registration to the Engineer prior to initiating any discharge.

All testing required by the general permit shall be conducted by a laboratory certified by the Connecticut Department of Public Health (DPH) for the method specified in the permit. The Contractor shall submit copies of the analytical results to the all parties specified in the permit terms and conditions and to the Engineer.

No claim for delay or request for additional time will be considered based upon the Contractor's failure to design a system to meet this performance specification. It is the Contractor's responsibility to properly size the treatment system and temporary containment tanks based on its anticipated flow rates from construction activities and to determine the level of treatment required to meet permit discharge limits.

c. Treatment System Operation

The Contractor shall ensure that all personnel involved in the groundwater treatment operations understand the terms of the General Permit. In the event of a conflict between the requirements of the Contract and the permit, the more stringent will apply.

The Contractor shall not commence work activities within any GW AOEC until such time as:

i. the temporary groundwater treatment system design is reviewed by the Engineer and comments are adequately addressed,

ii. the system is installed in accordance with the accepted design and is completely operational, and

iii. a copy of the Contractor's permit certificate of registration has been submitted to the Engineer.

The Contractor shall make any sanitary sewer tie-in modifications necessary to accommodate the treatment unit only after obtaining approval from the Engineer and the POTW.

The Contractor shall take all meter readings required by the permit and forward them to the appropriate parties.

The Contractor shall collect all samples related to permit compliance in the presence of the Engineer and shall submit copies of the analytical results and discharge monitoring reports to the appropriate agency(ies) as required by the General Permit terms and conditions. The Contractor shall provide informational copies of all analytical results and discharge monitoring reports to the Engineer as they are generated. In the event of an exceedance, the Contractor shall immediately comply with the "***Duty to Correct, Record, and Report Violations***" section of the General Permit. The Contractor shall provide the Engineer a copy of the required DEEP reporting and then document its review of the treatment system and all actions taken to correct the exceedance in writing to the Engineer within 48 hours of receiving laboratory data documenting the exceedance.

If the discharge must be suspended due to an effluent violation, the Contractor shall only restart the discharge after obtaining all necessary approvals from the DEEP/POTW and in full compliance with the General Permit and any amendments imposed thereto.

No claim for delay, request for additional time, or request for additional design/redesign costs for the system will be considered based upon the Contractor's failure to design/redesign a system to meet this performance specification.

2. On-Site Treatment System with Discharge to Surface Water

a. Contractor Submittals

At least 14 days prior to <u>any</u> submittal to the DEEP, the Contractor shall submit the treatment system design, which has been sealed by a Professional Engineer licensed in the State of Connecticut, to the Engineer for review and comment. Equipment shall prevent sediments and solids, as well as contaminants in excess of the permit allowable effluent concentrations, from discharging. This submittal shall include a schematic or diagram that shows all treatment system equipment, well point locations, pump set-ups in excavations, sedimentation control methods, system location, method of conveyance, flow rates, pipe sizes, valve locations, sampling ports, discharge locations, electrical power connection, etc.

The Contractor shall submit the manufacturer's data sheets, assembly details and performance data on all treatment equipment. If dewatering equipment is to remain on site between October 15 and April 15, the Contractor shall include its method to prevent the treatment system equipment from freezing (heat tape, immersion heaters, etc.).

The Contractor shall detail its method to collect and contain water in its excavations. The Contractor shall also describe in detail its methods for limiting the quantity of water entering the excavation, including shoring, location of well points, limiting excavation size, preventing entry of surface water into the excavation, etc. The Contractor shall also include its assumptions and flow rate calculations related to the sizing of the system.

It is the Contractor's responsibility to design and properly size the system to accommodate the anticipated contaminants and dewatering rates based on its construction activities and permit requirements. The Contractor is alerted that construction activities may be limited based on permit restrictions.

No claim for delay or request for additional time will be considered based upon the Contractor's failure to accommodate the review process.

b. Permits

Groundwater generated by construction activities within a GW AOEC shall be appropriately treated and discharged to surface water within Project limits. Management and discharge of contaminated groundwater shall be accomplished in accordance with a DEEP General Permit. The Contractor shall be responsible for registering under the General Permit and all associated fees.

The DEEP General Permit for the Discharge of Groundwater Remediation Wastewater Directly to Surface Water is available at www.ct.gov/dep. The Contractor shall submit the most current permit registration form to the DEEP. A minimum lead-time of six (6) weeks can be expected to process and submit the registration. **No claim for delay or request for additional time will be considered based upon the Contractor's failure to accommodate the permitting process.** The Contractor shall not submit the permit registration to the DEEP prior to review of and comment on the treatment system by the Engineer.

The Contractor shall submit a copy of the DEEP permit certificate of registration to the Engineer prior to initiating any discharge.

All testing required by the General Permit shall be conducted by a laboratory certified by the Connecticut Department of Public Health (DPH) for the method specified in the permit. The Contractor shall submit copies of the analytical results to the all parties specified in the permit terms and conditions and to the Engineer.

No claim for delay or request for additional time will be considered based upon the Contractor's failure to design a system to meet this performance specification. It is the Contractor's responsibility to properly size the treatment system and temporary containment tanks based on its anticipated flow rates from construction activities and to determine the level of treatment required to meet permit discharge limits.

For sites where the receiving water body does not qualify the site for registration under the DEEP General Permit for the Discharge of Groundwater Remediation Wastewater Directly to Surface Water and the discharge is anticipated to continue for 30 days or less, the Contractor may qualify for a DEEP Temporary Authorization (TA) to discharge to surface water. The Contractor will be bound to the terms and conditions of the TA the same as if it were a permit. If the Contractor applies for, and receives, a TA from the

DEEP, all other requirements of this specification will apply, except that where the specification refers to a permit, the TA will be substituted.

c. Treatment System Operation

The Contractor shall ensure that all personnel involved in the groundwater treatment operations understand the terms of the General Permit. In the event of a conflict between the requirements of this Item and the permit, the more stringent will apply.

The Contractor shall not commence work activities within any GW AOEC until such time as:

i. the temporary groundwater treatment system design is reviewed by the Engineer and comments are adequately addressed,

ii. the system is installed in accordance with the accepted design and is completely operational, and

iii. a copy of the Contractor's permit certificate of registration has been submitted to the Engineer.

The Contractor shall take all meter readings required by the permit and forward them to the appropriate parties.

The Contractor shall submit copies of the analytical results and discharge monitoring reports to the appropriate agency(ies) as required by the General Permit terms and conditions. The Contractor shall provide informational copies of all analytical results and discharge monitoring reports to the Engineer as they are generated. In the event of an exceedance, the Contractor shall immediately comply with the "***Duty to Correct, Record, and Report Violations***" section of the General Permit. The Contractor shall provide the Engineer a copy of the required DEEP reporting and then document its review of the treatment system and all actions taken to correct the exceedance in writing to the Engineer within 48 hours of receiving laboratory data documenting the exceedance.

If the discharge must be suspended due to an effluent violation, the Contractor shall only restart the discharge after obtaining all necessary approvals from the DEEP and in full compliance with the General Permit and any amendments imposed thereto.

No claim for delay, request for additional time, or request for additional design/redesign costs for the system will be considered based upon the Contractor's failure to design/redesign a system to meet this performance specification.

3. Off-Site Treatment and Disposal

At least 14 days prior to any work involving the dewatering of contaminated groundwater, the Contractor shall submit for the Engineer's review and comment its proposed system to collect and contain the contaminated groundwater. This submittal shall include schematics of proposed pump set-ups in excavations; sedimentation control measures; probable location of temporary containment tanks; schematics of proposed method to transfer liquids from temporary containment tanks to transport vehicles; schematic of proposed method to off-load liquids at the off-site permitted treatment/disposal facility; documentation that transport vehicles hold a "Waste Transportation Permit" for contaminated liquids per CGS 22a-454; and the name of the disposal facility from the following list of Department-approved and DEP-permitted treatment facilities for State-regulated liquid disposal:

Clean Harbors of CT
51 Broderick Rd.
Bristol, CT 06010
(860)224-7600

United Oil Recycling
Gracey Ave.
Meriden, CT 06450
(203)238-6754

Bridgeport United Recycling
50 Cross St.
Bridgeport, CT 06610
(203)238-6754

All testing required to meet facility acceptance parameters shall be conducted by the Contractor in the presence of the Engineer. The Contractor is hereby notified that laboratory turnaround time is expected to be fifteen (15) working days. The Contractor shall provide informational copies of the laboratory results to the Engineer. **No delay claim will be considered based upon the Contractor's failure to accommodate the laboratory turnaround time as identified above or to design its system with sufficient holding capacity to accommodate this requirement.**

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

The Contractor will be responsible for disposal of the entire shipment as the Hazardous Waste Generator for water that undergoes a change in waste classification due to the Contractor's work activities or processes (i.e. contaminated groundwater being classified characteristically hazardous for pH due to grouting operations).

Method of Measurement:

Within fourteen (14) calendar days after addressing the Engineer's comments on the proposed system(s) for Handling Contaminated Groundwater, the Contractor shall submit to the Engineer for approval a cost breakdown of its lump sum bid price. The submission must include substantiation showing that the cost breakdown submitted is reasonable based on the Contractor's lump sum bid. The cost breakdown shall be in accordance with the following payment schedule:

a. The cost to prepare the design for proposed system(s) for Handling Contaminated Groundwater, including preparation and submittal of all permit registration applications, in accordance with these specifications. Design costs shall not exceed 10% of the total cost of the item.

b. The procurement and installation cost for the proposed system(s) for Handling Contaminated Groundwater in accordance with these specifications. Procurement and installation costs shall not exceed 20% of the total cost of the item.

c. Equipment decontamination and demobilization and restoration of site. Decontamination and demobilization costs shall not exceed 10% of the total cost of the item.

d. The remaining costs for operation, monitoring, permit compliance, sampling and analysis, disposal costs, and maintenance of the proposed system(s), including cleaning of the temporary containment tanks of settled solids, transporting of solids to the WSA, and transportation of the contaminated dewatering wastewater to an off-site permitted treatment/disposal facility in accordance with these specifications shall be divided evenly throughout the duration of the project work involving contaminated groundwater at the discretion of the Engineer.

Increased costs directly related to the Contractor's operation (i.e. treatment or increased charges due to changes in pH or additional contaminants, treatment and disposal of excess water related to process or waste water, etc.) will not be paid under this item but will be considered a part of the Contractor's cost for the item under which the work is being performed.

Basis of Payment:

This work will be paid for at the Contract lump sum price for "Handling Contaminated Groundwater" which price shall include: all work and materials involved with handling contaminated groundwater from within GW AOEC and shall include all equipment, materials, tools and labor incidental to removal of the contaminated groundwater from the excavation; conveying contaminated groundwater from the dewatering point to the temporary containment tanks and groundwater treatment facility; treatment; conveying discharge of contaminated wastewater to a sanitary sewer, surface water or off-site disposal at a permitted treatment/disposal facility (including transportation); disposal or recycling of used treatment media (i.e. bag filters and spent carbon); permit applications; disposal and permit fees; POTW fees; electrical costs; sampling and documentation costs; laboratory costs; design and

monitoring; mobilization, operation, and maintenance of the system; site work; all required equipment decontamination; transportation of solids to the WSA; and equipment demobilization.

Sedimentation control associated with work under this Item will be paid under the appropriate items of the Contract.

Pay Item	Pay Unit
Handling Contaminated Groundwater	Lump Sum

ITEM #0210100A - ANTI –TRACKING PAD

Description:

Work under this item shall consist of furnishing, installing, maintaining and removing a crushed stone anti-tracking pad on filter fabric at the location shown on the plans or ordered by the Engineer.

Materials:

Materials for this work shall conform to the requirements of Article M.01.01, No.3 for crushed stone, and M.08.01-26 for geotextile filter fabric.

Construction Methods:

Clear area of anti-tracking pad of all vegetation and excavate to a minimum depth of 4". Place filter fabric over the full width and length of excavated area and cover with crushed stone to a depth of no less than 4".

The anti-tracking pad shall be uniformly graded to produce the entry and exit path to the site for all construction equipment. The pad shall be maintained of sufficient grading and stone surface to capture all soils and sediment from equipment tires prior to such exiting from the site.

Stone shall be replenished or replaced as necessary or as ordered by the Engineer to assure sufficient capture of sediment at the construction site. Any sediment tracked off the site shall be immediately cleaned, swept and removed by the Contractor at no cost to the State.

Method of Measurement:

This work will be measured for payment by the number of square yards of accepted anti-tracking pad completed as shown on the plans or ordered by the Engineer.

Basis of Payment:

This work will be paid for at the contract unit price per square yard for "Anti-Tracking Pad," complete which price shall include furnishing, placing, maintaining, and removing all materials, equipment, tools and labor incidental thereto.

Pay Item	Pay Unit
Anti-Tracking Pad	SY

ITEM #0406996A - PAVING FABRIC

Description:
Work under this item shall consist of furnishing and installing paving fabric on a bituminous concrete base course and covered with a bituminous concrete top course in the locations and to the dimensions shown on the plans as directed or as approved by the Engineer.

Submittals: Submit Product Data, including complete materials of construction and method of installation. Pavement fabric manufacturer to submit certified statement of factory testing and UL certificate upon approval.

Materials:
Paving Fabric: Paving fabric shall be 4.6 ounces per square yard. Provide Mirafi MPV600 by TenCate, Petromat 4597 by Propex, or equal.

Sealant: Uncut asphalt cement in conformance with fabric manufacturer's recommendations.

Construction Methods:
Install paving fabric in areas as shown on the plans. All materials shall be installed in strict accordance with the manufacturer's recommendations. A technical representative of the manufacturer shall be present at the job site for a minimum of one 8-hour workday in order to supervise the initial installation of the paving fabric.

Examine the areas and conditions under which paving fabric will be installed. Correct conditions detrimental to proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

Protect fabric from traffic during all operations. Do not allow excessive wrinkling and/or folding of the material to occur. Do not puncture or tear the fabric. Fabric damaged during construction shall be repaired in strict accordance with the manufacturer's recommendations.

Uniformly spray sealant over the surface. The rate of application shall be as recommended by the manufacturer. Apply the sealant 2 to 6 inches beyond the width of the fabric. Using a pneumatic roller, unroll fabric onto sealant. Minimize folds and wrinkles. Fabric can be cut at folds or to fit tight areas. Create joints using fabric with 1 to 3 inches overlap and approximately 0.25 gallons of sealant per square yard.

Apply bituminous top course on same day as installation of fabric. Compact as indicated on the drawings and specified herein. Turning or stopping equipment should be avoided while on the site, as this may cause tearing or displacement of the fabric.

Provide at least one person who shall be thoroughly trained and experienced in the skills required, who shall be completely familiar with the design and application of the work, and who shall be present at all times during the progress of the work, and shall direct all work performed.

Method of Measurement:
This work will be measured for Payment by the actual number of square yards of paving fabric completed, accepted and measured in place.

Basis of Payment:
This work will be paid for at the unit price per square yard for "Paving Fabric" complete in place, which shall include paving fabric, sealant, tools, material and labor incidental thereto.

There will be no direct payment made for sealant, but the cost thereof shall be included in the cost of the paving fabric item.

Pay Item	Pay Unit
Paving Fabric	S.Y.

ITEM #0406999A - ASPHALT ADJUSTMENT COST

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

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

The asphalt adjustment cost will be based on the variance in price for the performance-graded binder component of hot mix asphalt (HMA), warm mix asphalt (WMA) mixtures, and Ultra-Thin Bonded Hot-Mix Asphalt mixtures completed and accepted in the contract.

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

I. For HMA and WMA mixtures:
   a. The HMA or WMA mixture in which the adjustment is being applied is listed as a contract item with a pay unit of tons or metric tons.
   b. The total quantity for all HMA and WMA mixtures in a contract or individual purchase order (Department of Administrative Service contract awards) exceeds 1000 tons or more.
   c. The difference between the posted *Asphalt Base Price* and *Asphalt Period Price* varies by more than $5.00.

II. For Ultra-Thin Bonded HMA mixtures:
   a. The Ultra-Thin Bonded HMA mixture in which the adjustment is being applied is listed as a contract item.
   b. The total quantity for Ultra-Thin Bonded HMA mixture in a contract exceeds:
      i. 800 tons (727 metric tons) if Ultra-Thin Bonded HMA is listed as a contract item with a pay unit of tons or metric tons.
      ii. 30,000 square yards (25,080 square meters) if Ultra-Thin Bonded HMA is listed as a contract item with a pay unit of square yards or square meters.

      Note: For condition II.b.ii, the quantity of Ultra-Thin Bonded HMA measured in tons shall be determined from the material documentation requirements set forth in the Ultra-Thin Bonded HMA Special Provision.
   c. The difference between the posted *Asphalt Base Price* and *Asphalt Period Price* varies by more than $5.00.
   d. No Asphalt Adjustment Cost shall be applied to the liquid emulsion that is specified as part of the Ultra-Thin Bonded HMA mixture system.

III. Regardless of the binder used in all HMA and/or WMA mixtures, the Asphalt Adjustment Cost will be based on PG 64-22.

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

The selling price furnished from the Asphalt Weekly Monitor ® is based on a standard ton (US$/ST). The metric ton price is determined by applying a factor of 1.1023 (US$/ST x 1.1023 = US$/mton). Example: $150.00/ton x 1.1023 = $165.34/mton

Formula: HMA x $\frac{PG\%}{100}$ x [(*Period Price* - *Base Price*] = $ ____ , where

- **HMA:**
  1. For HMA, WMA, and Ultra-Thin Bonded HMA mixtures with pay units of mass: The quantity (tons or metric tons) of accepted HMA, WMA, or Ultra-Thin Bonded HMA mixture measured and accepted for payment.
  2. For Ultra-Thin Bonded HMA mixtures with pay units of area: The quantity of Ultra-Thin Bonded HMA mixture delivered, placed, and accepted for payment, calculated in tons or metric tons as documented according to the Material Documentation provision (section E) of the Ultra-Thin Bonded HMA Special Provision.

- ***Asphalt Base Price***: The asphalt price that is posted on the ConnDOT website 28 days before the actual bid opening posted.

- ***Asphalt Period Price***: The asphalt price that is posted on the ConnDOT website for the period in which the HMA, WMA mixture is placed.

- Performance-Graded Binder percentage (**PG%**)

  1. For HMA or WMA mixes:
     PG% = 4.5
     - For Superpave 37.5mm (1.5 inch), Superpave 25.0mm (1.0 inch), HMA S1, and Class 4

       PG % = 5.0
     - For Superpave 12.5mm (0.50 inch), HMA S0.5 and Class 1.

       PG % = 6.0
     - For Superpave 0.375 inch (9.5mm), HMA S0.375, Superpave 6.25mm (0.25 inch), HMA S0.25, Superpave 4.75mm (#4) and Class 2.

  2. For Ultra-Thin Bonded HMA mixes:

PG% = Design % PGB (Performance Graded Binder) in the approved job mix formula, expressed as a percentage to one decimal point (e.g. 5.1%)

The adjustment shall not be considered as a changed condition in the contract because of this provision and because the Contractors are being notified before submission of bids.

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

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

ITEM #0507171A - HYDRODYNAMIC SEPARATOR

Description: Hydrodynamic separators are proprietary devices manufactured for stormwater treatment. The hydrodynamic separator shall be a precast concrete structure and include an internal chamber with features that induce a swirling, circular, or spiraling flow pattern in the stormwater flow that separate and trap sediment and pollutants in a chamber that can be accessed for later removal.

This item will consist of furnishing and construction of a hydrodynamic separator, a flow diversion structure, manholes and pipes in the location, grades, treatment capacity and to the dimensions and details shown on the contract drawings, and in accordance with these specifications or as directed by the Engineer. The work also includes the preparation of hydraulic design calculations for the hydrodynamic separator(s) and flow diversion structure(s) as specified herein.

The hydrodynamic separator shall be assembled and installed in strict compliance with the Manufacturer's instructions unless otherwise directed by these specifications or by the Engineer. Internal flow controls / diversion components, external appurtenances, concrete manhole riser sections, manhole frames and covers, reinforcing, threaded inserts, lifting and seating fixtures, non-shrink grout, and all other necessary materials and equipment to complete the work shall be included.

This item shall also include the cleaning of the hydrodynamic separator of all sediment and debris every 90 days, or as needed, from when they are put into service, until final acceptance of the project.

Approved Products and Manufacturer Information: Proprietary hydrodynamic separators currently approved by the Department are listed in Table 1 "**CONNDOT LIST OF APPROVED HYDRODYNAMIC SEPARATORS**". Company contact information is provided for convenience. *As the company information frequently changes, the Department is not responsible for its accuracy.*

The Engineer will reject any proposed hydrodynamic separator that is not listed in Table 1.

The listed products have been approved for use on Department projects based on only a general review of the product's construction, function and treatment capabilities. **Therefore, the approved list shall not be construed to mean that all products appearing on the list are suitable to any specific project site or drainage design.**

Performance: The stormwater treatment performance of the selected hydrodynamic separator shall be based on the water quality flow (WQF) as defined and calculated in accordance with the Department's current version of the Drainage Manual.

The hydrodynamic separator shall be designed to treat the entire WQF as indicated on the contract drawings or specifications, without bypass, either through the separator's internal components or at the flow diversion structure.

TABLE 1 – CONNDOT LIST OF APPROVED HYDRODYNAMIC SEPARATORS

HYDRODYNAMIC SEPARATOR PRODUCT NAME	COMPANY INFORMATION
Downstream Defender	Hydro International 94 Hutchins Drive Portland, Maine 04102 (207) 756-6200 http://www.hydrointernational.biz/us/index_us.php
FloGard Dual-Vortex Hydrodynamic Separator	KriStar Enterprises, Inc. 4020 Riverclub Drive Cumming, Georgia 30041 (770)-889-4338 http://www.kristar.com/
High Efficiency CDS	Contech Stormwater Solutions 200 Enterprise Drive Scarborough, Maine 04074 (800)-925-5240 http://www.contech-cpi.com/stormwater/13
Vortechs	
Vortsentry	
Hydroguard	Hydroworks, LLC 525Boulevard Kenilworth, NJ 07033 (888)-290-7900 / (908)-272-4411 http://www.hydroworks.org/
Stormceptor OSR	Rinker Materials – Stormceptor 69 Neck Road Westfield, MA 01085 (800)-909-7763 / (413) 246-7144 www.rinkerstormceptor.com
Stormceptor STC	
V2B1	Environment 21 8713 Read Road, P.O. Box 55 East Pembroke, New York 14056-0055 (800)-809-2801 / (585)-815-4700 www.env21.com

Hydrodynamic separator systems and models that have been pre-approved for use on Department projects and their corresponding maximum allowable WQF's for stormwater treatment are shown in **Table 2**, "**PERFORMANCE MATRIX FOR CONNDOT APPROVED HYDRODYNAMIC SEPARATORS**". The Engineer shall reject any proposed hydrodynamic separator system/model that is not listed in Table 2.

For more severe storm events that produce flows up to and including the drainage design flow (DDF) and which result in flows greater than the WQF being directed to the hydrodynamic separator from the flow diversion structure, the hydrodynamic separator shall be capable of conveying the portion of the DDF directed to it without surcharging the upstream storm drainage system and re-suspending previously trapped sediment.

The WQF to be treated and the portion of the DDF directed to the hydrodynamic separator when the drainage system is operating at its design flow are shown on the Hydrodynamic Separator Design Data Sheets (Form A - Design). A separate form for each hydrodynamic separator site on the project is attached to this specification.

Sediment Storage Capacity: Settleable solids shall accumulate in a location within the hydrodynamic separator structure that is accessible for cleaning and maintenance but not susceptible to resuspension. Direct access through openings in the precast concrete unit shall be provided to the sediment storage chamber and all other chambers to facilitate maintenance.

The standard sediment storage capacities for Department pre-approved hydrodynamic separator systems/models are shown in **Table 3**, "**STANDARD SEDIMENT STORAGE CAPACITY FOR CONNDOT APPROVED HYDRODYNAMIC SEPARATORS**". The sediment storage capacities listed in Table 3 are values based on standard structure dimensions and anticipated maintenance requirements.

Some standard hydrodynamic separator models may be modified as determined by the Manufacturer to increase the sediment storage capacity. When a modification is proposed by increasing the depth of the standard structure, the sediment storage capacity of the proposed structure shall be determined in accordance with **Table 4, "SEDIMENT STORAGE CAPACITY CALCULATION"**.

The Contractor shall be responsible for verifying the standard sediment storage capacity of the hydrodynamic separator unit(s) and coordinating any proposed modifications to increase sediment storage capacity with the Manufacturer(s). All proposed modifications and revised sediment storage capacity determinations shall be clearly documented in the working drawing submission to the Department.

The minimum sediment storage capacities required for each hydrodynamic separator site on the project are shown on the Hydrodynamic Separator Design Data Sheets (Form A – Design) attached to this specification.

Hydraulic Design: The Contractor shall prepare or have prepared a hydraulic grade line (HGL) analysis for an evaluation of the selected hydrodynamic separator and the design of the flow diversion structure as described in this section. The HGL analysis shall be performed for both the WQF and the DDF. The analysis shall be consistent with the methodology described in Section 11.12 of the Department's Drainage Manual.

Head loss coefficients, to be used in the HGL analysis, shall be determined in accordance with Section 11.12.6 for all structures except the hydrodynamic separator, which shall be obtained from the Manufacturer. Documentation shall be submitted demonstrating how the coefficient was derived either through calculation and/or testing data. A benching factor of 1.0 shall be applied to the flow diversion structure.

The HGL analysis (or portion of) that was performed for the design of the storm drainage systems and preparation of the construction plans, including the design of the flow diversion structure and evaluation of a "generic" hydrodynamic separator, is shown on the Hydrodynamic Separator Design Data Forms (Form A – Design) attached to this specification.

TABLE 2 - PERFORMANCE MATRIX FOR CONNDOT APPROVED HYDRODYNAMIC SEPARATORS

Maximum WQF (cfs)	**Product Model**								
	Downstream Defender	*Flogard*	*High Eff. CDS*	*Hydroguard*	*Stormceptor OSR*	*Stormceptor STC*	*Vortechs*	*Vortsentry*	*V2B1*
0.4	4-ft	DVS-36	2015-4G; 2015-4	HG 4	065	450	1000	VS30	2
0.5	4-ft	DVS-36	2015-4G; 2015-4	HG 4	065	900	1000	VS30	2
0.6	4-ft	DVS-36	2015-4G; 2015-4	HG 4	065	900	1000	VS40	2
0.7	4-ft	DVS-48	2015-4G; 2015-4	HG 4	140	900	1000	VS40	2
0.8	4-ft	DVS-48	2015-4G; 2015-4	HG 4	140	900	1000	VS40	2
0.9	4-ft	DVS-48	2015-4G; 2015-4	HG 4	140	1200	1000	VS40	3
1.0	4-ft	DVS-48	2015-4G; 2015-4	HG 4	140	1800	1000	VS40	3
1.1	4-ft	DVS-48	2015-4G; 2015-4	HG 4	140	1800	1000	VS40	4
1.2	6-ft	DVS-48	2015	HG 5	140	2400	1000	VS50	4
1.3	6-ft	DVS-60	2015	HG 5	140	2400	1000	VS50	4
1.4	6-ft	DVS-60	2015	HG 5	140	2400	2000	VS50	4
1.5	6-ft	DVS-60	2020	HG 5	140	2400	2000	VS50	6
1.6	6-ft	DVS-60	2020	HG 5	140	2400	2000	VS50	6
1.7	6-ft	DVS-60	2020	HG 5	250	2400	2000	VS50	6

Maximum WQF (cfs)	Product Model								
	Downstream Defender	*Flogard*	*High Eff. CDS*	*Hydroguard*	*Stormceptor OSR*	*Stormceptor STC*	*Vortechs*	*Vortsentry*	*V2B1*
1.8	6-ft	DVS-60	2020	HG 6	250	2400	2000	VS50	7
1.9	6-ft	DVS-60	2020	HG 6	250	3600	2000	VS60	7
2.0	6-ft	DVS-60	2020	HG 6	250	3600	2000	VS60	7
2.1	6-ft	DVS-60	2020	HG 6	250	3600	2000	VS60	9
2.2	6-ft	DVS-72	2025	HG 6	250	3600	2000	VS60	8
2.3	6-ft	DVS-72	3020, 3020-D	HG 6	250	3600	2000	VS60	8
2.4	6-ft	DVS-72	3035; 3035-D	HG 6	250	4800	2000	VS60	8
2.5	6-ft	DVS-72	3035; 3035-D	HG 6	250	4800	3000	VS60	10
2.6	6-ft	DVS-72	3035; 3035-D	HG 6	250	4800	3000	VS60	11
2.7	6-ft	DVS-72	3035; 3035-D	HG 7	250	4800	3000	VS60	11
2.8	6-ft	DVS-72	3035; 3035-D	HG 7	250	4800	3000	VS70	11
2.9	6-ft	DVS-72	3035; 3035-D	HG 7	250	4800	3000	VS70	12
3.0	6-ft	DVS-72	3035; 3035-D	HG 7	390	4800	3000	VS70	12

TABLE 2 - PERFORMANCE MATRIX FOR CONNDOT APPROVED HYDRODYNAMIC SEPARATORS (continued)

Maximum WQF (cfs)	Product Model								
	Downstream Defender	*Flogard*	*High Eff. CDS*	*Hydroguard*	*Stormceptor OSR*	*Stormceptor STC*	*Vortechs*	*Vortsentry*	*V2B1*
3.1	8-ft	DVS-72	3035; 3035-D	HG 7	390	4800	3000	VS70	12
3.2	8-ft	DVS-72	3035; 3035-D	HG 7	390	4800	3000	VS70	12
3.3	8-ft	DVS-72	3035; 3035-D	HG 7	390	4800	3000	VS70	14
3.4	8-ft	DVS-72	3035; 3035-D	HG 7	390	6000	3000	VS70	14
3.5	8-ft	DVS-72	3030; 3030-DV, 3030-D; 4030-D	HG 7	390	6000	3000	VS70	14
3.6	8-ft	DVS-72	4030	HG 7	390	6000	3000	VS70	14
3.7	8-ft	DVS-84	4030	HG 8	390	6000	3000	VS70	14
3.8	8-ft	DVS-84	4030	HG 8	390	6000	4000	VS70	13
3.9	8-ft	DVS-84	4030	HG 8	390	7200	4000	VS70	15
4.0	8-ft	DVS-84	4030	HG 8	390	7200	4000	VS80	15
4.1	8-ft	DVS-84	4030	HG 8	390	7200	4000	VS80	15
4.2	8-ft	DVS-84	4030	HG 8	390	7200	4000	VS80	16
4.3	8-ft	DVS-84	4030	HG 8	390	7200	4000	VS80	16
4.4	8-ft	DVS-84	4030	HG 8	390	7200	4000	VS80	16
4.5	8-ft	DVS-84	4030	HG 8	390	7200	4000	VS80	16
4.6	8-ft	DVS-84	5640-D	HG 8	390	7200	4000	VS80	17
4.7	8-ft	DVS-84	5640-D	HG 8	390	7200	4000	VS80	17
4.8	8-ft	DVS-84	5640-D	HG 8	390	7200	4000	VS80	17
4.9	8-ft	DVS-84	5640-D	HG 8	390	11000s	4000	VS80	17
5.0	8-ft	DVS-84	5640-D	HG 9	390	11000s	4000	VS80	19
5.2	8-ft	DVS-84	4040-D	HG 9	390	11000s	4000	VS80	20
5.4	8-ft	DVS-96	4040-D	HG 9	390	11000s	4000	VS100	20
5.5	8-ft	DVS-96	4045-D	HG 9	390	11000s	5000	VS100	18
5.6	8-ft	DVS-96	4045-D	HG 9	560	11000s	5000	VS100	18
6.0	8-ft	DVS-96	4040	HG 9	560	11000s	5000	VS100	18
6.1	8-ft	DVS-96	4040	HG 9	560	11000s	5000	VS100	21

TABLE 2 - PERFORMANCE MATRIX FOR CONNDOT APPROVED HYDRODYNAMIC SEPARATORS (continued)

Maximum WQF (cfs)	Product Model								
	Downstream Defender	*Flogard*	*High Eff. CDS*	*Hydroguard*	*Stormceptor OSR*	*Stormceptor STC*	*Vortechs*	*Vortsentry*	*V2B1*
6.3	8-ft	DVS-96	4040	HG 9	560	11000s	5000	VS100	25
6.4	10-ft	DVS-96	4040	HG 9	560	11000s	5000	VS100	25
6.5	10-ft	DVS-96	4040	HG 10	560	11000s	5000	VS100	25
6.9	10-ft	DVS-96	4040	HG 10	560	11000s	5000	VS100	25
7.0	10-ft	DVS-96	4040	HG 10	560	11000s	5000	VS100	22
7.1	10-ft	DVS-96	5042-D	HG 10	560	11000s	5000	VS100	22
7.2	10-ft	DVS-96	5042-D	HG 10	560	13000s	5000	VS100	22
7.3	10-ft	DVS-96	4045	HG 10	560	13000s	5000	VS100	22
7.5	10-ft	DVS-96	5653-D	HG 10	560	13000s	7000	VS100	22
7.7	10-ft	DVS-120	5653-D	HG 10	560	13000s	7000	VS100	22
7.8	10-ft	DVS-120	5653-D	HG 10	560	13000s	7000	VS100	50
7.9	10-ft	DVS-120	5653-D	HG 10	780	13000s	7000	VS100	50
8.0	10-ft	DVS-120	5658-D	HG 10	780	13000s	7000	VS100	50
8.2	10-ft	DVS-120	5658-D	HG 10	780	16000s	7000	VS100	50
8.5	10-ft	DVS-120	5658-D	HG 12	780	16000s	7000	VS100	50
8.6	10-ft	DVS-120	5658-D	HG 12	780	16000s	7000	VS100	50
8.9	10-ft	DVS-120	5678-D	HG 12	780	16000s	7000	VS100	50
9.0	10-ft	DVS-120	5678-D	HG 12	780	16000s	7000	VS120	50
9.2	10-ft	DVS-120	5678-D	HG 12	780	16000s	7000	VS120	50
9.5	10-ft	DVS-120	5050-DV	HG 12	780	16000s	7000	VS120	50
9.6	10-ft	DVS-120	5050-DV	HG 12	780	16000s	7000	VS120	50
10.0	10-ft	DVS-120	5050-DV	HG 12	780	16000s	9000	VS120	50
10.1	10-ft	DVS-120	5050-DV	HG 12	780	16000s	9000	VS120	50
10.5	10-ft	DVS-120	5050-DV	HG 12	780		9000	VS120	50
10.9	10-ft	DVS-120	5050-DV	HG 12	780		9000	VS120	50
11.0	10-ft	DVS-120	7070-DV	HG 12	780		9000	VS120	50
11.2	10-ft	DVS-120	7070-DV	HG 12	1125		9000	VS120	50

TABLE 2 - PERFORMANCE MATRIX FOR CONNDOT APPROVED HYDRODYNAMIC SEPARATORS (continued)

Maximum WQF (cfs)	Product Model								
	Downstream Defender	*Flogard*	*High Eff. CDS*	*Hydroguard*	*Stormceptor OSR*	*Stormceptor STC*	*Vortechs*	*Vortsentry*	*V2B1*
11.5		DVS-120	7070-DV	HG 12	1125		9000	VS120	50
11.8		DVS-120	7070-DV	HG 12	1125		9000	VS120	50
11.9		DVS-120	7070-DV	HG 12	1125		9000	VS120	60
12.0		DVS-120	7070-DV	HG 12	1125		9000	VS120	60
12.1		DVS-120	7070-DV	HG 12	1125		9000	VS120	60
12.5		DVS-120	7070-DV	HG 12	1125		11000	VS120	60
13.0		DVS-120	7070-DV		1125		11000	VS120	60
13.5		DVS-120	7070-DV		1125		11000	VS120	60
13.6		DVS-120	7070-DV		1125		11000	VS120	60
14.0		DVS-144	7070-DV		1125		11000	VS120	60
14.5		DVS-144	7070-DV		1125		11000		60
14.9		DVS-144	7070-DV		1125		11000		60
15.0		DVS-144	7070-DV		1125		16000		60
15.5		DVS-144	7070-DV		1125		16000		60
15.7		DVS-144	7070-DV		1125		16000		60
16.0		DVS-144	7070-DV				16000		60
16.5		DVS-144	7070-DV				16000		60
17.0		DVS-144	7070-DV				16000		
17.5		DVS-144	7070-DV				16000		
18.0		DVS-144	7070-DV				16000		
18.5		DVS-144	7070-DV				16000		
19.0		DVS-144	7070-DV				16000		
19.7		DVS-144	7070-DV				16000		
20.0		DVS-144	10060-DV				16000		
21.5		DVS-144	10060-DV				16000		
22.3		DVS-144	10060-DV				1319		
25.0			10060-DV				1319		
25.2			10060-DV				1319		

TABLE 2 - PERFORMANCE MATRIX FOR CONNDOT APPROVED HYDRODYNAMIC SEPARATORS (continued)

Maximum WQF (cfs)	Product Model								
	Downstream Defender	*Flogard*	*High Eff. CDS*	*Hydroguard*	*Stormceptor OSR*	*Stormceptor STC*	*Vortechs*	*Vortsentry*	*V2B1*
27.6			10060-DV				1421		
29.3			10080-DV				1421		
30.0			10080-DV				1522		
31.2			10080-DV				1522		
33.6			100100-DV				1522		
35.0			100100-DV				1624		
38.2			100100-DV				1624		
40.0			100100-DV				1726		
43.2			100100-DV				1726		
49.3			100100-DV						

TABLE 3 - STANDARD SEDIMENT STORAGE CAPACITY FOR CONNDOT APPROVED HYDRODYNAMIC SEPARATORS

Sediment Storage (cubic yards)	**Product Model**								
	Downstream Defender	*Flogard*	*High Eff. CDS*	*Hydroguard*	*Stormceptor OSR*	*Stormceptor STC*	*Vortechs*	*Vortsentry*	*V2B1*
0.3		DVS-36					1000		
0.5	4-ft								
0.6							2000		
0.7		DVS-48		HG 4					
0.8					065	450		VS30	2; 3
0.9			2015-4G; 2015-4						
1.0 (minimum)							3000		
1.1					140	900			
1.2				HG 5					
1.3		DVS-60							
1.4							4000	VS40	
1.5			2015; 2020; 2025						
1.6									4
1.7				HG 6					
1.8	6-ft					1200			
1.9							5000		
2.0									
2.1									
2.2		DVS-72						VS50	
2.3				HG 7					
2.4									6; 7
2.5							7000		
2.6			3020, 3020-D; 3030, 3030-DV, 3030-D; 3035, 3035-D						
2.9					250	2400			

TABLE 3 - STANDARD SEDIMENT STORAGE CAPACITY FOR CONNDOT APPROVED HYDRODYNAMIC SEPARATORS (continued)

Sediment Storage (cubic yards)	Product Model								
	Downstream Defender	*Flogard*	*High Eff. CDS*	*Hydroguard*	*Stormceptor OSR*	*Stormceptor STC*	*Vortechs*	*Vortsentry*	*V2B1*
3.0				HG 8					
3.1							9000	VS60	
3.2									8; 9
3.3						1800			
3.4									
3.5		DVS-84							
3.6									
3.7	8-ft		5640-D						
3.8				HG 9					
3.9							11000		
4.0									
4.2									10; 11; 12
4.3			4030-D; 4040-D; 4045-D					VS70	
4.5									
4.6									
4.7									13
5.0				HG 10					
5.1									
5.3		DVS-96	5042-DV; 5050-DV						
5.5									
5.6			4030; 4040; 4045; 5653-D; 5658-D; 5678-D				16000	VS80	
5.7									
6.0						3600			
6.5									

TABLE 3 - STANDARD SEDIMENT STORAGE CAPACITY FOR CONNDOT APPROVED HYDRODYNAMIC SEPARATORS (continued)

Sediment Storage (cubic yards)	Product Model								
	Downstream Defender	*Flogard*	*High Eff. CDS*	*Hydroguard*	*Stormceptor OSR*	*Stormceptor STC*	*Vortechs*	*Vortsentry*	*V2B1*
6.6							1319		
6.9									
7.0									
7.1									
7.2									
7.3									14; 15; 16; 17; 18
7.5				HG 12					
7.6							1421		
7.7									
8.0									
8.3									
8.4			7070-DV						
8.6						4800			
8.7	10-ft				390		1522	VS100	
9.0									
9.5									
9.6									
9.9							1624		
10.0									
10.3		DVS-120							
10.5									19; 20
11.0									
11.2							1726		
11.3						6000			
11.5									21; 22
11.8									

TABLE 3 - STANDARD SEDIMENT STORAGE CAPACITY FOR CONNDOT APPROVED HYDRODYNAMIC SEPARATORS (continued)

Sediment Storage (cubic yards)	Product Model								
	Downstream Defender	*Flogard*	*High Eff. CDS*	*Hydroguard*	*Stormceptor OSR*	*Stormceptor STC*	*Vortechs*	*Vortsentry*	*V2B1*
12.0									
12.6								VS120	25
12.9					560				
13.0									
13.4						7200			
15.0									
17.5					780				
17.8		DVS-144	10060-DV;10080-DV; 100100-DV						
20.0									
22.3									50
25.0									
25.8					1125				
26.1						11000s			
26.2									
30.0									
34.1						13000s			
34.9									60
35.0									
38.7									
40.0									
40.7						16000s			

TABLE 4 - SEDIMENT STORAGE CAPACITY CALCULATION

Product	Sediment Storage Capacity (Volume) Calculation (cubic feet)
Downstream Defender	Inside Diameter (ft^2) of Structure x Distance (ft) from Bottom of Benching Skirt to Inside Floor of Structure
FloGard® Dual-Vortex	Inside Diameter (ft^2) of Structure x 1/2 Distance (ft) from Bottom of Vortex Tube to Inside Floor of Structure
High Efficiency CDS	Inside Diameter (ft^2) of Structure x Depth (ft) of Solids Storage Sump
Hydroguard	Inside Diameter (ft^2) of Structure x 1/2 Depth (ft) Below Outer Baffle Wall
Stormceptor STC	Inside Diameter (ft^2) of Structure x 1/2 Depth (ft) Below Drop Tee Inlet Pipe
Stormceptor OSR	Inside Diameter (ft^2) of Structure x 1/2 Depth (ft) Below Drop Tee Inlet Pipe
Vortechs	Inside Diameter (ft^2) of Grit Chamber x 1/2 Depth (ft) Below Opening in Swirl Wall
Vortsentry	Inside Diameter (ft^2) of Structure x Depth (ft) of Sediment Storage Sump
V2B1	Inside Diameter (ft^2) of Structure (D1) x 1/2 Depth (ft) Below Pipe Invert
Note: 1 cubic foot = 0.037 cubic yard or 1 cubic yard = 27 cubic feet	

Since the selected hydrodynamic separator and associated connecting pipes and structures may be different in type, configuration and performance than the one assumed in the design phase of the project, the hydraulic calculations performed for the drainage design must be replicated and revised to reflect any adjustments necessary to the drainage design for installation of the selected system, such as different flow-line elevations, head loss coefficient, pipe sizes, etc. The selected hydrodynamic separator shall be designed so as not to change the drainage system upstream of the flow diversion structure or to increase the HGL elevation upstream of the flow diversion structure. Any modifications necessary to the overall drainage design as a result of the Contractor selected hydrodynamic separator shall be the responsibility of the Contractor.

The new HGL analysis must demonstrate the following conditions:

1. The hydrodynamic separator can treat the WQF with no bypass. The HGL elevation at the flow diversion structure for the WQF shall be below the weir elevation and/or elevation of flow bypass that is listed in the design data form or shown in the plans, so that all of the WQF is directed to the hydrodynamic separator for treatment. The HGL elevation in the hydrodynamic separator at the WQF shall be below the elevation of internal bypass so that all of the WQF is treated by the system.

2. When the drainage system is operating at the DDF, the hydraulic computations must show that the HGL elevation at the flow diversion structure is lower than or equal to the HGL elevation shown on Form A for the DDF and the HGL elevation in the hydrodynamic separator must be a minimum of one foot below the top (ground) elevation of the structure. A HGL elevation in the flow diversion structure for the DDF which is higher than the corresponding HGL elevation shown on Form A may be approved by the Engineer only if hydraulic computations are submitted showing that the higher HGL elevation will provide a minimum of one foot of freeboard below the top (ground) elevation of the flow diversion structure and the upstream drainage structures, satisfying the design criteria stated in the Connecticut Department of Transportation Drainage Manual. To demonstrate compliance, the hydraulic analysis shall be extended to a point upstream in the drainage system that is not influenced by the proposed changes and where the results converge with the previous design analysis. In such a case, the Contractor shall request a copy of the design analysis from the Department. A freeboard less than one foot may be accepted by the Engineer on a case by case basis provided that a justification of the reason has been included with the HGL analysis.

3. When the drainage system is operating at the DDF, the resulting HGL elevation and flow split at the flow diversion structure has been designed such that the portion of the DDF directed to the hydrodynamic separator does not exceed the maximum flow shown on the Hydrodynamic Separator Design Data Sheets (Form A - Design). Documentation, however, must be provided that the flow in excess of the WQF can pass through the device without washout of the previously captured sediment or the device is equipped with an internal bypass to route the excess flow around the treatment chamber.

Upon conclusion of the HGL analysis, the Hydrodynamic Separator Design Data Sheets (Form B – Contractor Proposal) shall be completed by entering the HGL analysis data and other required information.

Hydrodynamic Separator Selection: To ensure compliance with the special provision, the selection process of a proprietary hydrodynamic separator for installation on a Department project is outlined by the following steps:

1. First, select the available product(s) from Table 2 (**PERFORMANCE MATRIX FOR CONNDOT APPROVED HYDRODYNAMIC SEPARATORS**) that meet or exceed the WQF treatment specified on the Hydrodynamic Separator Design Data Sheets (Form A - Design) attached to this specification. **The Engineer shall reject any proposed hydrodynamic separator system/model that is not listed in Table 2.**

2. Using Table 3 (**STANDARD SEDIMENT STORAGE CAPACITY FOR CONNDOT APPROVED HYDRODYNAMIC SEPARATORS**), check whether the initially selected product(s) in Step 1, meet or exceed the minimum sediment storage requirement specified on the Hydrodynamic Separator Design Data Sheets (Form A - Design). In some cases, the required sediment storage capacity will govern the model size required for the project. In lieu of selecting a larger model to accommodate the sediment storage requirement, the Contractor may submit working drawings as recommended by the Manufacturer, showing how a standard model has been modified to satisfy the sediment storage requirement. When a modification is proposed by increasing the depth of the standard structure, **Table 4 (SEDIMENT STORAGE CAPACITY CALCULATION)** shall be utilized to determine the sediment storage capacity of the proposed structure.

3. **Hydrodynamic separator system/models pre-approval by the Department shall not be construed to mean that all products appearing on Tables 2 and 3 are suitable to any specific project site or drainage design.** The Contractor shall verify the constructability of the selected hydrodynamic separator in relation to dimensional, structural, geotechnical and right-of-way constraints at each installation site. If revisions to the drainage design, including the system layout, are required to accommodate the selected separator, the Contractor shall provide working drawings showing the revised layout, including the position of the hydrodynamic separator and the number, positions and types of connecting structures, the design of the flow diversion structure, and any other components of the system within the pay limits. The working drawings shall be prepared in sufficient detail to perform a hydraulic analysis and confirm that the layout will fit the constraints of each site.

4. Upon determination that the WQF, sediment storage and constructability requirements have been met, the Contractor shall prepare or have prepared, a HGL analysis in accordance with the hydraulic requirements of this special provision, that includes the selected hydrodynamic separator and any revisions to the drainage design needed for the installation.

5. The Hydrodynamic Separator Design Data Sheets (Form B – Contractor Proposal) shall be completed and signed by a professional engineer licensed by the State of Connecticut.

6. *Acceptance of the computations by the Engineer must be obtained by the Contractor prior to the purchase or installation of any units.*

Materials: Materials utilized to fabricate, construct and install the precast concrete hydrodynamic separator including but not limited to precast concrete units, brick, concrete masonry units, manhole frames and covers shall meet the requirements specified in the Standard Specifications, Form 816, Article M.08.02, except that the 28 day compressive strength specified in Subarticle M.08.02-4, shall be a minimum of 4000 psi (27.6 MPa).

The Contractor shall provide a Materials Certificate in accordance with 1.06.07 for each unit delivered to the project. Upon request, the Contractor shall also provide Certified Test Reports for the fine and coarse aggregates and all cementitious materials, and the concrete mix design indicating the weight of each component, used in the construction of the precast units for review. The structures shall not be shipped until released by the Contractor's Quality Control Manager or designee.

The wall and slabs of the precast concrete units shall be designed to sustain HS20-44 (MS18) loading requirements.

Manholes and Catch Basins shall conform to Section 5.07 of Form 816.

Granular fill shall conform to the requirements of Article M.02.01 of Form 816.

Non-shrink grout shall conform to the requirements of Subarticle M.03.01-12 of Form 816.

Drainage pipe, sealant and gaskets shall conform to the requirements of Article M.08.01 of Form 816.

Mortar shall conform to the requirements of Article M.11.04 of Form 816.

Sealant used for the hydrodynamic separator unit(s) shall be resistant to oil and other hydrocarbons and conform to the requirements of ASTM C-443.

Working Drawings: Working drawings in accordance with Article 1.05.02 – 2 shall be required for the system selected by the Contractor. The working drawings shall include the HGL analysis and all other computations in strict accordance with the "Hydraulic Design" section of this special provision, including a completed Form B – Contractor Proposal.

If revisions to the layout of the system within the payment limits of this item are required to accommodate the selected separator, the working drawings shall also include plans that show the required revisions. These plans shall show the revised position of the hydrodynamic separator unit(s), and all revisions to connecting structures, pipes, elevations, and details, including the design within the flow diversion structure. The revised plans shall also include the pay limit showing all the components of the system that are included in this lump sum pay item.

Working drawings shall also show details for construction, reinforcing joints, internal and external components, any cast-in-place appurtenances, locations and elevations of pipe openings, access manhole locations and elevations, and type / method of sealing pipe entrances.

Working drawings for each hydrodynamic separator on the project shall have all appropriate vertical dimensions referenced with elevations that are consistent with the project plans. In addition to any other structural, material or installation requirements, the working drawings shall clearly indicate the following information:

1. The elevation and flow rate when internal flow bypass would occur within the device.

2. The location, dimensions and volume (capacity) of the sediment storage area within the device.

The working drawings shall be sealed by a professional engineer licensed in the state where the devices are manufactured and that said engineer shall certify the device meets the minimum requirements of the ConnDOT Standards.

The working drawing submission by the Contractor shall consist of the following documents:

1. Working drawings for each hydrodynamic separator proposed for installation on the project.

2. Hydraulic design calculations including the head loss documentation and completed Hydrodynamic Separator Design Data Sheets (Form B – Contractor Proposal) with professional engineer signature for each hydrodynamic separator.

3. Copies of the pertinent construction plan, profile, cross section and detail sheets that have been annotated with any proposed drainage revisions that are required for the installation of the proposed hydrodynamic separator(s). If no changes are required, the submittal shall note same.

4. An Operations and Maintenance Manual for each hydrodynamic separator describing operations, inspection, maintenance procedures and any applicable warranty information.

Acceptance of the working drawing submission by the Engineer must be obtained by the Contractor prior to the fabrication of each hydrodynamic separator and diversion structure.

Construction Methods: The Contractor shall inspect the hydrodynamic separator and any accessory equipment upon delivery for general appearance, dimensions, soundness or damage in a manner acceptable to the Engineer. If any defects or damage are identified by the inspection, the unit shall be rejected by the Contractor and a new undamaged hydrodynamic separator shall be supplied. Any required adjustments of the separator shall be completed in accordance with Manufacturer’s recommendations. A Manufacturer’s representative and the Engineer will inspect the hydrodynamic separator before installation.

The Contractor shall install the hydrodynamic separator structure in accordance with the Manufacturer's recommendations unless otherwise directed by this specification or by the Engineer. The hydrodynamic separator shall be installed plumb, level and aligned both vertically and horizontally with the inlet and outlet piping. The hydrodynamic separator shall be placed on a compacted granular fill base in accordance with the Manufacturer's specifications or a minimum thickness of 6" (150mm) whichever is larger. Anchoring systems shall be installed, where needed, to resist buoyancy forces. Care shall be taken not to damage the hydrodynamic separator during backfill and compaction.

Pipe openings in the hydrodynamic separator shall be sized to accept pipes of the specified size(s) and material(s) as shown on the contract drawings and shall be sealed by the Contractor in accordance with the requirements of this specification. The inlet and outlet pipe connections shall be watertight. The hydrodynamic separator shall be tested for leakage according to the Manufacturer's specifications and to the satisfaction of the Engineer. Any leaks must be found and corrected to the satisfaction of the Engineer prior to acceptance of the structure.

Access openings with manhole frames and covers shall be provided to all chambers of the hydrodynamic separator. The access openings and pipe openings shall be detailed on the working drawings to be submitted by the Contractor for review and acceptance by the Engineer.

All connecting structures and pipes included within the payment limits for this work shall be constructed in accordance with the applicable requirements of Article 5.07.03 and Article 6.51.03.

Method of Measurement: Design, construction, furnishing, installation and cleaning of the hydrodynamic separator, the flow diversion structure, manholes and pipes as shown on the contract drawings, including all internal and external appurtenances and materials used, will be paid for on a lump sum basis per site.

Basis of Payment: This work will be paid for at the contract lump sum for "HYDRODYNAMIC SEPARATOR", complete in place, which price shall include all work within the pay limits shown on the contract drawings for hydrodynamic separator. If revisions to the layout of the system within the payment limits for this item are required to accommodate the selected separator, the lump sum price shall also include all additional or revised connecting structures and pipes. The contract lump sum shall include, but not be limited to, the following:

1. Design, preparation, revisions of working drawings and hydraulic computations.

2. Concrete and reinforcing steel, sealant, cement, mortar, flexible rubber sleeves, internal and external components, brick and masonry, frames and covers used to construct access manholes.

3. Flow diversion structure, manholes and pipes as shown on the contract drawings, or as revised and shown on submitted working drawings accepted by the Engineer.

4. Structure excavation, back fill, and disposal of surplus material.

5. Compacted granular fill.

6. Trench excavation and bedding material.

7. Cleaning of the Hydrodynamic Separator, flow diversion structure, manholes and pipes as shown on the contract drawings (of all debris every 90 days, or as needed), during the duration of the project, shall also be included in the price of this item.

8. The Operations and Maintenance Manual for each hydrodynamic separator.

The price shall include but not be limited to all materials, testing, equipment, tools and labor incidental thereto.

Attachments: The following documents are attached to this specification:

1. Hydrodynamic Separator Design Data Sheets (Form A – Design), Sheets 1 & 2 of 2.

2. Hydrodynamic Separator Design Data Sheets (Form B – Contractor Proposal), Sheets 1 & 2 of 2 (blank), to be completed and submitted with the working drawings.

SAMPLE DATA

CONNECTICUT DEPARTMENT OF TRANSPORTATION HYDRODYNAMIC SEPARATOR DESIGN DATA SHEETS (FORM A - DESIGN)

Project No	*Example*	Route No.	*0*	Prepared By:	*HD*	Date:	*4/1/2010*
Town	*Somewhere*	Location/Station	*Site 1*	Checked By:	*DM*	Date:	*4/1/2010*
				Company:	*ConnDOT*		

HYDROLOGIC DATA

Drainage Area (Acres)	*3.7*
Percent Impervious Area %	*53*
Time of Concentration (min.)	*11*
Drainage Design Flow (cfs)	*10.8*
Drainage Design Frequency (yr)	*10*
Water Quality Flow (cfs)	*1.7*

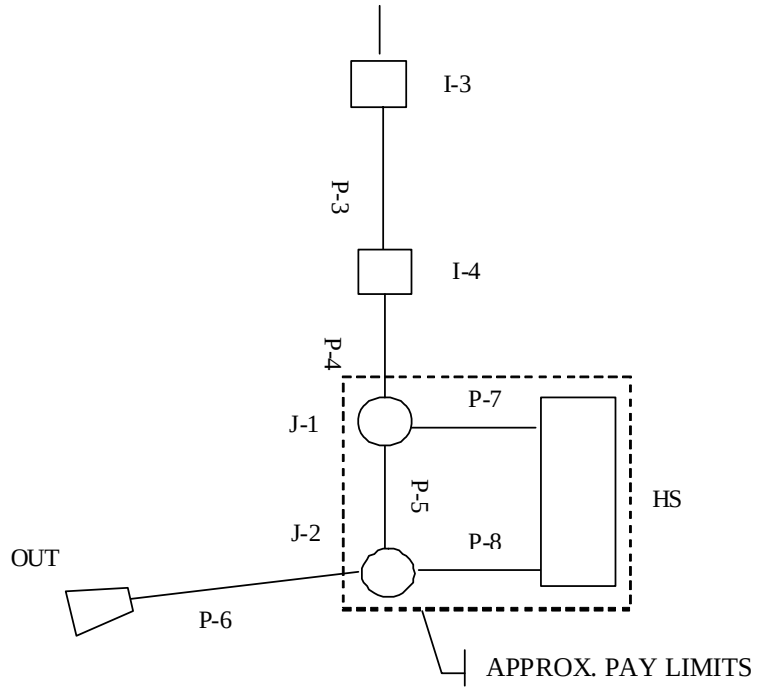
HYDRODYNAMIC SEPARATOR (HS)

Coordinates:		Datum:	
X:	*XXX,XXX*	Horiz.	*State Plane NAD83*
Y:	*YYY,YYY*	Vert.	*NGVD-1929*
Head loss coefficient		*1.75*	
Sediment Storage Capacity (cy):		HGL Elevation:	
Required	*1.0*	@ WQF	*104.13*
		@ Design Q	*104.85*
Maximum Flow to HS at Drainage Design Flow (cfs)			*4.3*

Comments:

FLOW DIVERSION STRUCTURE

Type	*4' Diameter Manhole*		
Weir and/or Bypass Elev.	*104.50*		
Weir Length (ft.)	*4*	Weir Coeff. (C)	*3.3*
HGL Elevation:		Flow Split @ Drainage Design Flow	
@ WQF	*104.20*	To HS	*3.2*
@ Design Q	*105.20*	Bypassing HS	*7.6*



Sketch (NTS) - Indicate Pay limits

Comments:

Sheet 1 of 2

SAMPLE DATA

CONNECTICUT DEPARTMENT OF TRANSPORTATION HYDRODYNAMIC SEPARATOR DESIGN DATA SHEETS
(FORM A - DESIGN)

Project No:	*Example*	**Location/Station:**	*Site 1*	**Date:**	*4/1/2010*

HYDRAULIC GRADE LINE ANALYSIS

Pipe	Downstream Str.	Pipe Size (in)	Flow (cfs)	Ground Elev. OUT (ft)	Invert Elev. OUT (ft)	HGL OUT (ft)	Depth OUT (ft)	Vel. Head OUT (ft)	EGL OUT (ft)	Length (ft)	Friction Slope (ft/ft)	Friction Loss (ft)	EGL IN (ft)	Vel. Head IN (ft)	HGL IN (ft)	Depth IN (ft)	Invert Elev. IN (ft)	Ground Elev. IN (ft)	Upstream Str.	Headloss Coeff.	Str. headloss (ft.)
			WQF																		
P-6	OUT	24	1.70	106.48	103.04	103.47	0.43	0.19	103.65	25	0.0047	0.12	103.77	0.16	103.61	0.45	103.16	108.86	J-2	0.01	0.00
P-8	J-2	12	1.70	108.86	103.16	103.71	0.55	0.23	103.94	6	0.0058	0.03	103.97	0.21	103.76	0.57	103.19	108.86	HS	1.75	0.37
P-7	HS	12	1.70	108.86	103.19	104.13	0.94	0.08	104.21	6	0.0017	0.01	104.22	0.08	104.14	0.91	103.23	109.19	J-1	0.82	0.06
P-4	J-1	24	1.70	109.19	103.23	104.20	0.97	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
	10	YR	DESIGN	FLOW																	
P-6	OUT	24	10.80	106.48	103.04	104.20	1.16	0.51	104.71	25	0.0048	0.12	104.83	0.49	104.34	1.18	103.16	108.86	J-2	0.05	0.02
P-8	J-2	12	3.20	108.86	103.16	104.36	1.20	0.26	104.62	6	0.0069	0.04	104.66	0.26	104.40	1.21	103.19	108.86	HS	1.75	0.45
P-7	HS	12	3.20	108.86	103.19	104.85	1.66	0.26	105.11	6	0.0069	0.04	105.15	0.26	104.89	1.66	103.23	109.19	J-1	1.18	0.31
P-4	J-1	24	10.80	109.19	103.23	105.20	1.97	0.18	105.38	88	0.0018	0.16	105.54	0.24	105.30	1.63	103.67	112.96	I-4	0.11	0.03
P-3	I-4	24	9.10	112.96	103.87	105.33	1.46	0.22	105.55	185	0.0041	0.76	106.31	0.43	105.88	1.08	104.80	109.55	I-3	----------	----------
P-6	OUT	24	10.80	106.48	103.04	104.2	1.16	0.51	104.71	25	0.0048	0.12	104.83	0.49	104.34	1.18	103.16	108.86	J-2	0.05	0.02
P-5	J-2	24	7.60	108.86	103.16	104.36	1.20	----------	----------	----------	----------	----------	----------	----------	104.36	1.13	103.23	109.19	J-1	----------	----------

CONNECTICUT DEPARTMENT OF TRANSPORTATION HYDRODYNAMIC SEPARATOR DESIGN DATA SHEETS (FORM B - CONTRACTOR PROPOSAL)

Project No		Route No.	
Town		Location/Station	

PE Signature:	
Name:	Date:
License No:	State:
Company:	

HYDROLOGIC DATA (Copy from FORM A - DESIGN)	
Drainage Area (Acres)	
% Impervious Area	
Time of Concentration (min.)	
Drainage Design Flow (cfs)	
Drainage Design Frequency (yr)	
Water Quality Flow (cfs)	

HYDRODYNAMIC SEPARATOR (HS)			
Manufacturer			
Model Name			
Model No.			
Coordinates:		Datum:	
X:		Horiz.	
Y:		Vert.	
Sediment Storage Capacity (cy):		HGL Elevation:	
Required		@ WQF	
Installed		@ Design Q	
Head loss coefficient			

FLOW DIVERSION STRUCTURE			
Type			
Weir and/or Bypass Elev.			
Weir Length (ft.)		Weir Coeff. (C)	
HGL Elevation:		Flow Split @ Drainage Design Flow (cfs):	
@ WQF		To HS	
@ Design Q		Bypassing HS	

Sketch (NTS)

Comments:

Sheet 1 of 2

CONNECTICUT DEPARTMENT OF TRANSPORTATION HYDRODYNAMIC SEPARATOR DESIGN DATA SHEETS (FORM B - CONTRACTOR PROPOSAL)

Project No:		Location/Station:		Date:	

HYDRAULIC GRADE LINE ANALYSIS

Pipe	Downstream Str.	Pipe Size (in)	Flow (cfs)	Ground Elev. OUT (ft)	Invert Elev. OUT (ft)	HGL OUT (ft)	Depth OUT (ft)	Vel. Head OUT (ft)	EGL OUT (ft)	Length (ft)	Friction Slope (ft/ft)	Friction Loss (ft)	EGL IN (ft)	Vel. Head IN (ft)	HGL IN (ft)	Depth IN (ft)	Invert Elev. IN (ft)	Ground Elev. IN (ft)	Upstream Str.	Headloss Coeff.	Str. headloss (ft.)

ITEM #0603169A - PROGRESS PHOTOGRAPHS

Description: Under this item, the Contractor shall engage a qualified commercial photographer to take photographs during construction. The photographer shall be a firm or an individual of established reputation that has been regularly engaged as a professional photographer for not less than 3 years.

At the Preconstruction Meeting, submit to the Designer for approval the name of the photographer whom will be responsible for taking the photographs during construction.

Submit photos of each view within seven (7) calendar days of taking photographs. Three (3) photographic sets of photos shall be submitted. ALL photos shall be submitted in IBM-PC compatible digital format on compact disc (CD). Other than the photo thumbnail index and the photo key plan required for submission with each CD, no other hardcopy photos shall be required for the project. One (1) set of photos (on CD) of each submittal shall be sent directly to each of the following offices:

1. Office of Facilities Design, Connecticut Department of Transportation, 2800 Berlin Turnpike, P.O. Box 317546, Newington, CT 06131-7546, Attention: Mr. Theodore H. Nezames, Room 3405NW.
2. District 3 Construction, Connecticut Department of Transportation, Project Chief Inspector's Construction Trailer.
3. Bureau of Finance and Administration, Property and Facilities Services, Connecticut Department of Transportation, 2800 Berlin Turnpike, P.O. Box 317546, Newington, CT 06131-7546, Attention: Mr. Daniel J. Smachetti, Room 2448SW.

Each CD and CD jewel case shall be labeled with the name of the project, State project number, name of the Contractor, date of submission, and name and address of the photographer.

Materials:

Provide digital images in IBM-PC compatible JPEG format, with uncompressed (open) image size equal to or greater than the following dimensions: Pixel Dimensions = 1596 x 2000; Resolution = 200 pixels/inch. JPEG compression for each image shall equal "Quality 7" (High). Images shall be color (RGB mode).

Digital Cameras used for the purpose of creating the above noted image files shall have a minimum sensor size of 7 million pixels.

Image files shall be named and a photo thumbnail index created with the following file naming convention: *Project number_date of submission_photo number.jpg*

For example: If the first set of photos on CD for project number 92-549, is submitted on 12/13/01, the first photo of the submission shall be file named: 00920549_121301_1.jpg and the

tenth photo of the set shall be file named: 00920549_121301_10.jpg. In the second set of photos on CD, submitted 1/12/02, the first photo of the set shall be file named: 00920549_011202_1.jpg

A hardcopy "Photo Thumbnail" index shall be provided with each CD submission. The photo thumbnails shall be printed on 8 ½" x 11" "glossy photo quality" ink jet paper with a minimum 720 dot-per-inch ink jet printer. The thumbnail images shall be a minimum 200 x 250 pixels at 200 pixel per inch resolution. The file names shall be located under each image. The thumbnail images shall be arranged so that they can all be contained on a single 8 ½-in by 11-in inkjet print. *For example*, 35 images would be arranged in five (5) columns and seven (7) rows. The CD shall also contain the digital file of the photo thumbnail index in jpeg format. The file shall share the same format as the above noted photo file format but the word "index" shall be placed in the location of the photo number. *For example*: 00920549_121301_index1.jpg

Photos shall be numbered and referenced by number on a "Photo Key Plan." A hardcopy of the photo key plan shall be provided with each CD submission. The photo key plan shall be printed on 8 1/2"x 11" "glossy photo quality" ink jet paper with a minimum 720 dot-per-inch ink jet printer. The key plan shall be made on digital images of the projects overall site plans and/or the overall building plans, as appropriate for the photos being submitted, and shall include an arrow pointing in the direction of the photo with the associated photo number. The CD shall also contain the digital file of the photo key plan in jpeg format. The file shall share the same format as the above noted photo file format but the word "key plan" shall be placed in the location of the photo number. 00920549_121301_keyplan1.jpg.

In lieu of using a digital camera to provide the above noted image files, standard 35 mm cameras and 35 mm color negative film may be used to take the images, and the images may then be captured as a digital file through the use of a designated 35mm film scanner. The 35mm scanner must have the following minimum specifications: 2700 dot per inch optical resolution; 3.4 Dmax; 36 bit color depth. The use of flatbed scanners shall not be permitted for this purpose.

Project progress photos shall be submitted as digital files on write-once CD-ROM in a jewel case on a monthly basis. **All subsequent CD submissions shall include the image files of the previous submissions and an updated hardcopy of the photo thumbnail index that contains all current and previous photos.**

Construction Methods:

Where used herein, one set of photographs will be defined as twenty-four (24) photographs.

Before starting construction, take one set of color photographs of the site and surrounding properties from different points of view as selected by the Engineer. Take photographs to show existing conditions to the property before starting Work. Take photographs of existing buildings

either on or adjoining the property in sufficient detail to record accurately the physical conditions at the start of construction.

Take one set of color photographs at no greater than monthly intervals, coinciding as closely as possible with the completion of a major construction phase. The photographer shall select the vantage points for each shot each month to best show the status of construction and progress since the last photographs were taken. Prior to taking any photographs, review the proposed vantage points for each shot with the Engineer. Photographs are for a record of the progress of work. Therefore, they shall be taken at a maximum interval of one month, whether or not they show any completion of work performed during the preceding month.

Take one set of color photographs upon notification by the Engineer of Final Inspection of the Project. Prior to taking any photographs, review the proposed vantage points for each shot with the Engineer. Take photographs from opposing views of the site in an effort to display various characteristics of the new construction.

Method of Measurement: This work will be measured for payment by the number of photographic sets submitted to the Engineer. "Each" photographic set shall be defined as twenty-four (24) photographs. For purposes of bidding, the pay unit for a photographic set shall be "Each."

Basis of Payment: This work will be paid for at the Contract unit price each for "Progress Photographs" which price shall include all material, equipment, and labor incidental thereto. Where any submission's image files do not conform to the requirements herein, the Contractor shall not receive any payment for the item.

Pay Item	Pay Unit
Progress Photographs	EA

ITEM #0901005A - BOLLARD

Description:

Work under this item shall consist of furnishing and installing concrete filled bollards with polyethylene sleeves at the locations called for on the plans, or as directed by the Engineer.

Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

1. Product Data: Include rated capacities of selected model clearly indicated, furnished specialties and accessories.

Materials:

Steel Bollard: Schedule 80 galvanized steel pipe, 8 inch nominal size (8.625" O.D.), conforming to the requirements of ASTM-A53.

Concrete: Class A, meeting the requirements of CSI Division 03 Section 033000, "Cast-in-Place Concrete."

Bollard Cover: Bollard cover shall be yellow in color with ¼"-thick polyethylene shell. Bumper (Bollard) Post Sleeve #PLS1009, as manufactured by New Pig Corporation or an approved equal.

Construction Methods:

Bollards shall be installed in the locations shown on the plans. The steel pipe shall be securely set plumb in concrete and filled with concrete.

Bollard covers shall be installed in the locations shown on the plans in accordance with manufacturer recommendations

Method of Measurement:

This work will be measured for payment by the actual number of bollards installed, accepted and measured in place.

Basis of Payment:

This work will be paid for at the unit price for each "Bollard" complete in place, which shall include all material, tools and labor incidental thereto.

Pay Item	Pay Unit
Bollard	EA

ITEM #0913041A - 8’ CHAIN LINK FENCE

ITEM #0913884A - 20’ CHAIN LINK DOUBLE GATE - 10’ HIGH W/BARBED WIRE

Description:
Work under this item shall consist of furnishing and installing chain link fence and gates in the locations and to the dimensions shown on the plans or as directed by the Engineer.

Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR - SUBMITTALS.

1. Product Data in the form of manufacturer's technical data, specifications, and installation instructions for fence and gate posts, fabric, gates, gate operators, and accessories.

2. Quality Assurance Submittals:

    a. Installer Qualifications: Engage an experienced Installer who has at least three years' experience and has completed at least five chain link fence projects with same material and of similar scope to that indicated for this Project with a successful construction record of in-service performance.

Single-Source Responsibility: Obtain chain link fences and gates, including accessories, fittings, and fastenings, from a single source.

Materials:
General: Round member sizes are given in actual outside diameter (OD) to the nearest thousandth of inches. Round fence posts and rails are often referred to in ASTM standard specifications by nominal pipe sizes (NPS) or the equivalent trade sizes in inches. The following indicates these equivalents all measured in inches:

Actual OD	NPS Size	Trade Size
1.315	1	1-3/8
1.660	1-1/4	1-5/8
1.900	1-1/2	2
2.375	2	2-1/2
2.875	2-1/2	3
3.500	3	3-1/2
4.000	3-1/2	4
6.625	6	6-5/8
8.625	8	8-5/8

Fence Posts and Rail:
General: Type I Round Posts, standard weight (schedule 40) galvanized-steel pipe conforming to ASTM F 1083, according to heavy industrial requirements of ASTM F 669, Group IA, with

minimum yield strength of 25,000 psi, not less than 1.8 oz. of zinc per sq. ft. Type A coating inside and outside according to ASTM F 1234, as determined by ASTM A 90, and weights per foot as follows:

Actual OD(in)	Weight(lb/ft)
1.315	1.68
1.660	2.27
1.900	2.72
2.375	3.65
2.875	5.79
3.500	7.58
4.000	9.11
6.625	8.97
8.625	28.55

Line or Intermediate Posts: 2.375-inch OD Type I round steel pipe.

End, Corner, and Pull Posts: 2.875-inch OD Type I round steel pipe.

Swing Gate Posts: Furnish posts to support single gate leaf, or one leaf of a double-gate installation, according to ASTM F 900, sized as follows for steel and pipe posts:

1. Fence height of 6 feet or less and gate leaf width:

    a. 4 to 10 Feet: 2.875-inch OD pipe weighing at least 4.64 lb. per foot.
    b. Over 10 to 18 Feet: 4.000-inch OD pipe weighing at least 8.65 lb. per foot.

2. Fence height over 6 feet and gate leaf width:

    a. Up to and Including 6 Feet: 2.875-inch OD pipe weighing at least 4.64 lb per ft.
    b. Over 6 to 12 Feet: 4.000-inch OD pipe weighing at least 8.65 lb. per foot.
    c. Over 12 to 18 Feet: 6.625-inch OD pipe weighing at least 10.02 lb. per foot.
    d. Over 18 to 24 Feet: 8.625-inch OD pipe weighing at least 27.12 lb. per foot.
    e. Over 24 to 40 Feet: Double 4.000-inch OD pipes.

Top Rail: Manufacturer's longest lengths (17 to 21 feet) with swedged-end or expansion-type coupling. Provide rail ends or other means for attaching top rail securely to each gate, corner, pull, and end post. 1.660-inch OD Type I round steel pipe.

Gate Frame Members:

Swing Gate Frame Members: Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware, and accessories. The gate frame shall be constructed from same material and finish as fence framework, welded at all corners or assembled with corner fittings. Members are sized as follows for steel and pipe posts: 1.90-inch OD round pipe weighing at least 2.28 lb. per foot.

Truss rods: Gate frames assembled with corner fittings shall have adjustable truss rods. 5/16-inch OD round pipe of the same metal and finish as the frame.

Interior bracing: Gate leaf shall have vertical interior bracing at maximum intervals of 8 ft. and shall have a horizontal interior member if fabric height is 8 ft. or more. Additional horizontal, vertical or diagonal member or diagonal truss rods may be needed to comply with ASTM F 900 Section 5.2.1. 5/16-inch OD round pipe of the same metal and finish as the frame.

Fabric:
Steel Chain-Link Fence Fabric: Fabricated in one-piece widths for fencing 12 feet and less in height to comply with Chain Link Fence Manufacturers Institute (CLFMI) "Product Manual" and with requirements indicated below:

1. Mesh and Wire Size: 2-inch mesh, 0.148-inch diameter (9 gage).
2. Coating: ASTM A 817, Type 1, 0.40 oz./ft^2 aluminum coating.

Chain Link Gate Fabric: The fabric shall same as specified for fence. Secure fabric at vertical edges with tension bars and bands and to top and bottom of frame with tie wires.

Fittings and Accessories:
General: Comply with ASTM F 626. Mill-finished aluminum or galvanized iron or steel to suit manufacturer's standards. Unless specified otherwise, hot-dip galvanize pressed steel or cast-iron fence fittings and accessories with at least 1.2 oz. zinc per sq. ft. as determined by ASTM A 90.

Post and Line Caps: Provide weather-tight closure cap for each post. Provide line post caps with loop to receive top rail.

Post Brace Assembly: Manufacturer's standard adjustable brace. 1.660-inch OD Type I round steel pipe for brace, and truss to line posts with 3/8-inch-diameter rod and adjustable tightener. Provide manufacturer's standard galvanized-steel, cast-iron or cast-aluminum cap for each end.

Top Rail Sleeves: Rail sleeve material shall be a minimum of 0.051 in. in thickness, and a minimum of 6 in. in length. Rail sleeve must be fabricated to prevent movement along the rail.

Tension or Stretcher Bars: Hot-dip galvanized steel with a minimum length 2 inches less than the full height of fabric, a minimum cross section of 3/16 inch by 3/4 inch, and a minimum of 1.2 oz. of zinc coating per sq. ft. Provide one bar for each gate and end post, and two for each corner and pull post, except where fabric is integrally woven into the post.

Tension and Brace Bands: ¾-inch-wide minimum hot-dip galvanized steel with a minimum of 1.2 oz. of zinc coating per sq. ft.

1. Tension Bands: 0.074 inch thick (14 gage) minimum.
2. Brace Bands: 0.105 inch thick (12 gage) minimum.

Truss Rod Assembly: Steel rods shall be 5/16 in. diameter and it and all related devices shall be hot-dip galvanized after threading with a minimum of 1.2 oz. of zinc coating per sq. ft. Truss rod and tightener shall be capable of withstanding a tension of 2000 lb.

Tension Wire: 0.177-inch-diameter metallic-coated steel Marcelled tension wire conforming to ASTM A 824 with finish to match fabric. Coating shall be Type I aluminum with a minimum coating weight of 0.40 oz. per sq. ft. as determined by ASTM A 824.

Tie Wires and Clips: 0.148-inch diameter (9 gage)steel with a tensile strength range from 55 to 65 ksi with a minimum coating of 0.40 oz./ft^2 of aluminum. Round metallic-coated steel tie wires, clips and hog rings shall withstand all forming or twisting operations without cracking or flaking of the aluminum coating. Bend ends of wire to minimize hazard to persons or clothing.

Gate Hardware:
General: Provide galvanized hardware and accessories for each gate.

Hinges: Size and material to suit gate size, non-lift-off type, offset to permit 180-degree gate opening. Provide 1-1/2 pair of hinges for each leaf over 6-foot nominal height.

Latch: Drop rod or plunger-bar type to permit operation from either side of gate, with padlock eye as an integral part of latch.

Keeper: Provide a keeper for vehicle gates that automatically engages gate leaf and holds it in the open position until manually released.

Gate Stops: Provide gate stops for double gates consisting of mushroom-type flush plate with anchors, set in concrete, and designed to engage a center drop rod or plunger bar. Include a locking device and padlock eyes as an integral part of the latch, permitting both gate leaves to be locked with a single padlock.

Chain: Provide welded stainless steel, Type 347 0.375 dia. chain in lengths required as specified by the Engineer.

Construction Methods:
General: Install fence to comply with ASTM F 567, in the location indicated on the drawings. Do not begin installation and erection before final grading is completed, unless otherwise permitted.

Excavation: Excavation and backfilling shall be performed as described herein and in accordance with Article 2.02.03 of Form 816. Drill or hand-excavate (using post-hole digger) holes for all posts to diameters and spacings indicated, in firm, undisturbed or compacted soil. Excavate holes for each fence post to a minimum of 9 inches in diameter for all line posts and 12 inches in diameter for terminal, pull or corner posts, but not less than four times the largest cross section of post. Excavate holes for all fence posts to depths not less than 40 inches below finish grade surface. Gate post holes shall comply with the following:

1. Gate width from 12 up to 18 feet: Excavate to a minimum diameter of 16 in. and a minimum depth of 46 in.
2. Gate width from 18 up to 24 feet: Excavate to a minimum diameter of 18 in. and a minimum depth of 52 in.

Setting Posts: Center and align posts in holes 4 inches above bottom of excavation. Space a maximum of 10 feet o.c., unless otherwise indicated. Pull posts shall be provided where a change in vertical or horizontal alignment of ten (10) degrees or more occurs. Place concrete for the full depth of excavation, around all posts (including, but not limited to, line, corner and gate posts) and vibrate or tamp for consolidation. Unless otherwise indicated, extend concrete footings 2 inches above grade and trowel to a crown to shed water. Protect portion of posts above ground from concrete splatter. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.

Brace Assemblies: Install braces at end and gate posts and at both sides of corner and pull posts. Locate horizontal braces at mid-height of fabric on fences with top rail and at two thirds fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

Top Rails: Run rail continuously through line post caps for entire length of fence, terminating at rail end attached to posts or at post caps fabricated to receive rail. Provide expansion couplings as recommended by fencing manufacturer.

Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric before stretching fabric and tie to each post with not less than same gage and type of wire. Pull wire taut, without sags. Fasten to fabric with wire ties spaced a maximum of 24 inches o.c.

Fabric: Apply fabric to outside of the area enclosed. Leave approximately 2 inches between finish grade and bottom selvage. Place the fabric by securing one end and applying sufficient tension to remove all slack before making attachment elsewhere. Tighten the fabric to provide a smooth uniform appearance free from sag. Cut the fabric by untwisting a picket and attach each span independently at all terminal posts. Thread tension bars through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not over 15 inches o.c. Fasten fabric to the line posts at intervals not exceeding 15 in. Fasten fabric to the rail or tension wire at intervals not exceeding 24 in.

Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts for added security.

Gate Installation: Install gates, according to manufacturer's instructions, plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary. After repeated operation of completed installation equivalent to 3 days use by normal traffic, readjust gates and gate operators and controls for optimum operating condition and safety. Lubricate operating equipment and clean exposed surfaces.

Method of Measurement:

8’ Chain Link Fence: This work shall be measured for payment by the number of linear feet of completed and accepted chain link fence, measured from outside to outside of terminal posts.

Chain Link Gates: This work shall be measured for Payment by the actual number of gates of the height and width specified, installed and accepted.

Basis of Payment:

8' Chain Link Fence: This work shall be paid for at the unit price per linear foot for "8' Chain Link Fence", complete in place, which price shall include all materials, equipment, tools, excavation, backfill, disposal of surplus material and labor incidental thereto.

Chain Link Gates: This work shall be paid for at the contract unit price each for "Chain Link Gate" of the height and width specified, complete in place, which price shall include all materials, equipment, tools, excavation, backfill, disposal of surplus material and labor incidental thereto.

Pay Item	Pay Unit
8' Chain Link Fence	L.F.
20' Chain Link Double Gate - 10' High w/Barbed Wire	EA.

ITEM #0921029A - CONCRETE APRON

Description:
Work under this item shall consist of furnishing and installing concrete apron on a granular base course, adjacent to the salt shed in the locations and to the dimensions and details shown on the plans.

Materials:
Comply with CSI Division 03, Section 033000, "Cast-in-Place Concrete" for all applicable materials contained therein, including, but not limited to, forms, concrete materials and expansion joint filler.

Granular Fill: Comply with the requirements of Article M.02.01.

Construction Methods:
Placement of concrete and associated items shall comply with the requirements of CSI Division 03, Section 033000, "Cast-in-Place Concrete".

Placement of granular fill shall comply with Section 2.13 of Form 816 and as amended in the Special Provisions.

Method of Measurement:
This work will be measured for Payment by the actual number of square feet of concrete apron installed and accepted.

Basis of Payment:
This work will be paid for at the unit price per square foot for "Concrete Apron" complete in place, which shall include all concrete, granular base, materials, equipment, tools, and labor incidental thereto.

Excavation will be paid for as "Earth Excavation" in accordance with Article 2.02.05, Form 816.

Pay Item	Pay Unit
Concrete Apron	SF

ITEM #0950008A - GRAVEL MULCH

Description:

This work shall consist of furnishing, placing and shaping gravel mulch in areas shown on the plan or where directed by the Engineer. The mulch shall be placed to the depth of 4 inches on a geotextile fabric as a weed control barrier.

Materials:

Stone: Stone mulch shall be clean, native, durable stone conforming to the following type, size range, and color:

1. Type: Rounded riverbed gravel, or smooth-faced stone
2. Particle Size Range: 3/4 inch maximum, 1/4 inch minimum screen.
3. Color: Uniform tan-beige color range acceptable to the Engineer or readily available natural gravel color range.

Geotextile: Geotextile shall comply with the requirements of M.08.01-26. Materials incidental to, and necessary for the installation of the geotextile, including sewing thread, staples, pins, etc., shall conform to the requirements of the fabric manufacturer.

Construction Methods:

Grade areas to be mulched to 4” below finished grade. Install geotextile over entire area, as recommended by the manufacturer, or as directed by the Engineer. Mulch shall then be spread and shaped to the limits and grades shown on the plans. The gravel shall be placed within the curbing and over the geo-textile fabric in areas shown on plans.

Method of Measurement:

This work will be measured for payment by the number of square yards of area on which the mulch has been placed completed and work accepted.

Basis of Payment:

This work will be paid for at the contract unit price per square yards for "Gravel Mulch" which price shall include all materials, equipment, tools, labor and work incidental thereto.

Pay Item	Pay Unit
Gravel Mulch	SY

ITEM #0950019A - TURF ESTABLISHMENT - LAWN

Description: The work included in this item shall consist of providing an accepted stand of grass by furnishing and placing seed as shown on the plans or as directed by the Engineer.

Materials: The materials for this work shall conform to the requirements of Section 9.50 of Standard Specification Form 816. The following mix shall be used for this item:

Turf Seed Mix:
In order to preserve and enhance the diversity, the source for seed mixtures shall be locally obtained within the Northeast USA including New England, New York, Pennsylvania, New Jersey, Delaware, or Maryland. One approved seed mixture is detailed below. Other proposed mixtures must be approved by the ConnDOT Landscape Design office.

Proportion (Percent)	Species Common name	Scientific name
25	Abbey Kentucky Bluegrass	Poa pratensis
15	Envicta Kentucky Bluegrass	Poa pratensis
25	Pennlawn Red Fescue	Festuca rubra
15	Ambrose Chewing Fescue	Festuca rubra
20	Manhattan Ryegrass	Lolium perenne

Construction Methods: Construction Methods shall be those established as agronomically acceptable and feasible and that are approved by the Engineer. Rate of application shall be field determined in Pure Live Seed (PLS) based on the minimum purity and minimum germination of the seed obtained. Calculate the PLS for each seed species in the mix. Adjust the seeding rate for the above composite mix, based on 250 lbs. (274 kg.) per acre (hectare). The seed shall be mulched in accordance with Article 9.50.03.

Method of Measurement: This work will be measured for payment by the number of square yards (square meters) of surface area of accepted established grasses as specified or by the number of square yards (square meters) of surface area of seeding actually covered and as specified.

Basis of Payment: This work will be paid for at the contract unit price per square yard (square meters) for "Turf Establishment - Lawn" which price shall include all materials maintenance, equipment, tools, labor, and work incidental thereto. Partial payment of up to 60% may be made for work completed, but not accepted.

Pay Item	Pay Unit
Turf Establishment - Lawn	S.Y. (S.M.)

ITEM #0950040A - CONSERVATION SEEDING FOR SLOPES

Description: The work included in this item shall consist of providing an accepted stand of established meadow grasses by furnishing and placing seed as shown on the plans or as directed by the Engineer.

Materials: The materials for this work shall conform to the requirements of Section 9.50 of Standard Specification Form 816. The following mix shall be used for this item:

Conservation Seed Mix:
In order to preserve and enhance the diversity, the source for seed mixtures shall be locally obtained within the Northeast USA including New England, New York, Pennsylvania, New Jersey, Delaware, or Maryland. One approved seed mixture is detailed. Other proposed mixtures must be approved by the ConnDOT Landscape Design Unit.

Percentage	Common Name	Scientific Name
25	Creeping Red Fescue	Festuca rubra
10	Little Bluestem	Schizachyrium scoparium
10	Black Eyed Susan	Rudbeckia hirta
10	Kentucky Blue Grass	Poa pratensis
10	Arrowwood Viburnum	Viburnum dentatum
10	Flowering Dogwood	Cornus florida
10	Gray Dogwood	Cornus racemosa
5	Meadow Goldenrod	Solidago canadensis
5	Indian Grass	Sorghastrum nutans
5	Partridge Pea	Chamaecrista fasciculate

Construction Methods: Construction Methods shall be those established as agronomically acceptable and feasible and that are approved by the Engineer. Rate of application shall be 25 lbs. per acre. The seed shall be mulched in accordance with Article 9.50.03.

Method of Measurement: This work will be measured for payment by the number of Square Yards of surface area of accepted established grasses as specified or by the number of Square Yards of surface area of seeding actually covered and as specified.

Basis of Payment: This work will be paid for at the contract unit price per Square Yard for "Conservation Seeding for Slope," which price shall include all materials maintenance, equipment, tools, labor, and work incidental thereto. Partial payment of up to 60% may be made for work completed, but not accepted.

Pay Item	Pay Unit
Conservation Seeding for Slopes	Square Yard

ITEM #0969062A - CONSTRUCTION FIELD OFFICE, MEDIUM

Description: Under the item included in the bid document, adequate weatherproof office quarters will be provided by the Contractor for the duration of the work, and if required, for a maximum of ninety days thereafter for the exclusive use of ConnDOT forces and others who may be engaged to augment ConnDOT 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 like new condition for the purpose intended and shall be approved by the Engineer.

Office Requirements: The Contractor shall furnish the office quarters and equipment as described below.

	Description:
400 SF	Sq. Ft. of floor space with a minimum ceiling height of 7 ft. and shall be partitioned as shown on building floor plan as provided by the Engineer.
2 EA	Minimum number of exterior entrances.
7 EA	Minimum number of parking spaces.

Office layout: The office shall have a minimum square footage as indicated in the table above, and shall be partitioned as shown on building floor plan as provided by the Engineer. The underside of the office shall be fully skirted to the ground.

Lavatory Facilities: The Contractor shall furnish lavatory and toilet facilities at a location convenient to the office quarters for the use of Department personnel and such assistants as they may engage. He shall also supply lavatory and sanitary supplies as required.

Windows and Entrances: The windows shall be of a type that will open and close conveniently, shall be sufficient in number and size to provide adequate light and ventilation, and shall be fitted with locking devices, blinds and screens. The entrances shall be secure, screened, and fitted with a lock for which four keys shall be furnished. All keys to the construction field office shall be furnished to the Department and will be kept in their possession while State personnel are using the office. Any access to the entrance ways shall meet applicable building codes and be slip resistant, with appropriate handrails.

Lighting: The Contractor shall equip the office interior with electric lighting that provides a minimum illumination level of 100 foot-candles at desk level height, and electric outlets for each desk and drafting table. The Contractor shall also provide exterior lighting that provides a minimum illumination level of 2 foot-candles throughout the parking area and for a minimum distance of 10 ft. on each side of the field office.

The Contractor shall provide the following additional equipment, facilities, and/or services at the Field Office on this project to include at least the following to the satisfaction of the Engineer:

Parking Facility: Adequate parking spaces with adequate illumination on a paved surface, with surface drainage if needed. If paved parking does not exist adjacent to the field office, the Contractor shall provide a parking area of sufficient size to accommodate the number of vehicles indicated in the table above. Construction of the parking area and driveway, if necessary, will consist of a minimum of 6 inches of processed aggregate base graded to drain. The base material will be extended to the office entrance.

Field Office Security: Physical Barrier Devices - This shall consist of physical means to prevent entry, such as: 1) All windows shall be barred or security screens installed; 2) All field office doors shall be equipped with dead bolt locks and regular day operated door locks; and 3) Other devices as directed by the Engineer to suit existing conditions.

Electric Service: The field office shall be equipped with an electric service panel to serve the electrical requirements of the field office, including: lighting, general outlets, computer outlets, calculators etc., and meet the following minimum specifications:

A. 120/240 volt, 1 phase, 3 wire.
B. Ampacity necessary to serve all equipment. Service shall be a minimum 100 amp dedicated to the construction field office.
C. The electrical panel shall include a main circuit breaker and branch circuit breakers of the size and quantity required.
D. Additional 120 volt, single phase, 20 amp, isolated ground dedicated power circuit with dual NEMA 5-20 receptacles will be installed at each computer workstation location.
E. Additional 120 volt, single phase, 20 amp, isolated ground dedicated power circuit with dual NEMA 5-20 receptacles will be installed, for use by the Telephone Company.
F. Additional 120-volt circuits and duplex outlets as required meeting National Electric Code requirements.
G. One exterior (outside) wall mounted GFI receptacle, duplex, isolated ground, 120 volt, straight blade.
H. After work is complete and prior to energizing, the State's ConnDOT electrical inspector, must be contacted at 860-594-2240. (Do Not Call Local Town Officials)
I. Prior to field office removal the ConnDOT Data Communications office must be notified to deactivate the communications equipment.

Heating, Ventilation and Air Conditioning (HVAC): The field office shall be equipped with sufficient heating, air conditioning and ventilation equipment to maintain a temperature range of 68^{o}-80^{o} Fahrenheit within the field office.

The Following Furnishings and Equipment Shall Be Provided In The Applicable Field Office Type:

Qty	Description:
3 EA	Office desks (2.5 ft x 5 ft) with drawers, locks, and matching desk chairs that have

Qty	Description:
	pneumatic seat height adjustment and dual wheel casters on the base.
2 EA	Office Chairs.
1 EA	Fire resistant cabinets (legal size/4 drawer), locking.
1 EA	Drafting type tables (3 ft x 6 ft) and supported by wall brackets and legs; and matching drafters stool that have pneumatic seat height adjustment, seat back and dual wheel casters on the base.
2 EA	Personal computer tables (4 ft x 2.5 ft).
1 EA	Hot and cold water dispensing unit and supply of cups and bottled water shall be supplied by the Contractor for the duration of the project.
2 EA	Electronic office type printing calculators capable of addition, subtraction, multiplication and division with memory and a supply of printing paper.
2 EA	Telephone.
1 EA	Telephone answering machine.
1 EA	Plain paper facsimile (FAX) machine capable of transmitting via telephone credit card. All supplies, paper and maintenance shall be provided by the Contractor.
1 EA	Copier/Scanner - dry, plain paper with automatic feeder and reducing capability. All supplies, paper and maintenance shall be provided by the Contractor.
2 EA	Computer systems as specified below under Computer Hardware and Software. All supplies and maintenance shall be provided by the Contractor.
1 EA	Laser printer as specified below under Computer Hardware and Software. All supplies, paper and maintenance shall be provided by the Contractor.
2 EA	Digital Camera as specified below under Computer Hardware and Software. All supplies and maintenance shall be provided by the Contractor.
1 EA	Wastebaskets - 30 gal., including plastic waste bags.
3 EA	Wastebaskets - 5 gal., including plastic waste bags.
2 EA	Electric pencil sharpeners.
* EA	Fire extinguishers - provide and install type and number to meet applicable State and local codes for size of office indicated, including a fire extinguisher suitable for use on a computer terminal fire.
1 EA	Vertical plan racks for 2 sets of 2 ft x 3 ft plans for each rack.
1 EA	Infrared Thermometer, including certified calibration, case, cleaning wipes.
1 EA	Concrete Curing Box as specified below under Concrete Testing Equipment.
1 EA	Concrete Air Meter as specified below under Concrete Testing Equipment.
1 EA	Concrete Slump Cone as specified below under Concrete Testing Equipment.

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

Telephone Service: This shall consist of the installation of two (2) telephone lines: one (1) line for phone/voice service and one (1) line dedicated for the facsimile machine. The Contractor shall pay all charges except for out-of-state toll calls made by State personnel.

Data Communications Facility Wiring: Contractor shall install a Category 5e 468B patch panel in a central wiring location and Cat 5e cable from the patch panel to each PC station, terminating in a (category 5e 468B) wall or surface mount data jack. The central wiring location shall also house either the data circuit with appropriate power requirements or a category 5 cable run to the location of the installed data circuit. The central wiring location will be determined by the ConnDOT Data Center staff in coordination with the designated field office personnel as soon as the facility is in place. The ConnDOT Project Engineer will provide the Contractor with a copy of the current PC specifications, approved printer list and data wiring schematic as soon as possible after the contract is awarded.

Contractor to run a CAT 5e LAN cable a minimum length of 25 feet for each computer to LAN switch area leaving an additional 10 feet of cable length on each side with terminated RJ45 connectors. Each run / jack shall be clearly labeled with an identifying Jack Number.

The installation of a data communication circuit between the field office and the ConnDOT Data Communication Center in Newington will be coordinated between the ConnDOT District staff, ConnDOT Office of Information Systems and the local phone company. The ConnDOT District staff will coordinate the installation of the data communication service with ConnDOT PC Support once the field office phone number is issued. The Contractor shall provide the field office telephone number(s) to the ConnDOT Project Engineer as soon as possible to facilitate data line and computer installations.

Computer Hardware and Software:

The ConnDOT Project Engineer will provide the Contractor with a copy of the current PC specifications, approved printer list and data wiring schematic as soon as possible after the contract is awarded.

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

Before any equipment is delivered to the Data Center, arrangements must be made a minimum of 24 hours in advance by contacting 860-594-3500. All software, hardware and licenses listed below shall be clearly labeled, specifying the (1) Project No., (2) Contractor Name, (3) Project Engineer's Name and (4) Project Engineer's Phone No., and shall be delivered to the ConnDOT Data Center, 2710 Berlin Turnpike, Newington, CT, where it will be configured and prepared for field installation. Installation will then be coordinated with ConnDOT field personnel and the computer system specified will be stationed in the Department's project field office.

The computer system furnished shall have all software and hardware necessary for the complete installation of the latest versions of the software listed, and therefore supplements the minimum specifications below. The Engineer reserves the right to expand or relax the specification to adapt to the software and hardware limitations and availability, the compatibility with current

agency systems, and to provide the Department with a computer system that can handle the needs of the project. This requirement is to ensure that the rapid changing environment that computer systems have experienced does not leave the needs of the project orphan to what has been specified. There will not be any price adjustment due to the change in the minimum system requirements.

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

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

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

A) Computer – Minimum Specification:

Processor – Intel® Core 2 Duo Processor (2.00 GHz, 800 MHz FSB 2MB L2 Cache)
Memory – 2 GB DIMM DDR2 667MHz.
Monitor – 19.0 inch LCD color monitor.
Graphics – Intel Graphics Media Accelerator 3100. or equivalent.
Hard Drive – 160 GB Ultra ATA hard drive (Western Digital, IBM or Seagate).
Floppy Drive – 3.5 inch 1.44MB diskette drive.
Optical Drive – CD-RW/DVD-RW Combo.
Multimedia Package – Integrated Sound Blaster Compatible AC97 Sound and speakers.
Case – Small Form or Mid Tower, capable of vertical or horizontal orientation.
Integrated Network Adapter – comparable to 3COM PCI 10/100 twisted pair Ethernet.
Keyboard – 104+ Keyboard.
Mouse – Optical 2-button mouse with scroll wheel.
Operating System – Windows XP Professional Service Pack 2; Windows Vista Capable.
Application Software – MS Office 2007 Professional Edition.
Additional Software (Latest Releases, including subscription services for the life of the Contract.–

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

Resource or Driver CD/DVD – CD/DVD with all drivers and resource information so that computer can be restored to original prior to shipment back to the contractor.
Uninterrupted power supply – APC Back-UPS 500VA.

Note A1: All hardware components must be installed before delivery. All software documentation and CD-ROMs/DVD for Microsoft Windows XP Professional, Microsoft

Office 2007 Professional Edition, and other software required software must be provided. Computer Brands are limited to Dell, Gateway and HP brands only. No other brands will be accepted. The ConnDOT Project Engineer will provide the Contractor with a copy of the current PC specifications and approved printer list as soon as possible after the contract is awarded.

Note A2: As of June 30, 2008, Microsoft will no longer distribute Windows XP for retail sale, although the date for specific computer manufacturers may be different. Please consult your manufacturer for details. The Department still requires Windows XP on all PCs. Microsoft has stated that any PCs that are purchased with either Windows Vista Business, or Vista Ultimate are automatically entitled to "downgrade rights", which allow the PC to be rolled back to Windows XP. Please consult the specific manufacturer for details on downgrading new PCs to Microsoft Windows XP after June 30, 2008.

B) Laser Printer – Minimum Specification:

Print speed – 20 ppm.
Resolution – 1,200 x 1,200 dpi.
Paper size – Up to 216 mm x 355 mm (8.5 in x 14 in).
RAM – 16 MB.
Print Drivers – Must support HP PCL6 and HP PCL5e.
Printer cable – 1.8 m (6 ft).

Note B1: Laser printer brands are limited to Hewlett-Packard and Savin brands only. The ConnDOT Project Engineer will provide the Contractor with a copy of the current PC specifications and approved printer list as soon as possible after the contract is awarded.

Note B2: It is acceptable to substitute a multi-function all-in-one printer/copier/scanner/fax machine listed on the approved printer list in place of the required laser printer and fax machine.

C) Digital Camera – Minimum Specification:

Optical – 5 mega pixel, with 3x optical zoom.
Memory – 2 GB.
Features – Date/time stamp feature.
Connectivity – USB cable or memory card reader.
Software – Must be compatible with Windows XP and Vista.
Power – Rechargeable battery and charger.

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

Concrete Testing Equipment: If the Contract includes items that require compressive strength cylinders for concrete, in accordance with the Schedule of Minimum Testing Requirements for

Sampling Materials for Test, the Contractor shall provide the following. All testing equipment will remain the property of the Contractor at the completion of the project.

A) Concrete Cylinder Curing Box – meeting the requirements of Section 6.12 of the Standard Specifications.

B) Air Meter – The air meter provided shall be in good working order and will meet the requirements of AASHTO T 152.

C) Slump Cone Mold – Slump cone, base plate, and tamping rod shall be provided in like-new condition and meet the requirements of AASHTO T119, Standard Test Method for Slump of Hydraulic-Cement Concrete.

Insurance Policy: The Contractor shall provide a separate insurance policy, with no deductible, in the minimum amount of twenty thousand dollars ($20,000.00) in order to insure all State-owned data equipment and supplies used in the office against all losses. The Contractor shall be named insured on that policy, and the Department shall be an additional named insured on the policy. These losses shall include, but not be limited to: theft, fire, and physical damage. The Department will be responsible for all maintenance costs of Department owned computer hardware. 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 monies due or which may become due the Contractor under the contract or under any other contract. The Contractor's financial liability under this paragraph shall be limited to the amount of the insurance coverage required by this paragraph. If the cost of equipment replacement required by this paragraph should exceed the required amount of the insurance coverage, the Department will reimburse the Contractor for replacement costs exceeding the amount of the required coverage.

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 shall be mowed and clean of debris. A trash receptacle (dumpster) with weekly pickup (trash removal) shall be provided. Snow removal, sanding and salting of all parking, walkway, and entrance ways areas shall be accomplished during a storm if on a workday during work hours, immediately after a storm and prior to the start of a workday. If snow removal, salting and sanding are not completed by the specified time, the State will provide the service and all costs incurred will be deducted from the next payment estimate.

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

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

Basis of Payment: The furnishing and maintenance of the construction field office will be paid at the listed unit price per month for the item "Construction Field Office, Medium", which price shall include all material, equipment, labor, utility services and work incidental thereto.

The cost of providing the parking area, external illumination, trash removal and snow and ice removal shall be included in the monthly unit price bid for the respective item "Construction Field Office, Medium".

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

Pay Item	Pay Unit
Construction Field Office, Medium	Month

ITEM #0980001A - CONSTRUCTION STAKING

Description: Under this item, the Contractor shall perform, including related administrative and procedural requirements, the following: construction layout and staking, field engineering and surveying, utility locations, general support services related to proposed construction methodology involving structural integrity or personnel safety, and civil engineering services.

Submit a certificate signed by the Contractor and co-signed by a Land Surveyor or Professional Engineer certifying that the location and elevation of improvements comply with the Contract.

Submit a record of Project work performed and project data as required under provisions of Form 816 Article 1.20-1.08.14.

Engage a Land Surveyor licensed in the State of Connecticut who is experienced in providing land-surveying services of the kind indicated.

Engage a Professional Engineer of the discipline required, licensed in the State of Connecticut, to perform engineering services of the kind indicated.

Materials:

Project Record Drawings: Appropriate scale reproducible final drawings shall be submitted to the Engineer. Drawings shall conform to an "Existing Building Location Survey" with a Class T-2 accuracy standard in accordance with the Connecticut General Statues, Section 20-300b.

Construction Methods:

The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction affecting the work. Furnish location data for Project work that must be performed by public utilities serving the Project Site.

Furnish information that is necessary to adjust, move or relocate existing structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

The existing benchmarks, control points and property corners are shown on the plans.

Verify layout information shown on the plans, in relation to the control points and existing benchmarks before proceeding to layout the Project work. Notify the Engineer if discrepancies are discovered. Locate existing permanent benchmarks, control points, and similar reference points before beginning Project work. Preserve and protect permanent benchmarks

and control points during construction operations. Do not change or relocate benchmarks or control points without the Engineer's prior written approval. Promptly report lost or destroyed control points, or the need to relocate permanent benchmarks or control points because of necessary changes in grades or locations. Promptly replace lost or destroyed benchmarks and control points. Base replacements on the original survey control points.

Establish and maintain a minimum of (2) permanent benchmarks on the Project Site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark. Record benchmark locations, with horizontal and vertical data, on Project Record Documents. Provide temporary reference points sufficient to locate the work where the actual location or elevation of layout points cannot be marked. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

Construction methodology shall be the Contractor's sole responsibility including the cost of using engineering services and recommendations as necessary. Inform the Engineer of any anticipated or encountered problems in construction methodology. Proceed with work only when such problems are fully resolved by the Contractor, using such engineering support services as required.

Work from lines and levels established by the control survey. Establish benchmarks and control points to set lines and levels at each area of construction as needed to locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale plans to determine dimensions. Advise entities engaged in construction activities, of marked lines and levels provided for their use. As construction proceeds, check every major element for line, level and plumb.

Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes and invert elevations by instrumentation and similar appropriate means. The Contractor shall identify and document by survey the extent, elevation, and location of all foundations and capped utilities to be left in place and backfilled. Appropriate scaled marked up drawings shall be furnished to the Engineer PRIOR to backfilling.

Locate and lay out control lines and levels for structures, building foundations, column grids and locations, floor levels including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from (2) or more locations.

Maintain a surveyor's log of control and other survey work. Make this log available to the Engineer for reference. Record deviations from required lines and levels, and advise the Engineer when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted by the Engineer and not corrected. Record the location of utilities at the time of installation in the log as well as on mylar for permanent record. The recording Land Surveyor shall place its registration seal and accuracy

statement regarding location of exterior underground utility lines on the utility plans of As-Built tracings.

Method of Measurement: This item will be paid for at the contract lump sum price for "Construction Staking" complete.

Basis of Payment: This item will be paid for at the contract lump sum price for "Construction Staking", which price shall include all administrative and procedural requirements, material, equipment, labor, and work incidental thereto.

PAY ITEM	PAY UNIT
Construction Staking	LS

ITEM #0999001A - DISPOSAL OF BUILDINGS

Article 9.99.01 - Description:

Work under this item shall include all activities related to the deconstruction/demolition and recycling/disposal of structures as detailed in this specification. Upon award of the Contract, the Contractor shall accept title and ownership of such structures as detailed herein, as well as all risk of loss and any and all liability in connection therewith. The Contractor shall not rent or otherwise use such structures without written permission from the Engineer.

The Commissioner reserves the right to delete from the contract the removal of any of the buildings listed in the contract documents.

The work shall be performed by an experienced firm that has successfully completed deconstruction/demolition work similar to that indicated herein. Such firm shall be Registered for Demolition Business by the Department of Public Safety (CTDPS) in accordance with CGS 29-402, and shall perform work under the supervision of a competent person as defined under OSHA 29 CFR 1926.850 - Demolition. In addition, employees performing on-site deconstruction/demolition related activity shall have attended an OSHA 10-hour Occupational Safety and Health Training Course in Construction Safety & Health, or equivalent.

The State does not engage to protect any of the buildings against damage, in any form including loss of fixtures or equipment, or vandalism in the period between the bidder's inspection of the building and the time such building is formally released to him as described herein. The Contractor shall take this into account in placing his bid.

The Contractor shall not perform any deconstruction/demolition work until such time that all applicable hazardous material abatement has been completed, as detailed in Items 0020801A – Asbestos Abatement, 0020902A – Lead Compliance for Building Renovation & Demolition and/or 0101143A – Handling and Disposal of Regulated Items.

All activities shall be performed in accordance with the State of Connecticut Demolition Code (CGS 29-401 through 415), the Connecticut State Building Code including Supplements and Amendments, OSHA Demolition Standard (29 CFR 1926.850), CTDEEP Solid Waste Management Standards (22a-209-1 through 13), CTDEEP Air Regulations (22a-174-1 through 36), CTDPH Public Health Code Regulations and Technical Standards for Subsurface Sewage Disposal Systems (19-13-B100a, B103 & B104), OSHA Construction Standards (29 CFR 1926), EPA Clean Air Act (CAA) National Ambient Air Quality Standards (NAAQS), ANSI A10.6-1990 – Safety Requirements for Demolition, NFPA 241-1993 – Safeguarding Construction, Alteration and Demolition Operations, and the State of Connecticut Office of Policy and Management Establishment of High Performance Building Construction Standards for State-Funded Buildings (16a-38k-1 through 7).

The Engineer will supply the Contractor with utility service disconnect notices and/or historical reviews from the State Historical Preservation Office, as applicable. Should such disconnect notices not be available, the Contractor shall arrange for the discontinuance of all utility services and obtain the necessary documentation from the utility provider.

Article 9.99.02 - Materials:

Sheeting for covering excavated materials and/or construction debris determined to be contaminated shall be polyethylene sheet having a minimum thickness of 6 mils.

Sedimentation control bales (Hay bales) shall conform to the requirements of Article 2.18.

Sedimentation Control System (Geotextile silt fencing) shall conform to the requirements of Article 2.19.

Granular Fill shall conform to the requirements of Article 2.13.

Article 9.99.03 - Construction Methods:

(1) Pre-Demolition Submittals and Permits:

(a) The Contractor shall, in accordance with CGS 29-406, apply for and obtain from the local building department, demolition permits for each structure to be deconstructed/demolished/recycled/disposed of. The Contractor shall pay all associated fees. The Contractor is also hereby notified that the local authority may impose, by ordinance, a waiting period of up to one hundred-eighty (180) days before granting any demolition permit, except with the demolition permit is required for the removal of a structure acquired by the Department of Transportation for a transportation project. It is the Contractor's responsibility to schedule activities to accommodate for any such waiting periods and these waiting periods will not be allowed as the basis of delay claims by the Contractor.

(b) For each structure to be deconstructed/demolished, if an Asbestos Abatement Notification Form was not submitted to the CTDPH, the Contractor shall submit the Demolition Notification Form to the CTDPH not less than 10 working days prior to the commencement of deconstruction/demolition activities in accordance with CTDPH 19a-332a-3. The Contractor shall pay all associated fees.

(c) In accordance with CGS 29-407, prior to commencing deconstruction/demolition activity, Contractor shall notify each adjoining property owner by certified mail that such deconstruction/demolition operations are planned.

(d) In accordance with CGS 4b-64, for structures that are more than fifty years old, the Contractor shall post a sign stating the intent to demolish the structures in a conspicuous place on the property not less than 30 days before the demolition. The Contractor also

shall publish notice of intent to demolish such structures three times in a newspaper of general circulation in the municipality in which the structures are located not more than 120 days and not less than 30 days prior to deconstruction/demolition.

(e) At least fifteen (15) working days prior to the start of any deconstruction/demolition work, the Contractor shall submit the following to the Engineer for review and approval:

1. A copy of the Contractors CTDPS Registration for Demolition Business
2. A copy of the approved demolition permit(s)
3. A copy of the CTDPH Demolition/Notification Form (as applicable)
4. A copy of the letters to adjoining property owners
5. Copies of utility disconnect letters
6. Copies of on-site employee OSHA 10-hour Construction Safety & Health training certificates, or equivalent
7. Proposed protective/safety measures to be implemented with regards to personnel protective equipment (PPE) for employees as well as protection of adjacent properties, subsurface structural, electrical or mechanical equipment, etc.
8. Proposed dust control measures
9. Proposed demolition C&D bulky waste disposal facility
10. Proposed steel/scrap metal recycling facility
11. Proposed concrete, brick, stone batch processing/recycling facility
12. Proposed bituminous disposal/recycling facility
13. Any other proposed C&D waste stream recycling facility
14. Proposed septage waste facility (as applicable)
15. Certification from a licensed exterminator that the structures are free from rodent and insect infestations (as applicable)
16. A copy of the CTDEEP Nuisance Wildlife Control Operator license (as applicable)
17. Copies of the Site Postings and Legal Notices Published pursuant to CGS 4b-64 (as applicable)
18. Proposed Construction Waste Management Plan (CWMP)

(f) If, in lieu of deconstructing/demolishing a building, the Contractor intends to move a building off of the site or to have it moved, the Contractor shall submit to the Engineer at least fifteen (15) working days in advance of the move the proposed method of operation, proposed future location of the building, and documentation of permission to relocate the building, including all required permits from the municipality and/or the State.

(2) Disposal of Buildings Provisions:

The Contractor shall completely deconstruct/demolish the structures, and remove/recycle/dispose of the demolition debris. Furthermore, the Contractor shall backfill the foundation and subgrade areas, abandon utilities (including public water service and public sewer service), and properly abandon septic tank systems as detailed below or as directed by the Engineer.

SEA STREET SALT/STORAGE SHEDS, NEW HAVEN, CONNECTICUT

- **Salt Shed 1 is a wood-framed structure on a concrete foundation with an asphalt roof. There are metal guardrails on two (2) sides of the structure. Electricity was previously connected to the structure. No other utilities are associated with this structure (telephone, water, septic, gas, etc.) however there is a telephone pole with wires attached located in close proximity to the rear of the structure.**

- **Storage Shed 2 is a steel-framed/concrete block structure on a concrete slab foundation with an asphalt roof. No utilities are associated with this structure.**

The Contractor shall provide adequate safety measures and suitable protection for the public. This shall include, but not be limited to, erecting a fence or barricade not less than 8 feet high, along the street line the entire length of the structure, with each end returning back to the building prior to starting deconstruction/demolition in accordance with CGS 29-408.

The Contractor shall erect and maintain a sidewalk shed meeting the requirements of CGS 29-409 for structures that are within 6 feet of a street line or an area used as a public way, 12 feet or more in height, or when the distance between the street line or public area and such structures is more than 6 feet but less than ½ the total height of the structures to be deconstructed/demolished.

The Contractor shall retain the services of a licensed exterminator to determine the extent of rodent and insect infestation and if found, retain the exterminator to rid the structure of rodent and insect infestation. Any nuisance wildlife shall be removed by a CTDEEP licensed Nuisance Wildlife Control Operator (NWCO), retained by the Contractor, in accordance with CGS 26-47, prior to structure deconstruction/demolition.

The Contractor shall prevent damage to any existing utilities that are to remain in service during deconstruction/demolition. The Contractor shall not interrupt existing utilities serving adjacent facilities, except when authorized in writing by authorities having jurisdiction and the Engineer.

Use of explosives or blasting for deconstruction/demolition purposes will not be permitted.

No burning or flame/torch cutting will be permitted.

Any items listed in the Contract to be salvaged shall be removed in accordance with Item #006399A – Architectural Salvage.

Any items not designated for salvage in the documents that are of salvageable value to the Contractor may be removed as work progresses. The Contractor shall transport its salvaged items from site as they are removed. Storage or sale of such items will not be permitted on site. No requests for additional time will be considered based on delays caused by the Contractor's salvage work.

The Contractor shall use the methods of deconstruction/demolition required to complete the work in accordance with all codes, ordinances and requirements of governing authorities. Deconstruction/demolition practices shall be acceptable to the Engineer, shall assure the safety of persons, equipment and structures which are to remain, and shall provide adequate protection of the environment. The Contractor shall schedule demolition activities to minimize delays, storage of debris, and construction traffic on-site.

Deconstruction/demolition shall proceed in a systematic manner, from top of structures to ground. The Contractor shall complete demolition work above each floor or tier before disturbing supporting members on lower levels. Structural framing members shall be removed and lowered to ground by means of hoists or other suitable methods. Deconstruction/demolition equipment shall be located throughout the site/structure and shall remove materials so as not to impose excessive loads on supporting walls, floors and framing. Walls fronting on streets that will remain open shall be demolished inward, toward the middle of the building. Load bearing walls fronting on streets, shall be razed one story at a time. All floors above the third floor shall be demolished with the use of adequate chutes. No storage of rubble on the upper floors of any building or on the site shall be allowed. Concrete, masonry and stone walls shall be demolished in small sections.

The Contractor shall remove the structures to the top of the foundation and shall break up and remove the slab floor and/or foundation of the structures to a minimum of 24 inches below existing grade or as directed by the Engineer. The Contractor shall also break up any remaining (>24" deep) below grade concrete, brick or stone foundation materials and ensure that proper water drainage can be maintained through the foundation or floor slab following break-up. Any floor drain piping within the floor slabs shall be removed separately for disposal.

If hazardous materials are encountered during demolition operations, the Contractor shall immediately notify the Engineer. The Contractor shall also comply with applicable laws and regulations regarding removal, handling, disposal, and protection against exposure and environmental pollution.

Deconstruction/demolition operations and removal of debris shall not interfere with roads, streets, walks, and other adjacent occupied and used facilities. Shoring, bracing, barricades, fencing and other devices shall be used as necessary to protect adjacent properties and the public. Damage to adjacent facilities caused by demolition operations shall be promptly repaired. The Contractor shall not close or obstruct streets, walks, or other occupied or used facilities without permission from the Engineer and local authorities.

The Contractor shall implement a fugitive dust suppression program in accordance with the Contract to prevent the off-site migration of particulate matter and/or dust resulting from demolition activities. It shall be the Contractor's responsibility to supervise fugitive dust control measures and to monitor airborne particulate matter. The Contractor shall employ reasonable fugitive dust suppression techniques and shall visually observe the amounts of particulate and/or fugitive dust generated.

If the control of fugitive dust and/or particulate matter is not acceptable to the Engineer, the Contractor shall implement corrective measures, including using water or calcium chloride for dust control, temporary enclosures, and other methods to limit and control dust and dirt migration. The contractor shall not create hazardous or objectionable conditions, such as ice, flooding, water runoff and pollution when using water for dust control. Calcium Chloride for dust control shall conform to the requirements of Article 9.42. Water for dust control shall conform to the requirements of Article 9.43.

The Engineer will conduct ambient air monitoring for contaminants such as total lead, total dust, total fibers, silica, microbial spores, etc. for comparison to applicable standards. If any standard is exceeded, Contractor shall immediately cease operations and modify the engineering controls being used to maintain levels below the applicable standard.

Except as otherwise specified, the Contractor shall break up, demolish and remove from site for disposal/recycling/reuse:

1. All above ground building structures
2. All surface debris, brick, stone, concrete, walks and curbs
3. All existing bituminous and concrete paved areas
4. All structures, piers, tunnels, footings and foundations to a minimum depth of 24 inches below existing grade or below final grade, whichever depth is lower
5. All slabs on-grade or floors of structures without basements
6. All floor construction over basements, regardless of elevation
7. All apparatus and debris from within basements
8. All miscellaneous structures, fences and debris to produce a clean site

Basement floors may remain if located a minimum depth of 24 inches below grade; however, they shall be broken up sufficiently to permit drainage (pieces not greater than 48” in any direction).

Accumulated debris, rubbish, wood, plaster, roofing, wallboard, and other materials resulting from deconstruction/demolition and related operations shall be removed from the site daily as generated.

Land clearing shall be in accordance with Article 2.01. Land clearing debris generated during the demolition process shall be managed for beneficial reuse in accordance with the DEEP Brush & Stump Management Guidelines by companies registered under the DEEP Recycling General Permit. The Contractor shall coordinate with the Engineer as to whether any chipping of untreated wood can be reused on-site or must be managed off site.

Steel and scrap metal generated during the demolition process shall be recycled as scrap metal at an approved scrap metal recycling facility. Aboveground and underground storage tanks (AST’s/UST’s) shall be cleaned prior to recycling. Disposal of any contents of the AST’s/UST’s shall be in accordance with Item 0101143A.

Materials that have not been characterized as hazardous shall be recycled off site or disposed of at a landfill. Transport materials removed from demolished structures and dispose/recycle off site as C&D bulky waste in accordance with the DEEP solid waste management standards. The Contractor shall recycle as much C&D bulky waste as practical, following waste management guidelines such as the US Green Building Council (USGBC) Leadership in Energy & Environmental Design (LEED) Green Building Rating System, in cases where it reduces the overall project costs, does not violate applicable regulations or restrictions, or contributes to compliance with the CTOPM High Performance Building Construction Standards. Burning of combustible materials from demolished structures shall not be permitted on site.

The Contractor shall dispose or recycle materials off-site in accordance with the Specifications and all Federal, State and local regulations. A copy of the shipping paper for each load of material shipped off-site for disposal/recycling, including the weight of the load as measured at the disposal/recycling facility shall be returned to the Engineer.

In accordance with CGS 29-413, the Contractor shall not allow any basement, cellar, hole or similar structure to remain uncovered or opened as a result of deconstruction/demolition activity.

The foundation and subgrade areas (e.g. basement) shall be backfilled to grade with surplus suitable excavated "clean fill" materials (unpainted brick, stone, concrete) from the project and graded with clean native soil. Any additional material required to bring the subsurface area to grade shall be granular fill in accordance with Article 2.13. Prior to placement of fill materials, areas to be filled shall be free of standing water, frost, frozen material, trash and debris. Construction debris, excluding clean fill, shall not be used as fill within the project limits and shall be properly disposed of in accordance with all regulations. After fill placement and compaction, the Contractor shall grade surface to meet adjacent contours and provide flow to surface drainage structures. Grading shall not create any depressions that can retain water, create any diversions to surface flow, or block the intended flow of surface water.

(3) Construction Waste Management:

In accordance with Section 16a-38k-4(d)(5) of the State of Connecticut Office of Policy and Management's Establishment of High Performance Building Construction Standards for State-Funded Buildings, and in accordance with guidelines such as the US Green Building Council (USGBC) Leadership in Energy & Environmental Design (LEED) Green Building Rating System, the Contractor shall divert as much non-hazardous construction and demolition (C&D) waste from disposal in landfill and incinerators as practical. The minimum acceptable level of recycling and/or reuse/salvaging shall be at least 75% by weight of the non-hazardous C&D waste to be generated by the deconstruction/demolition process.

Contractor shall prepare, and submit to the Engineer for approval, a proposed Construction Waste Management Plan (CWMP) which will, at a minimum:

- Identify the types of materials to be diverted from landfill disposal and incineration
- Identify whether the materials will be sorted on-site or co-mingled

- Identify the proposed recycling facilities to be used for each type of materials to be diverted
- Project the total weight, by type, of the C&D materials to be recycled/salvaged/reused as well as disposed of in landfill, and then provide the estimated recycling rate (75% by wt. minimum).
- Specify what records/waste shipping papers/etc. the Contractor will maintain and submit to the Engineer as documentation of the types and amounts of C&D materials recycled/reused/landfilled and the actual recycling rate achieved.

The proposed CWMP and actual implementation shall divert a minimum of 75% by weight of non-hazardous C&D debris from disposal in landfills and incinerators, as well as redirect recyclable recovered resources back to the manufacturing process and/or appropriate sites. Note that excavated soil and land-clearing debris do not count toward the 75% calculation; however, diversion may include donation of materials to charitable organizations and salvage/reuse of materials on site.

Examples of the types of materials to be included in the CWMP include, but are not limited to:

1. Steel/Scrap Metal
2. Clean Concrete
3. Clean Brick
4. Cured Asphalt
5. Asphalt Roofing Products
6. Clean Wood
7. Acoustical Tile
8. Clean Gypsum Wallboard
9. Carpet
10. Porcelin Fixtures
11. Furniture & Furnishings

Identification of suitable haulers and recyclers to handle the designated materials shall be the responsibility of the Contractor.

Contractor shall maintain detailed records, by material type and weight, in order to track all materials during the project that are diverted from disposal in landfills and incinerators, redirected (recyclable recovered resources) back to the manufacturing process, and/or salvaged/reused at the project site, as well as those ultimately disposed of in landfills, and provide the Engineer such records, along with the calculated actual recycling rate.

(4) Sanitary Sewer Line Capping:

For sites connected to sanitary sewer, the Contractor shall cap all connections to sanitary sewer lines at the property line and shall perform this work under the supervision and approval of the Engineer and the Sewer Authority having jurisdiction of the property. All sewer lines shall be capped using a method acceptable to the Sewer Authority including the use of vitrified clay,

concrete or cast iron disk, placed in the hub and the entire end sealed or encased in concrete. The Contractor shall coordinate its activities with the representative of the Sewer Authority and have such representative inspect and approve of the sewer line cap. Where excavations are required in the street for the purpose of capping sewer lines, the Contractor shall backfill and repair the affected street area in a manner acceptable to the Engineer. Any damage to sewer laterals or other sewer lines that are to remain in service shall be repaired by the Contractor at its own expense.

(5) Septic System Abandonment:

Septic tanks and hollow leaching structures shall be properly abandoned by the Contractor in accordance with the Connecticut Public Health Code Technical Standard for Septic Tank Abandonment 19-13-B103 V. A. 7. Abandonment shall be performed in such a manner as to eliminate the danger of the structures inadvertently collapsing. The chambers shall be emptied of all septage wastes. The structures shall be filled with clean sand or gravel, or the structures shall be crushed and the area backfilled.

(6) Post-Demolition Submittals:

The Contractor shall provide the Engineer, within 30 days of completion of the demolition work, a compliance package; which shall include, but not be limited to, the following:

1. Shipping papers from the CTDEEP solid waste bulky waste disposal facility indicating receipt and acceptance of C&D bulky waste demolition debris, which clearly indicates the weight of C&D bulky waste disposed of and the name/location of the disposal facility.
2. Shipping papers from the approved scrap metal recycling facility indicating receipt and acceptance of scrap metal debris, which clearly indicates the weight of scrap metal recycled and the name/location of the recycling facility.
3. Shipping papers from the approved concrete, brick, stone, asphalt shingle, etc. batch processing/recycling facilities indicating receipt and acceptance of the recycled debris, which clearly indicates the type/weight of the materials recycled and the name/location of the recycling facility.
4. Calculations on the weight of each type of debris reused on-site as clean-fill, otherwise reused on-site, or elsewhere recovered and diverted from landfill.
5. Calculated actual C&D waste recycling/reuse rate, on a percent by weight basis.
6. If the Contractor does not achieve the specified requirement of diverting at least 75% by weight of the non-hazardous C&D demolition waste from landfill/incineration, the Contractor shall submit written documentation detailing its good faith efforts that were made to satisfy the requirement.

Article 9.99.04 - Method of Measurement: is supplemented with the following:

The Contractor shall submit a lump sum bid price for the disposal of all buildings on the project included with the proposal. The lump sum bid price shall also include all other related necessary

work and material associated with the deconstruction/demolition and recycling/reuse/disposal of the structures, such as permits, excavation, recycling, disposal, backfill, saw cutting, dust suppression, septic tank abandonment, water and sewer line capping, paving, sedimentation control system, granular fill, fencing etc.

Article 9.99.05 - Basis of Payment: is supplemented with the following:

The work will be paid by the State or paid for by the Contractor at the contract lump sum for the "Disposal of Buildings" as adjusted in accordance with the provisions of the above paragraph, which price shall include all materials, equipment, tools, labor and work incidental thereto.

The Contract lump sum shall also include all other related necessary work and material associated with the deconstruction/demolition and recycling/reuse/disposal of the structures, such as permits, excavation, recycling, disposal, backfill, saw cutting, dust suppression, septic tank abandonment, water and sewer line capping, paving, sedimentation control system, granular fill, fencing, etc.

Failure of the Contractor at the completion of all contract work to have met the specified requirement for diverting C&D demolition waste from landfill/incineration will result in the reduction in contract payments to the Contractor of 5% of the total lump sum bid for Item 0999001A, unless the Contractor can adequately document or substantiate its good faith efforts made to meet the required percentage to the satisfaction of the Engineer.

Final payment will not be made until all post-demolition submittals have been provided to the Engineer. Once completed documents have been received in their entirety, the Engineer will review and make the final payment to the Contractor.

Pay Item	Pay Unit
Disposal of Buildings	Lump Sum

CSI FORMATTED SPECIFICATIONS

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes the following:

1. Framing with dimension lumber.
2. Framing with timber.
3. Framing with engineered wood products.
4. Wood blocking, cants, and nailers.
5. Wood furring and grounds.
6. Plywood backing panels.

B. Related CSI Sections include the following:

1. Division 06 Section 061500, "Wood Decking."
2. Division 06 Section 061600, “Sheathing.”
3. Division 06 Section 061800, “Glued-Laminated Construction.”

1.2 DEFINITIONS:

A. Exposed Framing: Framing not concealed by other construction.

B. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

C. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. NLGA: National Lumber Grades Authority.
3. RIS: Redwood Inspection Service.
4. SPIB: The Southern Pine Inspection Bureau.
5. WCLIB: West Coast Lumber Inspection Bureau.
6. WWPA: Western Wood Products Association.

1.3 SUBMITTALS:

A. Submit the following in accordance with Form 816, Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

C. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

D. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:

1. Wood-preservative-treated wood.
2. Engineered wood products.
3. Power-driven fasteners.
4. Powder-actuated fasteners.
5. Metal framing anchors.

1.4 QUALITY ASSURANCE:

A. Source Limitations for Engineered Wood Products: Obtain each type of engineered wood product through one source from a single manufacturer in accordance with Form 816 Article 1.20-1.06.01.

B. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria":

1. Dimension lumber framing.
2. Laminated veneer lumber.
3. Rim boards.
4. Miscellaneous lumber.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL:

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
4. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER:

A. Preservative Treatment by Pressure Process: AWPA C2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).

1. Preservative Chemicals: Acceptable to authorities having jurisdiction.
2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.

D. Application: Treat items indicated on plans, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping**,** and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS:

A. General: Comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood).

1. Use Exterior type for exterior locations and where indicated.
2. Use Interior Type A, High Temperature (HT) for enclosed roof framing, framing in attic spaces, and where indicated.
3. Use Interior Type A, unless otherwise indicated.

B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.

1. For exposed lumber indicated to receive a stained or natural finish, [mark end or back of each piece.

C. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

D. Application: Treat items indicated on Drawings, and the following:

1. Concealed blocking.
2. Framing for non-load-bearing partitions.
3. Framing for non-load-bearing exterior walls.
4. Roof construction.
5. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING:

A. Maximum Moisture Content: 19 percent**.**

B. Non-Load-Bearing Interior Partitions: Construction or No. 2 and any of the following species:

1. Hem-fir (north); NLGA.
2. Mixed southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB, or WWPA.
5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
6. Northern species; NLGA.
7. Eastern softwoods; NeLMA.

C. Ceiling Joists (Non-Load-Bearing): Construction or No. 2 grade and any of the following species:

1. Hem-fir (north); NLGA.
2. Southern pine; SPIB.
3. Douglas fir-larch; WCLIB or WWPA.
4. Douglas fir-larch (north); NLGA.
5. Mixed southern pine; SPIB.
6. Spruce-pine-fir; NLGA.
7. Hem-fir; WCLIB or WWPA.
8. Northern species; NLGA.
9. Eastern softwoods; NeLMA.

D. Joists, Rafters, and Other Framing Not Listed Above: Construction or No. 2 grade and any of the following species:

1. Hem-fir (north); NLGA.
2. Southern pine; SPIB.
3. Douglas fir-larch; WCLIB or WWPA.
4. Mixed southern pine; SPIB.
5. Spruce-pine-fir; NLGA.
6. Douglas fir-south; WWPA.
7. Hem-fir; WCLIB or WWPA.
8. Douglas fir-larch (north); NLGA.

2.5 MISCELLANEOUS LUMBER:

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Cants.
4. Furring.
5. Grounds.

B. For items of dimension lumber size, provide Construction, Stud, or No. 2 grade lumber with 19 percent maximum moisture content and any of the following species:

1. Hem-fir (north); NLGA.
2. Mixed southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB, or WWPA.
5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
6. Northern species; NLGA.
7. Eastern softwoods; NeLMA.

C. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine, No. 2 grade; SPIB.
2. Eastern softwoods, No. 2 Common grade; NeLMA.
3. Northern species, No. 2 Common grade; NLGA.
4. Western woods, Construction or No. 2 Common Standard or No. 3 Common grade; WCLIB or WWPA.

D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.6 PLYWOOD BACKING PANELS:

A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

2.7 FASTENERS:

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1.

F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

2.8 METAL FRAMING ANCHORS:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Alpine Engineered Products, Inc.
2. Cleveland Steel Specialty Co.
3. Harlen Metal Products, Inc.
4. KC Metals Products, Inc.
5. Simpson Strong-Tie Co., Inc.
6. Southeastern Metals Manufacturing Co., Inc.
7. USP Structural Connectors.

B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

C. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 coating designation.

1. Use for interior locations where stainless steel is not indicated.

D. Joist Hangers: U-shaped joist hangers with 2-inch- long seat and 1-1/4-inch wide nailing flanges at least 85 percent of joist depth.

1. Thickness: 0.062 inch.

E. I-Joist Hangers: U-shaped joist hangers with 2-inch- long seat and 1-1/4-inch- (32-mm-) wide nailing flanges full depth of joist. Nailing flanges provide lateral support at joist top chord.

1. Thickness: 0.062 inch.

F. Bridging: Rigid, V-section, nailless type, 0.062 inch (1.3 mm) thick, length to suit joist size and spacing.

G. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch above base and with 2-inch- minimum side cover, socket 0.062 inch thick, and standoff and adjustment plates 0.108 inch (2.8 mm) thick.

H. Joist Ties: Flat straps, with holes for fasteners, for tying joists together over supports.

I. Rafter Tie-Downs: Bent strap tie for fastening rafters or roof trusses to wall studs below, 1-1/2 inches wide by 0.050 inch thick.

J. Rafter Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening rafters or roof trusses to wall studs below, 2-1/4 inches wide by 0.062 inch thick. Tie fits over top of rafter or truss and fastens to both sides of rafter or truss, face of top plates, and side of stud below.

K. Hold-Downs: Brackets for bolting to wall studs and securing to foundation walls with anchor bolts or to other hold-downs with threaded rods and designed with first of two bolts placed seven bolt diameters from reinforced base.

L. Wall Bracing: T-shaped bracing made for letting into studs in saw kerf, 1-1/8 inches wide by 9/16 inch deep by 0.034 inch thick with hemmed edges.

M. Wall Bracing: Angle bracing made for letting into studs in saw kerf, 15/16 by 15/16 by 0.040 inch thick with hemmed edges.

2.9 MISCELLANEOUS MATERIALS:

A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch nominal thickness, compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated.

B. Adhesives for Gluing to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

1. Use adhesives that have a VOC content that complies with local regulations when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL:

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.

D. Do not splice structural members between supports, unless otherwise indicated.

E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

F. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

G. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

H. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

I. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

J. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

K. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.

3.2 WOOD GROUND, SLEEPER, BLOCKING, AND NAILER INSTALLATION:

A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 WOOD FURRING INSTALLATION:

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal- size furring horizontally at 24 inches o.c.

C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal- size furring vertically at 16 inches o.c.

3.4 WALL AND PARTITION FRAMING INSTALLATION:

A. General: Provide single bottom plate and double top plates using members of 2-inch nominal thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions. Fasten plates to supporting construction, unless otherwise indicated.

1. For exterior walls, provide 2-by-6-inch nominal size wood studs spaced 16 inches o.c., unless otherwise indicated.
2. For interior partitions and walls, provide 2-by-4-inch nominal size wood studs spaced 16” o.c., unless otherwise indicated.

B. Construct corners and intersections with three or more studs.

C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.

1. For non-load-bearing partitions, provide double-jamb studs and headers not less than 4-inch nominal depth for openings 48 inches and less in width, 6-inch nominal depth for openings 48 to 72 inches in width, 8-inch nominal (184-mm actual) depth for openings 72 to 120 inches in width, and not less than 10-inch nominal (235-mm actual) depth for openings 10 to 12 feet in width.
2. For load-bearing walls, provide double-jamb studs for openings 60 inches and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated or, if not indicated, according to Table R502.5(1) or Table R502.5(2), as applicable, in ICC's International Residential Code for One- and Two-Family Dwellings.

D. Provide diagonal bracing in exterior walls, at both walls of each external corner, at 45-degree angle, full-story height, unless otherwise indicated. Use 1-by-4-inch nominal-size boards, let-in flush with faces of studs.

3.5 PROTECTION:

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

SECTION 061500 - WOOD DECKING

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes the following:

1. Solid-sawn roof decking.
2. Glued-laminated wood roof decking.

B. Related CSI Sections include the following:

1. Division 06 Section 061000, "Rough Carpentry" for dimension lumber items associated with wood decking.

1.2 SUBMITTALS:

A. Submit the following in accordance with Form 816, Article 1.20-1.05.02 and NOTICE TO CONTRACTOR-SUBMITTALS.

B. Product Data:

1. For glued-laminated wood decking. Include installation instructions and data on fabrication.
2. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treatment plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.

a. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before further fabrication or shipment to Project site.

3. For sealant and installation adhesive.

C. Research/Evaluation Reports: For glued-laminated wood decking indicated to be of diaphragm design and construction.

1.3 QUALITY ASSURANCE:

A. Standard for Solid-Sawn Wood Decking: Comply with AITC 112, "Standard for Tongue-and-Groove Heavy Timber Roof Decking."

B. Forest Certification: Provide wood decking produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, “Principles and Criteria”.

1.4 DELIVERY, STORAGE, AND HANDLING:

A. Schedule delivery of wood decking to avoid extended on-site storage and to avoid delaying the Work.

B. Store materials under cover and protected from weather and contact with damp or wet surfaces. Provide for air circulation within and around stacks and under temporary coverings. Stack wood decking with surfaces that are to be exposed in the final work protected from exposure to sunlight.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL:

A. General: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.

B. Grade Stamps: Provide solid-sawn wood decking with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, species, grade, moisture content at time of surfacing, and mill. Apply grade stamp to surfaces that will not be exposed to view.

C. Moisture Content: Provide wood decking with 19 percent maximum moisture content at time of dressing.

D. Preservative Treatment: Where preservative-treated laminated decking is indicated, pressure treat lumber before gluing according to AWPA C28 for aboveground use.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction.
2. Use preservative solution without substances that might interfere with application of indicated finishes.

2.2 SOLID-SAWN WOOD DECKING:

A. Decking Species: Balsam fir, Douglas fir-larch, Douglas fir-larch (North), hem-fir, hem-fir (North), southern pine, spruce pine-fir (North), western hemlock, or western hemlock (North).

B. Decking Grade: Selected Decking.

C. Face Surface: Smooth.

D. Edge Pattern: Vee grooved.

2.3 GLUED-LAMINATED WOOD DECKING:

A. Face Species: Douglas fir-larch or Douglas fir-larch North, Ponderosa pine, Southern pine, Western cedars or western cedars North.

B. Decking Nominal Size: As indicated on plans.

C. Decking Configuration: For glued-laminated wood decking indicated to be of diaphragm design and construction, provide tongue-and-groove configuration that complies with research/evaluation report.

D. Face Grade: Service or better: Face knot holes, stain, end splits, skip, roller split, planer burn, and other nonstrength-reducing characteristics are allowed. Strength-reducing characteristics are not allowed.

E. Face Surface: Smooth.

F. Edge Pattern: Vee grooved.

G. Adhesive: Wet-use type complying with ASTM D 2559.

1. Use adhesive that contains no urea-formaldehyde resins.

2.4 FASTENERS AND ACCESSORY MATERIALS:

A. Fasteners for Solid-Sawn Decking: Provide fastener size and type complying with decking standard for thickness of deck used.

B. Fasteners for Glued-Laminated Decking: Provide fastener size and type complying with requirements for installing laminated decking in Part 3.2 "Installation."

C. Fastener Material: Hot-dip galvanized.

D. Installation Adhesive: For glued-laminated wood decking indicated to be of diaphragm design and construction, provide adhesive that complies with research/evaluation report.

1. Use adhesive that has a VOC content that complies with local regulations when calculated according to 40 CRF 59, Subpart D (EPA Method 24)..

E. Penetrating Sealer: Clear sanding sealer complying with CSI Division 09 painting Sections and compatible with topcoats specified for use over it.

2.5 FABRICATION:

A. Shop Fabrication: Where preservative-treated decking is indicated, complete cutting, trimming, surfacing, and sanding before treating.

B. Predrill decking for lateral spiking to adjacent units to comply with referenced decking standard.

C. Seal Coat: After fabricating and surfacing decking, apply a saturation coat of penetrating sealer.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine walls and support framing in areas to receive wood decking for compliance with installation tolerances and other conditions affecting performance of wood decking.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION:

A. Install solid-sawn wood decking to comply with referenced standard.

B. Install laminated wood decking to comply with manufacturer's written instructions.

1. Nail each course of glued-laminated wood decking at each support with one nail slant nailed above the tongue and one straight nailed through the face.

2. Glue adjoining decking courses together by applying a 3/8-inch bead of adhesive on the top of tongues according to research/evaluation report.

C. Where preservative-treated decking must be cut during erection, apply a field-treatment preservative to comply with AWPA M4.

D. Apply joint sealant to seal roof decking at exterior walls at the following locations:

1. Between decking and supports located at exterior walls.
2. Between decking and exterior walls that butt against underside of decking.
3. Between tongues and grooves of decking over exterior walls and supports at exterior walls.

3.3 ADJUSTING:

A. Repair damaged surfaces and finishes after completing erection. Replace damaged decking if repairs are not approved by Engineer.

3.4 PROTECTION

A. Provide temporary waterproof covering to protect exposed decking before applying roofing.

END OF SECTION 061500

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes the following:

1. Wall sheathing.
2. Roof sheathing.

B. Related CSI Sections include the following:

1. Division 06 Section 061000, "Rough Carpentry."

1.2 SUBMITTALS:

A. Submit the following in accordance with Form 816, Article 1.20-1.05.02 and NOTICE TO CONTRACTOR-SUBMITTALS.

B. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

C. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:

1. Preservative-treated plywood.
2. Fire-retardant-treated plywood.

1.3 QUALITY ASSURANCE:

A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory."

B. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria":

1. Plywood.

1.4 DELIVERY, STORAGE, AND HANDLING:

A. Stack plywood and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS, GENERAL:

A. Plywood: DOC PS 1.

B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.

C. Factory mark panels to indicate compliance with applicable standard.

2.2 PRESERVATIVE-TREATED PLYWOOD:

A. Preservative Treatment by Pressure Process: AWPA C9.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction.

B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

C. Application: Treat all plywood, unless otherwise indicated.

2.3 WALL SHEATHING:

A. Plywood Wall Sheathing: Exposure 1 sheathing.

1. Span Rating: Not less than 24/0.

2.4 ROOF SHEATHING:

A. Plywood Roof Sheathing: Exterior, Structural I sheathing.

1. Span Rating: Not less than 24/16.

2.5 FASTENERS:

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153 or of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

1. For wall and roof sheathing panels, provide screws with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

F. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

1. For steel framing less than 0.0329 inch thick, attach sheathing to comply with ASTM C 1002.
2. For steel framing from 0.033 to 0.112 inch thick, attach sheathing to comply with ASTM C 954.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL:

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."

D. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

E. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION:

A. General: Comply with applicable recommendations in APA Form No. E30S, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:

1. Wall and Roof Sheathing:

a. Nail to wood framing.
b. Screw to cold-formed metal framing.
c. Space panels 1/8 inch apart at edges and ends.

END OF SECTION 061600

SECTION 061800 - GLUED-LAMINATED CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes framing using structural glued-laminated timbers.

B. Related CSI Sections include the following:

1. Division 06 Section 061000, "Rough Carpentry" for dimension lumber items associated with structural glued-laminated timber construction.
2. Division 06 Section 061500, "Wood Decking" for wood roof decking.

1.2 DEFINITIONS:

A. Structural Glued-Laminated (Glulam) Timber: An engineered, stress-rated timber product assembled from selected and prepared wood laminations bonded together with adhesives and with the grain of the laminations approximately parallel longitudinally.

1.3 SUBMITTALS:

A. Submit the following in accordance with Form 816, Article 1.20-1.05.02 and NOTICE TO CONTRACTOR-SUBMITTALS.

B. Product Data: For structural glued-laminated timber and connectors.

1. Include data on lumber, adhesives, fabrication, and protection.
2. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treatment plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated materials.
3. Include installation instructions for timber connectors.

C. Shop Drawings: Show layout of structural glued-laminated timber system and full dimensions of each member. Indicate species and laminating combination, adhesive type, and other variables in required work.

1. Include large-scale details of connections.
2. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer, registered in the State of Connecticut, responsible for their preparation.

D. Qualification Data: For manufacturer.

1.4 QUALITY ASSURANCE:

A. Manufacturer Qualifications: Provide factory-glued structural units produced by an AITC- or APA-licensed firm.

1. Factory mark each piece of structural glued-laminated timber with AITC Quality Mark or APA trademark. Place mark on surfaces that will not be exposed in the completed Work.

B. Quality Standard: Comply with AITC A190.1, "Structural Glued Laminated Timber."

C. Forest Certification: Provide structural glued-laminated timber produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria."

1.5 DELIVERY, STORAGE, AND HANDLING:

A. General: Comply with provisions in AITC 111, "Recommended Practice for Protection of Structural Glued Laminated Timber during Transit, Storage, and Erection."

B. Individually wrap members using plastic-coated paper covering with water-resistant seams.

PART 2 - PRODUCTS

2.1 STRUCTURAL GLUED-LAMINATED TIMBER:

A. General: Provide structural glued-laminated timber that complies with AITC 117--MANUFACTURING or research/evaluation reports acceptable to authorities having jurisdiction.

1. Provide structural glued-laminated timber made from a single species.

B. Species and Grades for Structural Glued-Laminated Timber: Provide structural glued-laminated timber made from Alaska cedar, Douglas fir-larch or southern pine, sized as shown on plans, with laminating combinations that meet or exceed stress value for normal loading duration and dry condition of use as shown on the plans.

C. Species and Grades for Beams and Purlins: Provide structural glued-laminated timber that complies with AITC 117--MANUFACTURING or research/evaluation reports acceptable to authorities having jurisdiction and the following:

1. Species and Beam Stress Classification: Douglas fir-larch or southern pine, 24F-1.8E.
2. Lay-up: Either balanced or unbalanced.

D. Species and Grades for Arches: Provide structural glued-laminated timber that complies with AITC 117--MANUFACTURING or research/evaluation reports acceptable to authorities having jurisdiction and the following:

1. Species and Beam Stress Classification: Eastern spruce, 20F-1.5E, Douglas fir-larch or southern pine, 24F-1.8E.
2. Lay-up: Either balanced or unbalanced.

E. Appearance Grade: Premium appearance grade, complying with AITC 110.

F. Preservative Treatment: Where preservative-treated structural glued-laminated timber is indicated, pressure treat lumber before gluing according to AWPA C28 for waterborne preservatives. Discard pieces affected by treatment that cause a detrimental effect.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction.
2. Use preservative solution without substances that might interfere with application of indicated finishes.

G. Adhesive: Wet-use type complying with ASTM D 2559.

1. Use adhesive that contains no urea-formaldehyde resins.

H. End Sealer: Manufacturer's standard, transparent, colorless wood sealer that is effective in retarding the transmission of moisture at cross-grain cuts and is compatible with indicated finish.

I. Penetrating Sealer: Manufacturer's standard, transparent, penetrating wood sealer that is compatible with indicated finish.

2.2 TIMBER CONNECTORS:

A. General: Unless otherwise indicated, fabricate from the following materials:

1. Structural-steel shapes, plates, and flat bars complying with ASTM A 36.
2. Round steel bars complying with ASTM A 575, Grade M 1020.
3. Hot-rolled steel sheet complying with ASTM A 1011, Structural Steel, Type SS, Grade 33.

B. Hot-dip galvanize steel assemblies and fasteners after fabrication to comply with ASTM A 123 or ASTM A 153.

2.3 FABRICATION:

A. Shop fabricate for connections to greatest extent possible, including cutting to length and drilling bolt holes.

1. Dress exposed surfaces to remove planing or surfacing marks and to provide a finish equivalent to that produced by machine sanding with No. 120 grit sandpaper.

B. Camber: Fabricate horizontal and inclined members of less than 1:1 slope with either circular or parabolic camber equal to 1/500 of span.

C. End-Cut Sealing: Immediately after end-cutting each member to final length, apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces flood-coated for not less than 10 minutes.

D. Seal Coat: After fabricating, sanding, and end-coat sealing, apply a heavy saturation coat of penetrating sealer on surfaces of each unit.

2.4 FACTORY FINISHING:

A. Clear Finish: Manufacturer's standard, two-coat, clear conversion varnish finish; oven dried and resistant to mildew and fungus.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine substrates in areas to receive structural glued-laminated timber, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of structural glued-laminated timber.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION:

A. General: Erect structural glued-laminated timber true and plumb, with uniform, close-fitting joints. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.

1. Lift with padded slings and protect corners with wood blocking.
2. Install structural glued-laminated timber to comply with Shop Drawings.
3. Install timber connectors as indicated.

B. Cutting: Avoid extra cutting after fabrication. Where field fitting is unavoidable, comply with requirements for shop fabrication.

3.3 ADJUSTING:

A. Repair damaged surfaces and finishes after completing erection. Replace damaged structural glued-laminated timber if repairs are not approved by the Engineer.

3.4 PROTECTION:

A. Do not remove wrappings on individually wrapped members until they no longer serve a useful purpose including protection from weather, sunlight, soiling, and damage from work of other trades.

1. Coordinate wrapping removal with finishing work specified in CSI Division 09. Retain wrapping where it can serve as a painting shield.

END OF SECTION 061800

SECTION 071113 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes the following:

1. Cold-applied, emulsified-asphalt dampproofing.

B. Related CSI Sections include the following:

1. Division 03 Section 033000, "Cast-in-Place Concrete" for curing compounds, curing and sealing compounds, and penetrating liquid floor treatments.

1.2 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For each type of product indicated. Include recommendations for method of application, primer, number of coats, coverage or thickness, and protection course.

C. Quality Assurance Submittals:

1. Material Certificates: For each product, signed by manufacturers.
2. Manufacturer Certification Letter in accordance with NOTICE TO CONTRACTOR – POTENTIAL FOR ASBESTOS CONTAINING MATERIALS.

D. LEED Submittal:

1. Product Data for Credit EQ 4.2: For dampproofing, including printed statement of VOC content.

1.3 QUALITY ASSURANCE:

A. Source Limitations: Obtain primary dampproofing materials and primers through one source from a single manufacturer. Provide secondary materials recommended by manufacturer of primary materials.

1.4 PROJECT CONDITIONS:

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.

B. Ventilation: Provide adequate ventilation during application of dampproofing in enclosed spaces. Maintain ventilation until dampproofing has cured.

PART 2 - PRODUCTS

2.1 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. BASF Construction Chemicals - Building Systems; Sonneborn Brand Products.
2. ChemMasters, Inc.
3. Euclid Chemical Company (The); an RPM company.
4. Karnak Corporation.

B. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1.

C. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

D. VOC Content: 0.25 lb/gal. (30 g/L).

2.2 PROTECTION COURSE:

A. Protection Course: Fan folded, with a core of extruded-polystyrene board insulation faced on one side with plastic film, nominal thickness 1/4 inch (6 mm), with a compressive strength of not less than 8 psi (55 kPa) per ASTM D 1621, and maximum water absorption by volume of 0.6 percent per ASTM C 272.

2.3 MISCELLANEOUS MATERIALS:

A. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended by manufacturer.

B. Asphalt-Coated Glass Fabric: ASTM D 1668, Type I.

C. Patching Compound: Manufacturer's fibered mastic of type recommended by dampproofing manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine substrates, with Installer present, for compliance with requirements for surface smoothness and other conditions affecting performance of work.

1. Proceed with dampproofing application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.
2. Test for surface moisture according to ASTM D 4263.

3.2 PREPARATION:

A. Protection of Other Work: Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.

B. Clean substrates of projections and substances detrimental to work; fill voids, seal joints, and apply bond breakers if any, as recommended by prime material manufacturer.

C. Apply patching compound for filling and patching tie holes, honeycombs, reveals, and other imperfections; cover with asphalt-coated glass fabric.

3.3 APPLICATION, GENERAL:

A. Comply with manufacturer's written recommendations unless more stringent requirements are indicated or required by Project conditions to ensure satisfactory performance of dampproofing.

1. Apply additional coats if recommended by manufacturer or if required to achieve coverages indicated.
2. Allow each coat of dampproofing to cure six hours before applying subsequent coats.
3. Allow 24 hours drying time prior to backfilling.

B. Apply dampproofing to footings and foundation walls where opposite side of wall faces building interior.

1. Apply from finished-grade line to top of footing, extend over top of footing, and down a minimum of 6 inches (150 mm) over outside face of footing.
2. Extend 12 inches (300 mm) onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.

3. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where shown as "reinforced," by embedding an 8-inch- (200-mm-) wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.

3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING:

A. On Concrete Foundations: Apply 2 brush or spray coats at not less than 1.5 gal./100 sq. ft. (0.6 L/sq. m) for first coat and 1 gal./100 sq. ft. (0.4 L/sq. m) for second coat, 1 fibered brush or spray coat at not less than 3 gal./100 sq. ft. (1.2 L/sq. m), or 1 trowel coat at not less than 4 gal./100 sq. ft. (1.6 L/sq. m).

B. On Unexposed Face of Concrete Retaining Walls: Apply 1 brush or spray coat at not less than 1.25 gal./100 sq. ft. (0.5 L/sq. m).

C. On Exterior Face of Inner Wythe of Cavity Walls: Apply primer and 1 brush or spray coat at not less than 1 gal./100 sq. ft. (0.4 L/sq. m).

3.5 INSTALLATION OF PROTECTION COURSE:

A. Where indicated, install protection course over completed-and-cured dampproofing. Comply with dampproofing material manufacturer's written recommendations for attaching protection course.

1. Support protection course with spot application of adhesive of type recommended by protection board manufacturer over cured coating.
2. Install protection course within 24 hours of installation of dampproofing (while coating is tacky) to ensure adhesion.

3.6 CLEANING:

A. Remove dampproofing materials from surfaces not intended to receive dampproofing.

END OF SECTION 071113

SECTION 071900 - WATER REPELLENTS

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes penetrating water-repellent coatings for the following vertical and horizontal surfaces:

1. Concrete (unpainted).

B. Related CSI Sections include the following:

1. Division 03 Section 033000, "Cast-in-Place Concrete" for curing compounds, curing and sealing compounds, and penetrating liquid floor treatments.
2. Division 09 painting Sections for paints and coatings.

1.2 PERFORMANCE REQUIREMENTS:

A. Performance Testing: Provide water repellents that comply with test-performance requirements indicated, as evidenced by reports of tests performed by manufacturer by a qualified independent testing agency on manufacturer's standard products applied to substrates simulating those on Project using same application methods to be used for Project.

1. Engage testing agency to perform preconstruction tests on laboratory mockups.
2. Select sizes and configurations of assemblies to adequately demonstrate capability of water repellents to comply with performance requirements.
3. Notify Engineer seven days in advance of the dates and times when assemblies will be constructed.

B. Absorption: Minimum 90 percent reduction of absorption after 24 hours in comparison of treated and untreated specimens.

1. Brick: ASTM C 67.
2. Stone: ASTM C 97.
3. Concrete Unit Masonry: ASTM C 140.
4. Hardened Concrete: ASTM C 642.

C. Water-Vapor Transmission: Maximum 10 percent reduction in rate of vapor transmission in comparison of treated and untreated specimens, per ASTM E 96.

D. Permeability: Minimum 80 percent water-vapor transmission in comparison of treated and untreated specimens, per ASTM D 1653.

E. Water Penetration and Leakage through Masonry: Maximum 90 percent reduction in leakage rate in comparison of treated and untreated specimens, per ASTM E 514.

F. Durability: Maximum 5 percent loss of water repellency after 2500 hours of weathering in comparison to specimens before weathering, per ASTM G 154.

G. Chloride-Ion Intrusion in Concrete: NCHRP Report 244, Series II tests.

1. Reduction of Water Absorption: 80 percent.
2. Reduction in Chloride Content: 80 percent.

1.3 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For each type of product indicated.

1. Include manufacturer's printed statement of VOC content.

C. Quality Assurance Submittals:

1. Manufacturer Certification Letter in accordance with NOTICE TO CONTRACTOR – POTENTIAL FOR ASBESTOS CONTAINING MATERIALS.

D. Manufacturer Certificates: Signed by manufacturers certifying that water repellents comply with requirements.

E. Qualification Data: For Installer.

F. Preconstruction Testing Reports: For water-repellent-treated substrates.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for assemblies.

H. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE:

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Testing Agency Qualifications: An independent agency qualified according to ASTM E 548 for testing indicated.

C. Test Application: Apply a finish sample for each type of water repellent and substrate required. Duplicate finish of approved sample.

1. Locate each test application as directed by the Engineer.
2. Size: 25 sq. ft. (2.3 sq. m).
3. Final approval by Designer.

1.5 PROJECT CONDITIONS:

A. Limitations: Proceed with application only when the following existing and forecasted weather and substrate conditions permit water repellents to be applied according to manufacturers' written instructions and warranty requirements:

1. Ambient temperature is above 40 deg F (4.4 deg C).
2. Concrete surfaces and mortar have cured for more than 28 days.
3. Concrete or brick masonry walls are not treated prior to 30 days after building close-in.
4. Rain or snow is not predicted within 24 hours.
5. Application proceeds more than 24 hours after surfaces have been wet.
6. Substrate is not frozen, or surface temperature is above 40 deg F (4.4 deg C).
7. Windy conditions do not exist that may cause water repellent to be blown onto vegetation or surfaces not intended to be treated.

1.6 WARRANTY:

A. Refer to Form 816 Article 1.20-1.06.08 and NOTICE TO CONTRACTOR – WARRANTIES for additional information.

B. Special Warranty: Manufacturer's standard form in which manufacturer and Applicator agree(s) to repair or replace materials that fail to maintain water repellency specified in Part 1.2 "Performance Requirements" within specified warranty period.

1. Warranty Period: Five years from the issuance of the Certificate of Compliance.

PART 2 - PRODUCTS

2.1 PENETRATING WATER REPELLENTS:

A. Silane, Penetrating Water Repellent: Clear, monomeric compound containing 20 percent or more solids of alkyltrialkoxysilanes; with alcohol, mineral spirits, water, or other proprietary solvent carrier; and with 3.3 lb/gal. (400 g/L) or less of VOCs.

1. Available Products: Subject to compliance with requirements, manufactures offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. BASF Construction Chemicals, LLC; Hydrozo 100
    b. Chemical Products Industries, Inc.; CP-500
    c. Fox Industries, Inc.; FX-424
    d. Pecora Corporation; KlereSeal 9100-S.
    e. Tnemec Inc.; Dur A Pell 100

PART 3 - EXECUTION

3.1 PREPARATION:

A. Clean substrate of substances that might interfere with penetration or performance of water repellents. Test for moisture content, according to water-repellent manufacturer's written instructions, to ensure that surface is dry enough.

1. Cast-in-Place Concrete: Remove oil, curing compounds, laitance, and other substances that could prevent adhesion or penetration of water repellents.

B. Test for pH level, according to water-repellent manufacturer's written instructions, to ensure chemical bond to silicate minerals.

C. Protect adjoining work, including sealant bond surfaces, from spillage or blow-over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of water repellent being deposited on surfaces. Cover live plants and grass.

D. Coordination with Sealants: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.

1. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those used in the work.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATION:

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect the substrate before application of water repellent and to instruct Applicator on the product and application method to be used.

B. Apply a heavy-saturation spray coating of water repellent on surfaces indicated for treatment using low-pressure spray equipment. Comply with manufacturer's written instructions for using airless spraying procedure, unless otherwise indicated.

1. Precast Concrete: At Contractor's option, first application of water repellent on precast concrete units may be completed before installing units. Mask sealant-bond surfaces to prevent water repellent from migrating onto joint surfaces.

C. Apply a second saturation spray coating, repeating first application. Comply with manufacturer's written instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats. Consult manufacturer's technical representative if written instructions are not applicable to Project conditions.

3.3 CLEANING:

A. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Repair damage caused by water-repellent application. Comply with manufacturer's written cleaning instructions.

END OF SECTION 071900

SECTION 073113 - ASPHALT SHINGLES

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes the following:

1. Asphalt shingles.
2. Felt underlayment.
3. Self-adhering sheet underlayment.
4. Ridge vents.

B. Related CSI Sections include the following:

1. Division 06 Section 061500, "Wood Decking" for tongue-and-groove laminated wood decking.
2. Division 07 Section 076200, "Sheet Metal Flashing and Trim" for metal work not part of this Section.

1.2 DEFINITIONS:

A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.3 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For each type of product specified, including details of construction relative to materials, dimensions of individual components, profiles, textures, colors, finishes, and manufacturer's installation instructions.

C. Product Samples: For the following products, of sizes indicated, to verify color selected.

1. Asphalt Shingle: For color selection in the form of manufacturer's sample finishes showing the full range of colors and profiles available for each type of asphalt shingle indicated.
2. Ridge and Hip Cap Shingle: Full-size ridge
3. Shingle manufacturer's approved underlayment: 12 inches square.
4. Roof Warranty Sign:

a. Samples for Verification: Provide a sample panel not less than 3 inches by 6 inches in size for each material, color, texture, and pattern required. Include a representative sample of graphic image process required, showing graphic style, and colors and finishes of letters, numbers, and other graphic devices.

D. Quality Assurance Submittals:

1. Manufacturer Certification Letter in accordance with NOTICE TO CONTRACTOR – POTENTIAL FOR ASBESTOS CONTAINING MATERIALS.
2. Qualification Data for Installer: Written certificate signed by asphalt shingle manufacturer stating that Installer is approved, authorized, or licensed to install roofing system indicated.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for asphalt shingles.

F. Maintenance Data: For asphalt shingles to include in the operation and maintenance manuals specified in Form 816 Article 1.20-1.08.14 subsection 2 and described in NOTICE TO CONTRACTOR – OPERATION AND MAINTENANCE MANUALS.

G. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE:

A. Installer Qualifications: The installer of the roof shingles shall be currently certified as an approved applicator by the manufacturer. The installer shall have completed a comprehensive certification program equal to the "GAF Master Elite Residential Roofing Contractor" course.

1. The installer shall ensure that its employees are properly trained and certified by the shingle manufacturer.

B. Source Limitations: Obtain all roofing materials through one source from a single asphalt shingle manufacturer in accordance with Form 816 Article 1.20-1.06.01. This includes: glass fiber-reinforced asphalt shingles and surfaced with mineral granules, hip and ridge shingles, underlayment, and ridge vent. If the proposed shingle manufacturer does not manufacture all required roofing materials, the Contractor shall obtain from the shingle manufacturer a written warranty certifying that the proposed material is compatible with the proposed shingle to be installed and that the use of the proposed material does not effect the special warranty.

C. Fire-Test-Response Characteristics: Provide asphalt shingle and related roofing materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method below by UL or another testing and inspecting

agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108 or UL 790, for application and roof slopes indicated.

D. Wind-Resistance Performance Characteristics: Provide products that are identical to those tested according to ASTM D 3161 and passed. Identify product with appropriate markings of applicable testing and inspecting organization.

1. Basic wind speed and importance factor requirements - Products shall be approved and installed in compliance with specific requirements for the applicable wind zone location identified in Appendix K of the State Building Code-2005 CT Supplement to the IBC.

E. Field Construction Mockup: Prior to shingle installation, build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution of workmanship. Erect mock-up to comply with the following requirements, using materials indicated for final unit of work.

1. Locate mock-up on roof of building in area and size (min. 9-foot length by 4-foot height) as directed by the Engineer.
2. Demonstrate the proposed range of aesthetic effects and workmanship; establish and verify pattern and adequacy of nailing for failsafe attachment and compliance with warranty provisions.
3. Conduct a Pre-Installation Meeting at the Project Site in compliance with the requirements of Form 816 Article 1.20-1.05.24 subsection 2 prior to roof installation and after construction of the mock-up. The meeting will be attended by representatives of the Contractor, the Engineer, the Designer, the installing Subcontractor, and the Shingle Manufacturer's Local Inspection Representative. The purpose of this meeting is to obtain the Engineer's acceptance and the Manufacturer's Local Inspection Representative's visual and written acceptance of mock-ups before start of final unit of Work. The Manufacturer's Local Inspection shall review the construction of the mockup and approve in writing the mockup, to include but not be limited to starter course installed correctly, proper nailing, proper lapping, and proper gluing. The letter from the manufacturer, which must be received by the Engineer prior to any shingle work except the mock-up, must clearly state the following:

    a. **"A pre-inspection was performed by a GAF materials territory manager and nothing was found that would limit the covering for a Golden Pledge Material or Application Warranty and that the installing Contractor is properly certified by GAF."**

4. Acceptable mock-up in undisturbed condition shall be retained as part of the completed unit of work and shall be the standard to which all roof shingles installed shall be acceptable to the Engineer.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Deliver materials to Project Site in manufacturer's unopened bundles or containers with labels intact.

B. Materials shall be delivered in quantities required to assure continuity of application.

C. Store roofing materials in a dry, well-ventilated, weathertight location according to asphalt shingle manufacturer's written instructions. Store underlayment rolls on end on pallets or other raised surfaces. Do not double-stack rolls.

1. Handle, store, and place roofing materials in a manner to avoid significant or permanent damage to roof deck or structural supporting members.

D. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

1.6 PROJECT CONDITIONS:

A. Weather Limitations: Proceed with asphalt shingle installation only when existing and forecasted weather conditions permit asphalt shingle roofing to be performed according to manufacturer's written instructions and warranty requirements, and when substrate is completely dry.

1. Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended by manufacturer.

1.7 WARRANTY:

A. Refer to Form 816 Article 1.20-1.06.08 and NOTICE TO CONTRACTOR – WARRANTIES for additional information.

B. Special Warranty: The Manufacturer shall provide 100% non-prorated coverage for any defect in materials or Contractor application for a period of twelve (12) years (equal to GAF's Golden Pledge Limited Warranty) from the issuance of the Certificate of Compliance. This shall include materials, installation, misapplication, removal and disposal costs, and workmanship.

1. A prorated material and labor coverage shall be provided by the Manufacturer for the period from thirteen (13) to forty (40) years.
2. As part of this warranty, the manufacturer verifies that the installation performed under this Project is in accordance with manufacturers' requirements for the application of roofing materials that the installer and its employees are certified installers by the manufacturer as noted in PART 1.4 and are up-to-date in all training. The manufacturer shall forward this information in writing.

3. The expressed intent of this Special Warranty is to ensure that the Manufacturer shall replace and repair the roofing system, to the Engineers satisfaction, where shingles buckle, tear, or rip away from the roof surface.

C. This warranty shall be in addition to, and not a limitation of, other rights the Engineer may have against the Contractor under the Contract.

1.8 SPARE PARTS:

A. Furnish to the Engineer spare parts described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Asphalt Shingles: 170 sq. ft of each type, in unbroken bundles.
2. Ridge shingles: 3 LF, in unbroken bundles.

PART 2 - PRODUCTS

2.1 MANUFACTURER FOR ROOFING:

A. Basis-of-Design: The requirements of this Section, including manufacturers special warranty, are based on roofing products manufactured by GAF Building Materials Corporation. The Contractor may propose an "EQUAL" manufacturer that meets the material quality, appearance, warranty, installer certification, construction, and installation requirements. The Designer will be the sole judge whether the Contractor's proposed alternate is a recognized equivalent for that specified.

B. Materials: Provide cast (not extruded or continuous cast) methyl methacrylate monomer plastic sheet, in sizes and thickness indicated, with a minimum flexural strength of 16,000 psi when tested according to ASTM D 790, with a minimum allowable continuous service temperature of 176 deg F and of the following general types:

1. Opaque Sheet: Provide plaque sign that is manufactured from 1/8” thick laminated engraving stock.
2. Engraved Copy: Engraved copy characters through the first background layer to expose the contrasting color of the inner core of the engraving stock.

a. Panel Size: 18”x20”, long side horizontal.
b. Engraving Stock Thickness: 1/8-inch minimum.
c. Engraved Letter proportion: Letters and Numbers on signs shall have a width-to-height ratio between 3:5 and 1:1 and a stroke-width-to-height ratio between 1:5 and 1:10.
d. Engraved Letter Size: Characters shall be 5/8 inch high.
e. Background or first layer of engraving stock: Black
f. Inner core of engraving stock: White

g. Engraved letter style: Helvetica Medium with all upper case letters.
h. Mounting Methods: Mechanical mounting as indicated in PART 3.7.

2.2 GLASS-FIBER-REINFORCED ASPHALT SHINGLES:

A. Multitab-Strip Asphalt Shingles: Super Heavyweight 5-Tab Shingle, Mineral-granule surfaced, Fiberglass Asphalt composition, self-sealing, complying with ASTM D3462, Type I UL Class "A" fire rated and UL 997 Wind Resistant complying with ASTM D3018 and D3161. Provide shingles bearing UL Class “A” external fire exposure and UL “Wind Resistant” label.

1. “Slateline” shingles by GAF, 17”x40”, 7 1/2” exposure, or approved equal.

B. Hip and Ridge Shingles: Manufacturer’s standard factory precut units to match shingles.

1. Timbertex Hip and Ridge by GAF, or approved equal.

C. Colors, Blends, and Patterns: To be selected from manufacturer's full range of colors, textures, and patterns for asphalt shingles of type indicated.

D. Algae Resistance: Granules treated to resist algae discoloration.

2.3 UNDERLAYMENT MATERIALS:

A. Felts: ASTM D 226 and ASTM D 4869, Fiberglass reinforced, non-perforated, water repellent, for use with GAFMC Class A asphalt shingles.

1. Shingle-Mate underlayment as manufactured by GAF Materials Corporation or approved equal.

2.4 ACCESSORIES:

A. Asphalt Roofing Caulk: ASTM D 4586, Type I, asbestos free, designed for cartridge application.

B. Roofing Nails: ASTM F 1667; Type 304 or 316 stainless-steel, wire shingle nails, minimum 0.120-inch diameter, barbed shank, sharp-pointed, with a minimum 3/8-inch-diameter flat head and of sufficient length to penetrate 1 1/2 inch into solid wood decking or extend at least 1/4 inch through plywood sheathing.

1. Where fasteners are in contact with metal flashing, use fasteners made of copper, hardware bronze, or Series 300 stainless-steel.

C. Felt Underlayment Nails: stainless-steel wire with low profile capped heads or disc caps, 1-inch minimum diameter.

2.5 METAL FLASHING AND TRIM:

A. Sheet Metal Flashing and Trim: Comply with requirements in CSI Division 07 Section 076200 "Sheet Metal Flashing and Trim."

1. Sheet Metal: Zinc-tin alloy-coated copper.

B. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item.

1. Apron Flashings: Fabricate with lower flange a minimum of 5 inches over and beyond each side of downslope asphalt shingles and 6 inches up the vertical surface.
2. Step Flashings: Fabricate with a headlap of 4 inches and a minimum extension of 4 inches over the underlying asphalt shingle and up the vertical surface.
3. Extended Perimeter Drip-Edge Flashing at Rakes: Fabricate 1-piece in width flashing in lengths not exceeding 10 feet, with roof flange extending 3 inches back from the edge of the deck, 5/8 inch overhang extending from face flange, and 2-inch face flange with 5/8 inch 45^{o} hemmed drip at lower edge.
4. Extended Perimeter Drip-Edge Flashing at Eaves: Fabricate 1-piece in width flashing in lengths not exceeding 10 feet , with the roof flange extending 3 inches back up the roof slope and 5/8 inch drip overhang extending down the roof slope from the edge of the deck. Fold metal back to form drip edge and bend it over the lower edge of deck. Dimension flashing to adequately wrap around the downslope edge of the deck. Maintain an approximate flashing width of 8 3/8 inches.
5. Z-Flashings: Fabricate with a vertical flange of 4 inches. Maintain an approximate flashing width of 6 1/4 inches including 5/8 inch 45^{o} hemmed drip at lower edge.
6. Extended Upper Pitchbreak Flashing: Fabricate 1-piece in width flashing in lengths not exceeding 10 feet, with roof flange extending 8 inches back from the edge of break, 5/8 inch hammed overhang extending from face flange, and 4-inch face flange with 5/8 inch 45^{o} hemmed drip at lower edge. Dimension face flange to adequately overlap nails. Maintain an approximate flashing width of 14 1/2 inches.
7. Extended Lower Pitchbreak Flashing: Fabricate 1-piece in width flashing in lengths not exceeding 10 feet, with roof flange extending 8 inches back from the edge of break, 5/8 inch hammed overhang extending from face flange, and 4-inch face flange with 5/8 inch 45^{o} hemmed drip at lower edge. Dimension face flange to adequately overlap nails. Maintain an approximate flashing width of 14 1/2 inches.

2.6 ROOF WARRANTY SIGN:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering roof warranty signs that may be incorporated in the Work include, but are not limited to, the following:

1. Best Sign Systems Inc.
2. Mohawk Sign Systems.
3. Seton Identification Products.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored; and that provision has been made for flashings and penetrations through asphalt shingles.
3. Repair excessively resinous areas, loose knots, holes over 1" in diameter, and cracks over 1/2" in width with sheet metal.
4. Replace damaged decking with new materials.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION:

A. Clean substrates of projections and substances detrimental to application.

B. Coordinate installation with flashing and other adjoining work to ensure proper sequencing. Do not install roofing materials until all penetrations through roof sheathing have been installed and are securely fastened against movement.

3.3 UNDERLAYMENT INSTALLATION:

A. Single-Layer Felt Underlayment: When roof slope is 4:12 or more, Install single layer of felt underlayment on roof deck perpendicular to roof slope in parallel courses. Lap sides a minimum of 2 inches over underlying course. Lap ends a minimum of 4 inches. Stagger end laps between succeeding courses at least 72 inches (1830 mm). Fasten with felt underlayment nails.

B. Double-Layer Felt Underlayment: When roof slope is less than 4:12, install double layers of felt underlayment on roof deck perpendicular to roof slope in parallel courses. Install a 19-inch wide starter course at eaves and completely cover with full-width second course. Install succeeding courses lapping previous courses 19 inches in shingle fashion. Lap ends a minimum of 6 inches. Stagger end laps between succeeding courses at least 72 inches. Fasten with felt underlayment nails.

1. Apply a continuous layer of asphalt roofing cement over starter course and on felt underlayment surface to be concealed by succeeding courses as each felt course is installed. Apply over entire roof.

3.4 METAL FLASHING INSTALLATION:

A. General: Install metal flashings and other sheet metal to comply with requirements in CSI Division 07 Section 076200 "Sheet Metal Flashing and Trim."

1. Install metal flashings according to recommendations in Asphalt Roofing Manufactures Roofing Association (ARMA's) "Residential Asphalt Roofing Manual" and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."

B. Apron Flashings: Extend lower flange over and beyond each side of downslope asphalt shingles and up the vertical surface.

C. Step Flashings: Install with a headlap of 4 inches and extend over the underlying asphalt shingle and up the vertical surface. Fasten to roof deck only.

D. Pitchbreak Flashings: Install with a headlap of 4 inches and extend over the underlying asphalt shingle and up the vertical surface. Fasten to roof deck only.

1. Secure hemmed flange edges into metal cleats spaced 18 inches apart and fastened to roof deck.

E. Rake Drip Edges: Install rake drip edge flashings over underlayment and fasten to roof deck.

F. Eave Drip Edges: Install eave drip edge flashings below underlayment and fasten to roof sheathing.

3.5 ASPHALT SHINGLE INSTALLATION:

A. Install asphalt shingles according to recommendations in ARMA's "Residential Asphalt Roofing Manual," and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual", and manufacturer's written instructions for pattern alignment and nail spacing, including additional nailing required for steep roofs.

1. Nails as specified for shingles shall be manually driven; Power Actuated Nails or Staples Will Not Be Allowed.

B. Install full height starter strip along the lowest roof edge with self-sealing strip face up at roof edge.

1. Align asphalt shingles with the outer edge of the perimeter metal flashing, if extended drip edge flashing is used. If an "L"-type metal flashing, or no flashing is used, extend the starter course beyond the perimeter eave and rake edges 3/8 inch, according to the manufacturer's recommendations.
2. Install half height starter strip along rake edge.

C. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure. Use vertical and horizontal chalk lines or pre-marked underlayment to ensure straight coursing.

D. Fasten asphalt shingle strips with a minimum of six (6) roofing nails located according to manufacturer's written instructions.

1. Where roof slope exceeds 20:12, seal asphalt shingles with asphalt roofing cement spots as directed on the drawings.
2. When ambient temperature during installation is below 50 deg F, seal asphalt shingles with asphalt roofing cement spots.

E. Ridge Vents: Install continuous ridge vents over asphalt shingles according to manufacturer's written instructions. Fasten with roofing nails of sufficient length to penetrate sheathing.

F. Ridge and Hip Cap Shingles: Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with roofing nails of sufficient length to penetrate sheathing.

1. Fasten ridge cap asphalt shingles to cover ridge vent without obstructing airflow.

3.6 INSTALLATION OF ROOF WARRANTY SIGN:

A. The Roof Warranty Sign shall be permanently anchored to the facility in an extruded aluminum with clear anodized finish frame, with stainless steel fasteners, adjacent to the electrical panel, unless otherwise directed by the Engineer.

1. Panel sign shall include the following information:

NEW ROOF(S) INSTALLATION WARRANTY

CTDOT (Project #): SEA STREET SALT SHED, NEW HAVEN

WARRANTY START DATE:
(X/X/XX) (Date of the issuance of the Certificate of Compliance)

ROOF TYPE: (Type of roof installed),
(*i.e. GAF'S SLATELINE SPECIALITY SHINGLES)*

WARRANTY: (Manufacturer's name and type of warranty), 40yr
(Years of non-prorated and prorated time)
(i.e. TWELVE (12) YEARS NON-PRORATED AND THIRTEEN (13) TO FORTY (40) YEARS – PRORATED TIME)

WARRANTY NUMBER: (Actual Warranty number)

INSTALLER:(Contractor's name, town located, and telephone number.)

AFTER 2 YEARS CONTACT MANUFACTURER: (Manufacturer's name and telephone number of warranty service)

3.7 ADJUSTING:

A. Replace any damaged materials installed under this Section with new materials that meet specified requirements.

3.8 CLEANING AND PROTECTION:

A. After installation of signs, clean soiled sign surfaces according to the manufacturer's instructions. Protect units from damage until acceptance by the Engineer.

END OF SECTION 073113

SECTION 073129 - WOOD SHINGLES AND SHAKES

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes the following:

1. Wood shingle walls.
2. Felt underlayment.

B. Related CSI Sections include the following:

1. Division 06 Section 061000, "Rough Carpentry" for wood wall corner trim.
2. Division 07 Section 076200, "Sheet Metal Flashing and Trim" for flashing and other sheet metal work.

1.2 DEFINITIONS:

A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.3 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For each type of product indicated. Include manufacturers' product specifications, standard details, dimensions, and general recommendations, as applicable to materials and installation.

C. Shop Drawings: For locations and details of wood shingles and sheet metal flashing and counterflashing terminations and transitions, including dimensions and profiles.

D. Product Samples for Verification: For the following products, of sizes indicated, to verify color selected. Full size, of each exposed product for each color, style, and texture required for Project.

1. Wood Shingles: Full size.
2. Underlayment: 12 inches square.

E. Qualification Data: For Installer.

F. Quality Assurance Submittals:

1. Research/Evaluation Reports: For fire-retardant-treated wood shingles available from the treatment company.

1.4 QUALITY ASSURANCE:

A. Installer Qualifications: A qualified installer who is an approved affiliate member of CSSB.

B. Grading Agency Qualifications: An independent testing and inspecting agency recognized by authorities having jurisdiction as qualified to label wood shingles for compliance with referenced grading rules.

C. Source Limitations: Obtain wood shingles through one source from a single manufacturer in accordance with Form 816 Article 1.20-1.06.01.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Store underlayment rolls on end on pallets or other raised surfaces. Do not double-stack rolls.

1. Handle, store, and place roofing materials in a manner to avoid significant or permanent damage to roof deck or structural supporting members.

B. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

1.6 PROJECT CONDITIONS:

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing to be performed according to manufacturer's written instructions and warranty requirements.

1. Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended by manufacturer.

1.7 SPARE PARTS:

A. Furnish to the Engineer spare parts described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Wood Shingles: Furnish shingles equal to 2% of amount installed, but not less than 1 square identical to those installed in unbroken bundles.

PART 2 - PRODUCTS

2.1 WALL SHINGLES:

A. Cedar Wall Shingles: Smooth-sawn western red cedar shingles.

1. Grading Standards: CSSB's "Grading Rules for Certigrade Red Cedar Shingles."
2. Grade: No. 1 Blue Label.
3. Size: 18 inches long; 0.45 inch thick at butt.

2.2 WOOD TREATMENTS:

A. Preservative Treatment: AWPA C34, chromated copper arsenate pressure-treated units, minimum 0.40 lb/cu. ft.

B. Identification: Attach a label to each bundle of shingles; identify manufacturer, references to model-code approval, type of product, grade, dimensions, and approved grading agency.

1. Include chemical treatment, method of application, purpose of treatment, and warranties available.

2.3 UNDERLAYMENT MATERIALS:

A. Roof Felt Underlayment: ASTM D 226, Type II, asphalt-saturated organic felt.

2.4 ACCESSORIES:

A. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.

B. Nails: ASTM F 1667; stainless-steel Type 304 or 316 wire nails, sharp-pointed, and of sufficient length to penetrate a minimum of 3/4 inch into sheathing.

1. Use box-type nails for wood shingles.
2. Where nails are in contact with metal flashing, use nails made from same metal as flashing.

C. Felt Underlayment Nails: stainless-steel, wire nails with low-profile capped heads or disc caps, 1-inch minimum diameter.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored; and that provision has been made for flashings and penetrations through roofing.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION:

A. Single-Layer Felt Underlayment: Install single layer felt underlayment horizontally, starting at the base of the wall, with a 2" horizontal overlap with each succeeding course, and a 6" overlap vertically when starting a new roll. Wrap underlayment 4" each way around both inside and outside corners. Fasten with felt underlayment nails.

3.3 METAL FLASHING INSTALLATION:

A. General: Install metal flashings and other sheet metal to comply with requirements in CSI Division 07 Section 076200, "Sheet Metal Flashing and Trim."

1. Install metal flashings associated with doors, windows, and penetration details in accordance with good building practice and as indicated on the plans, if applicable.

3.4 WALL SHINGLE INSTALLATION, SINGLE COURSED:

A. Install wood wall shingles according to manufacturer's written instructions and recommendations in CSSB's "Design and Application Manual for Exterior and Interior Walls."

B. Install wood shingles, beginning at base of wall, with a double-layer starter course in a continuous straight line. Offset joints of double-layer starter course a minimum of 1-1/2 inches.

1. Extend starter course 1 inch below top of foundation wall.
2. Extend outer course 1/2 inch lower than the inner course.

C. Install first course of wood shingles over starter course. Install second and succeeding courses of wood shingles, offsetting joints between shingles in succeeding courses a minimum of 1-1/2 inches.

1. Install shingles in continuous straight-line courses.
2. Space shingles 1/8 to 1/4 inch apart.
3. Fasten each shingle with 2 concealed nails**,** spaced 3/4 to 1 inch from edge of shingle and 1 inch above butt line of subsequent course. For shingles wider than 8 inches add 2 concealed fasteners to the center of shingle spaced 1 inch apart. Drive fasteners flush with top surface of shingles without crushing wood.
4. Maintain weather exposure of 5 inches for 18-inch long shingles.
5. Interior Corner Treatment: Butted against wood stop.
6. Exterior Corner Treatment: Butted against corner boards.

END OF SECTION 073129

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:

1. Manufactured Products:

a. Manufactured through-wall flashing.

2. Formed Products:

a. Formed through-wall flashing.
b. Formed low-slope roof sheet metal fabrications (metal coping).
c. Formed wall sheet metal fabrications.
d. Formed equipment support flashing.

B. Related CSI Sections:

1. Division 06 Section 061000, "Rough Carpentry" for wood nailers, curbs, and blocking.
2. Division 07 Section 079200, "Joint Sealants" for field-applied sheet metal flashing and trim sealants.
3. Division 07 Section 073113, "Asphalt Shingles" for information about mockups and flashing installation instructions.

1.2 PERFORMANCE REQUIREMENTS:

A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Fabricate and install roof edge flashing and copings capable of resisting the following forces according to recommendations in FMG Loss Prevention Data Sheet 1-49:

1. Wind Zone 1: For velocity pressures of 21 to 30 lbf/sq. ft. (1.00 to 1.44 kPa): 60-lbf/sq. ft. (2.87-kPa) perimeter uplift force, 90-lbf/sq. ft. (4.31-kPa) corner uplift force, and 30-lbf/sq. ft. (1.44-kPa) outward force.

C. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

D. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.3 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

C. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:

1. Identification of material, thickness, weight, and finish for each item and location in Project.
2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
4. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.

D. Samples for Initial Selection: For each type of sheet metal flashing, trim, and accessory indicated with factory-applied color finishes involving color selection.

1. Include similar Samples of trim and accessories involving color selection.

E. Quality Assurance Submittals:

1. Manufacturer Certification Letter in accordance with NOTICE TO CONTRACTOR – POTENTIAL FOR ASBESTOS CONTAINING MATERIALS.

1.4 QUALITY ASSURANCE:

A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Plans.

1. Copper Sheet Metal Standard: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

    a. Copper Standard: Comply with CDA's "Copper in Architecture Handbook."

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.6 COORDINATION:

A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and non-corrosive installation.

PART 2 - PRODUCTS

2.1 SHEET METALS:

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

B. Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 or H01 temper.

C. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.

    1. As-Milled Finish: Standard two-side bright finish.

D. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, dead soft, fully annealed.

    1. Finish: No.4 (polished directional satin).

2. Surface: Smooth, flat.

2.2 UNDERLAYMENT MATERIALS:

A. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

2.3 MISCELLANEOUS MATERIALS:

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
2. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.

3. Fasteners for Copper and Zinc-Tin Alloy-Coated Copper Sheet: Copper, hardware bronze or Series 300 stainless steel.
4. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
5. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.

C. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane, silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

2.4 MANUFACTURED SHEET METAL FLASHING AND TRIM:

A. Through-Wall Ribbed Sheet Metal Flashing: Manufacture through-wall sheet metal flashing for embedment in masonry with ribs at 3-inch (75-mm) intervals along length of flashing to provide an integral mortar bond. Manufacture through-wall flashing with snaplock receiver on exterior face to receive counterflashing.

1. Copper: 10 oz. minimum for fully concealed flashing; 16 oz. elsewhere.

a. Available Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Cheney Flashing Company; Cheney Flashing (Dovetail).
2) Cheney Flashing Company; Cheney Flashing (Sawtooth).
3) Hohmann & Barnard, Inc.; STF Sawtooth Flashing.
4) Keystone Flashing Company, Inc.; Keystone Three-Way Interlocking Thruwall Flashing.
5) Sandell Manufacturing Company, Inc.; Pre-Formed Metal Flashing.

2. Stainless Steel: 0.016 inch thick.

a. Available Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Cheney Flashing Company; Cheney Flashing (Dovetail).
2) Cheney Flashing Company; Cheney Flashing (Sawtooth).
3) Hohmann & Barnard, Inc.; STF Sawtooth Flashing.
4) Keystone Flashing Company, Inc.; Keystone Three-Way Interlocking Thruwall Flashing.
5) Sandell Manufacturing Company, Inc.; Pre-Formed Metal Flashing.

2.5 FABRICATION, GENERAL:

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.

D. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

E. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" and by FMG Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.

F. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder or form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

G. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

H. Do not use graphite pencils to mark metal surfaces.

2.6 WALL SHEET METAL FABRICATIONS:

A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch long, but not exceeding 12-foot long, sections, under copings, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings. Form with 2-inch high, end dams where flashing is discontinuous. Fabricate from the following materials:

1. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft..

B. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches (100 mm) beyond wall openings. Form head and sill flashing with 2-inch- (50-mm-) high, end dams. Fabricate from the following materials:

1. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft. (0.55 mm thick).

2.7 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other

components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION:

A. General: Install underlayment as indicated on the plans.

B. Felt Underlayment: Install felt underlayment with adhesive for temporary anchorage to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches (50 mm).

3.3 INSTALLATION, GENERAL:

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
5. Install sealant tape where indicated.
6. Torch cutting of sheet metal flashing and trim is not permitted.

7. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.

1. Coat back side of uncoated aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.

D. Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws and metal decking not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Seal joints as shown and as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
2. Prepare joints and apply sealants to comply with requirements in CSI Division 07 Section 079200, "Joint Sealants."

F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm), except reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder metallic-coated steel and aluminum sheet.
2. Pre-tinning is not required for zinc-tin alloy-coated stainless steel and zinc-tin alloy-coated copper.
3. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
4. Stainless-Steel Soldering: Tin edges of uncoated sheets using solder recommended for stainless steel and acid flux. Promptly remove acid flux residue

from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

5. Copper Soldering: Tin edges of uncoated copper sheets using solder for copper.

G. Rivets: Rivet joints in uncoated aluminum or zinc where indicated and where necessary for strength.

3.4 ROOF FLASHING INSTALLATION:

A. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with sealant. Secure in a waterproof manner by means of snap-in installation and sealant or lead wedges and sealant, interlocking folded seam or blind rivets and sealant. Anchor and washer at 36-inch (900-mm) centers.

3.5 WALL FLASHING INSTALLATION:

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

3.6 MISCELLANEOUS FLASHING INSTALLATION:

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.7 CLEANING AND PROTECTION:

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation

instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:

1. Exterior joints in the following vertical surfaces and horizontal non-traffic surfaces:

a. Construction joints in cast-in-place concrete.
b. Perimeter joints between and frames of doors windows and louvers.

2. Exterior joints in the following horizontal traffic surfaces:

a. Joints between different exterior materials i.e. concrete, stone, brick, wood, and metal.

3. Interior joints in the following vertical surfaces and horizontal non-traffic surfaces:

a. Perimeter joints of exterior openings where indicated.
b. Other joints as indicated.

4. Interior joints in the following horizontal traffic surfaces:

a. Isolation joints in cast-in-place concrete slabs.
b. Control and expansion joints in concrete flooring.
c. Other joints as indicated.

1.2 PERFORMANCE REQUIREMENTS:

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.3 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For each joint-sealant product indicated.

C. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

D. LEED Submittals:

1. Credit EQ 4.1: Manufacturers' product data for interior sealants, including printed statement of VOC content.

E. Quality Assurance Submittals:

1. Manufacturer Certification Letter in accordance with NOTICE TO CONTRACTOR – POTENTIAL FOR ASBESTOS CONTAINING MATERIALS.

F. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.

G. SWRI Validation Certificate: For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.

H. Qualification Data: For Installer and testing agency.

I. Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in Part 1.4 "Quality Assurance."

J. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

K. Field Test Report Log: For each elastomeric sealant application.

L. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.

1.4 QUALITY ASSURANCE:

A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer in accordance with Form 816 Article 1.20-1.06.01.

C. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
2. Test according to SWRI'S Sealant Validation Program for compliance with requirements specified by reference to ASTM C920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.

1.5 PROJECT CONDITIONS:

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other portions of Part 2.

2.2 MATERIALS, GENERAL:

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Provide interior sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

C. Colors of Exposed Joint Sealants: As selected by Designer from manufacturer's full range.

2.3 ELASTOMERIC JOINT SEALANTS:

A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

C. Multicomponent Nonsag Polysulfide Sealant:

1. Available Products:

a. Pacific Polymers, Inc.; Elasto-Seal 227 Type II (Gun Grade).
b. Pecora Corporation; Synthacalk GC-2+.
c. Polymeric Systems Inc.; PSI-350.
d. PolySpec Corp.; T-2235-M.
e. PolySpec Corp.; T-2282.
f. PolySpec Corp.; Thiokol 2P.
g. Sonneborn, Division of ChemRex Inc.; Sonolastic Polysulfide Sealant.

2. Type and Grade: M (multicomponent) and NS (nonsag).
3. Class: 25.
4. Use Related to Exposure: NT (nontraffic).
5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

a. Use O Joint Substrates: Coated glass, color anodic aluminum, galvanized steel, brick, and wood.

D. Multicomponent Nonsag Neutral-Curing Silicone Sealant:

1. Available Products:

a. Dow Corning Corporation; 756 H.P.

2. Type and Grade: M (multicomponent) and P (pourable).
3. Class: 50.
4. Use Related to Exposure: NT (nontraffic).
5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

a. Use O Joint Substrates: Coated glass, color anodic aluminum, aluminum coated with a high-performance coating, galvanized steel, brick, ceramic tile, and other Use O substrates.

E. Single-Component Pourable Neutral-Curing Silicone Sealant:

1. Available Products suitable for Use T:

a. Dow Corning Corporation; 890-SL.
b. Pecora Corporation; 300 Pavement Sealant (Self Leveling).

2. Available Products suitable for Uses T and NT:

a. Dow Corning Corporation; SL Parking Structure Sealant.

3. Type and Grade: S (single component) and P (pourable).
4. Class: 100/50.
5. Uses Related to Exposure: As indicated above.
6. Uses Related to Joint Substrates: M, A, and O, as applicable to joint substrates indicated.

a. Use O Joint Substrates: Galvanized steel, brick, ceramic tile, and other Use O substrates.

F. Single-Component Neutral- and Basic-Curing Silicone Sealant:

1. Available Products:

a. Dow Corning Corporation; 790.
b. GE Silicones; SilPruf LM SCS2700.
c. Tremco; Spectrem 1 (Basic).
d. GE Silicones; SilPruf SCS2000.
e. Pecora Corporation; 864.
f. Pecora Corporation; 890.
g. Polymeric Systems Inc.; PSI-641.
h. Sonneborn, Division of ChemRex Inc.; Omniseal.
i. Tremco; Spectrem 3.
j. Dow Corning Corporation; 791.
k. Dow Corning Corporation; 795
l. GE Silicones; SilPruf NB SCS9000.
m. GE Silicones; UltraPruf II SCS2900.
n. Pecora Corporation; 865.
o. Pecora Corporation; 895.
p. Pecora Corporation; 898.

2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 50 or 100/50.
4. Use Related to Exposure: NT (nontraffic).

5. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.

G. Single-Component Mildew-Resistant Neutral-Curing Silicone Sealant:

1. Available Products:

a. Pecora Corporation; 898.
b. Tremco; Tremsil 600 White.

2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Use Related to Exposure: NT (nontraffic).

2.4 PREFORMED JOINT SEALANTS:

A. Preformed Silicone-Sealant System: Manufacturer's standard system consisting of precured low-modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral-curing silicone sealant for bonding extrusions to substrates.

1. Available Products:

a. Dow Corning Corporation; 123 Silicone Seal.
b. GE Silicones; UltraSpan US1100.
c. Pecora Corporation; Sil-Span.
d. Tremco; Spectrem Ez Seal.

B. Preformed Foam Sealant: Manufacturer's standard preformed, precompressed, open-cell foam sealant that is manufactured from high-density urethane foam impregnated with a nondrying, water-repellent agent; is factory produced in precompressed sizes in roll or stick form to fit joint widths indicated; is coated on one side with a pressure-sensitive adhesive and covered with protective wrapping; develops a watertight and airtight seal when compressed to the degree specified by manufacturer; and complies with the following:

1. Available Products:

a. EMSEAL Joint Systems, Ltd.; Emseal 25V.
b. Illbruck Sealant Systems, Inc.; Wilseal 600.
c. Polytite Manufacturing Corporation; Polytite B.
d. Polytite Manufacturing Corporation; Polytite Standard.
e. Sandell Manufacturing Co., Inc.; Polyseal.

2. Properties: Permanently elastic, mildew resistant, nonmigratory, nonstaining, and compatible with joint substrates and other joint sealants.

a. Density: Manufacturer's standard.

2.5 JOINT-SEALANT BACKING:

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), O (open-cell material), B (bicellular material with a surface skin) for brick vert joints, or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F (minus 32 deg C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS:

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material, compatible with pointing mortar, joint primers, sealants, and surfaces adjacent to joints; that will easily come off entirely, including adhesive.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION:

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.

B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer**,** based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such

contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS:

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants. Install bond-breaker tape, where space is insufficient to install sealant backings or sealant backing is not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
4. Install sealant as recommended by sealant manufacturer but within the following general limitations, measured at the center (thin) section of the bead:

a. Fill joints to a depth equal to joint width, but not more than 1/2 inch (13 mm) deep or less than 1/4 inch (6 mm) deep.
b. Do not allow sealant to overflow or spill onto adjoining surfaces, or to migrate into the voids of adjoining surfaces, particularly rough textures. Remove excess and spillage of sealant promptly as the work progresses. Clean adjoining surfaces by the means necessary to eliminate evidence of spillage, without damage to adjoining surfaces or finishes, as demonstrated in an approved mockup.

1) Cure sealant according to mfr.'s instructions.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form

smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated in the manufacturer's instructions.

    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:

1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch (10 mm). Hold edge of sealant bead 1/4 inch (6 mm) inside masking tape.
3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.

H. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, producing seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in compliance with sealant manufacturer's written instructions.

3.4 FIELD QUALITY CONTROL:

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed elastomeric sealant joints as follows:

    a. Perform 1 test for the first 100 feet (30 m) or 10% of joint length for each type of elastomeric sealant and joint substrate.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab in Appendix X1 in ASTM C 1193, or as appropriate for type of joint-sealant application indicated.

a. For joints with dissimilar substrates, verify adhesion to each substrate separately; do this by extending cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field-adhesion-test log.
4. Inspect tested joints and report on the following:

   a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
   b. Whether sealants filled joint cavities and are free of voids.
   c. Whether sealant dimensions and configurations comply with specified requirements.

5. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
6. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING:

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION:

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of the issuance of the Certificate of Compliance. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 089000 - LOUVERS AND VENTS

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:

1. Fixed, wood louvers.

B. Related CSI Sections:

1. Division 07 Section 079200, "Joint Sealants" for sealants applied during louver installation.
2. Division 09 Section 099113, “Exterior Painting and Coating” for painting applied during louver installation.

1.2 DEFINITIONS:

A. Horizontal Louver: Louver with horizontal blades; i.e., the axes of the blades are horizontal.

1.3 PERFORMANCE REQUIREMENTS:

A. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.

1. Wind Loads: Determine loads based on a uniform pressure of 20 lbf/sq. ft. (957 Pa), acting inward or outward.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes, without buckling, opening of joints, overstressing of components, failure of connections, or other detrimental effects.

C. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.4 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For each type of product indicated.

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

C. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

1. Show weep flashing, sealant, or other means of preventing water intrusion.

1.5 QUALITY ASSURANCE:

A. Source Limitations: Obtain louvers and vents from single source from a single manufacturer where indicated to be of same type and design.

B. AWS Standard: Comply with recommendations in the Architectural Woodworking Institute's "Architectural Woodwork Standard" for fabrication, construction details, and installation procedures.

1.6 PROJECT CONDITIONS:

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Western Red Cedar: Wood Class II

B. 20 oz. Copper Flashing

C. Fasteners: Use types and sizes to suit unit installation conditions.

1. Use Stainless Steel Trim Head Wood Screws unless otherwise indicated or required for a complete installation.

2.2 FABRICATION, GENERAL:

A. Assemble louvers in factory to minimize field assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

C. Fabricate frames, including integral sills and flashings, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

D. Include supports, anchorages, and accessories required for complete assembly.

E. Provide extended sills for recessed louvers.

F. Miter outer frame/ trim components.

2.3 FIXED, WOOD LOUVERS:

A. Horizontal, Blade Louver:

1. Louver Depth: 7 inches (178 mm).
2. Louver Width: 66 inches (1677 mm).
3. Louver Height: 84 inches (2134 mm).
4. Frame and Blade Nominal Thickness: Not less than 0.25 inch (6.35 mm).
5. Louver Performance Ratings:

    a. Free Area: Not less than 19.25 sq. ft. (1.78 sq. m) for 66-inch (1677 mm) wide by 84-inch (2134 mm) high louver.
    b. Point of Beginning Water Penetration: Not less than 1000 fpm (5.1 m/s).
    c. Air Performance: Not more than 0.15-inch wg (37-Pa) static pressure drop at 1000-fpm (5.1-m/s) free-area intake velocity.

B. Horizontal, Blade Louver:

1. Louver Depth: 7 inches (178 mm).
2. Louver Width: 48 inches (1219 mm).
3. Louver Height: 36 inches (914 mm).
4. Frame and Blade Nominal Thickness: Not less than 0.25 inch (6.35 mm).
5. Louver Performance Ratings:

    a. Free Area: Not less than 6 sq. ft. (.55 sq. m) for 48-inch (1219 mm) wide by 36-inch (914 mm) high louver.
    b. Point of Beginning Water Penetration: Not less than 1000 fpm (5.1 m/s).

c. Air Performance: Not more than 0.15-inch wg (37-Pa) static pressure drop at 1000-fpm (5.1-m/s) free-area intake velocity.

2.4 LOUVER SCREENS:

A. General: Provide screen at interior and exterior side of louver.

1. Screening Type: ½" Mesh .022 Welded Stainless Wire, Dia. T316.

B. Secure screen frames to louver frames with approved wood screws, spaced a maximum of 6 inches (150 mm) from each corner and at 12 inches (300 mm) o.c.

C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.

1. Wood: Same kind and form of wood as indicated for louver to which screens are attached. Reinforce wood screen frames at corners with clips.
2. Finish: Mill

2.5 FINISHES, GENERAL:

A. Comply with CSI Division 09 Section 099113, "Exterior Painting" for applying designated finishes.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION:

A. Coordinate drawings and directions for installation of anchorages. Coordinate delivery of such items to Project Site.

3.3 INSTALLATION:

A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide stainless steel washers fitted to screws where required to protect wood surfaces and to make a weather-tight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Install concealed flashings and joint fillers as louver installation progresses, where weather-tight louver joints are required. Comply with CSI Division 07 Section 079200, "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING:

A. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove soiling during the construction period. Do not let soil accumulate during construction period.

B. Before final inspection, thoroughly clean exposed surfaces taking the proper care not to harm any finishes.

C. Corrective Work- Repair finishes damaged by cutting, trimming, sanding, fitting, and cleaning. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

D. If results of restoration are unsuccessful, as determined by Engineer, remove damaged units and replace with new units.

1. Touch up minor abrasions in finishes, matches color and gloss of, as required or compatible with finished coating.

END OF SECTION 089000

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY:

A. Section includes surface preparation and the application of paint and oil based coating systems on the following wooden exterior substrates: trim, louvers, cedar shakes, and soffit.

1.2 DEFINITIONS:

A. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

1.3 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For each type of product. Include preparation requirements and application instructions.

C. Product List: For each product indicated, include the following:

1. Cross-reference to paint and staining system and locations of application areas. Use same designations indicated in schedule.
2. Printout of current "MPI Approved Products List" for each paint product category specified, with the proposed product highlighted.
3. VOC content for each system.

1.4 DELIVERY, STORAGE, AND HANDLING:

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.5 FIELD CONDITIONS:

A. Apply materials only when temperature of surfaces to be painted or coated and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply materials in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Paint Manufacturer: Subject to compliance with requirements for painting, available manufacturer offering products that may be incorporated into the Work include, but is not limited to, the following:

1. Sherwin-Williams Company (The).
2. Benjamin Moore.
3. Dulux.

B. Stain Basis of Design Manufacturer: Subject to compliance with requirements for wood staining, provide products manufactured by Benjamin Moore, or an approved equal.

2.2 PAINT AND STAINING, GENERAL:

A. MPI Standards: Provide paint products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

1. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and systems indicated.

B. Staining Standards: Provide staining products that penetrate into wood fibers to rejuvenate or replace natural oils and resins.

C. Material Compatibility:

1. Provide materials for use within each paint and staining system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each application in paint and staining system, provide products recommended in writing by manufacturer for substrates indicated.

D. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

E. Paint Colors: As selected by Designer from manufacturer's full range.

2.3 WATER-BASED PAINTS:

A. Latex, Exterior Semi-Gloss (Gloss Level 5): MPI #11.

2.4 WOOD STAINING:

A. Semi-Transparent Oil/ Stain for Exterior Wood Cedar Shake Siding.

1. Moore Wood, Alkyd Deck/Siding Semi-transparent Stain- Natural Cedar.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Wood: 15 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and coatings.

D. Proceed with applications only after unsatisfactory conditions have been corrected.

1. Approved application of materials indicates acceptance of surfaces and conditions.

3.2 PREPARATION:

A. Comply with paint manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and systems indicated.

B. Comply with staining manufacturer's written instructions and recommendations in applicable to substrates and systems indicated.

C. Remove hardware, covers, plates, or similar items already in place that are removable. If removal is impractical or impossible because of size, weight, or type of item, provide surface-applied protection before surface preparation and application.

1. After completing painting and staining operations, use workers skilled in the trades involved to reinstall items that were removed if applicable. Remove surface-applied protection.

D. Clean substrates of substances that could impair bond of materials, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and re-prime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

E. Wood Substrates:

1. Sand uneven surfaces flush that will be exposed to view, and dust off.
2. Prime edges, ends, and faces of wood accordingly.
3. After priming, fill imperfections in the finish surfaces that can not be remediated with paint with putty or plastic wood filler. Sand smooth when dried.

3.3 APPLICATION:

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."

1. Use applicators and techniques suited for substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only accordingly.
3. Paint both sides and edges of exterior door and door frames.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and breaks.

3.4 CLEANING AND PROTECTION:

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing material applications, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from material applications. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Engineer, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING AND STAINING SCHEDULE:

A. Wood: To include trim:

1. Latex System:

a. Prime Coat: Primer, latex for exterior wood, MPI #6.
b. Intermediate Coat Latex, exterior, matching topcoat.
c. Topcoat: Latex, exterior semi-gloss (Gloss Level 5), MPI #11.

B. Wood: To include louvers, plywood soffit lining.

1. Latex System:

a. Prime Coat: Primer, latex for exterior wood, MPI #6.
b. Intermediate Coat: Latex, exterior, matching topcoat.
c. Topcoat: Latex, exterior, low sheen (Gloss Level 3), MPI #15.

C. Cedar Shakes:

1. Semi-Transparent Oil/ Stain:

a. Surface preparation as required per the manufacturer's written instructions.
b. Topcoat: Latex, exterior gloss semi-gloss (Gloss Level 5), MPI #11.

END OF SECTION 099113

SECTION 260519 – LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

B. Related CSI Sections: The following sections contain requirements that relate to this Section:

1. Division 26 Section 260526, “Grounding and Bonding for Electrical Systems.”
2. Division 26 Section 260533, “Raceway and Boxes for Electrical Systems.”
3. Division 26 Section 260543, “Underground Ducts and Raceways for Electrical Systems.”
4. Division 26 Section 260544, “Sleeves and Sleeves Seals for Electrical Systems.”

1.2 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20 – 1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For the following products:

1. 600 volt insulated wires and cables, all sizes
2. All terminals, lugs and wire connectors

C. Quality Assurance Submittals

1. Manufacturer Certification Letter in accordance with NOTICE TO CONTRACTOR – POTENTIAL FOR ASBESTOS CONTAINING MATERIALS.

1.3 QUALITY ASSURANCE:

A. Testing Agency Qualifications: Testing agency as defined by OSHA in 29 CFR 1910.7 or a member company of the NETA and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the NETA or the NICET to supervise on-site testing specified in Part 3.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

1.4 DELIVERY, STORAGE, AND HANDLING:

A. Deliver wires and cables according to NEMA WC 26.

1.5 COORDINATION:

A. Coordinate layout and installation of cables with other installations.

B. Revise locations and elevations from those indicated, as required to suit field conditions and as approved by Engineer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Wires and Cables:

a. Alcan Aluminum Corporation; Alcan Cable Div.
b. American Insulated Wire Corp.; Leviton Manufacturing Co.
c. Southwire Comany
d. Carol Cable Co., Inc.

2. Connectors for Wires and Cables:

a. Hubbell Power Systems, Inc.
b. 3M; Electrical Products Division
c. Monogram Co.; AFC.
d. Square D Co.; Anderson.

2.2 BUILDING WIRES AND CABLES:

A. UL-listed building wires and cables with conductor material, insulation type, cable construction, and rating as specified in Part 3.2 "Wire and Insulation Applications".

B. Rubber Insulation Material: Comply with NEMA WC 3.

C. Thermoplastic Insulation Material: Comply with NEMA WC 5.

D. Cross-Linked Polyethylene Insulation Material: Comply with NEMA WC 7.

E. Ethylene Propylene Rubber Insulation Material: Comply with NEMA WC 8.

F. Conductor Material: Copper.

G. Stranding: All wires shall be stranded.

H. General:

1. The Contract Plans show the locations, type, size and number of wires and cables to be used for this Contract. Each type shall comply with the Specifications contained herein.
2. Cables which have been manufactured more than two years prior to installation will not be accepted.
3. The conductors, unless otherwise noted, shall be soft or annealed copper conforming to ANSI/ASTM B 33 if coated, ANSI/ASTM B 3 if uncoated. In addition, unless otherwise specified, stranded conductors shall have concentric stranding as per ANSI/ASTM B 8.
4. Cables shall be supplied with both ends of each length sealed against the entry of moisture.

I. 600 Volt Insulated Wires and Cables:

1. General:

a. Power, instrumentation, lighting, grounding, and control cable shall be approved for use in wet or dry locations, indoors or outdoors in raceway, wireways, trenches, conduits, underground ducts.
b. Asbestos, in any form, is prohibited from the cable. This prohibition includes such items as fillers and binding tapes even though the item is encapsulated, or the asbestos fibers are impregnated with binder material.
c. All conductors shall be copper, insulated, 600 Volt, unless otherwise noted. Wire size No.8 and smaller shall be type THHN-THWN, unless otherwise noted or shown; wire size No. 6 AWG and larger shall be type THWN or XHHW. Type SF-1 or SF-2 shall be used for connections to lighting fixtures.

d. Conductors with higher insulation temperature rating shall be provided as required. Wiring run through continuous fluorescent fixtures shall be rated 90°C, 194°F. Conductors shall be rated and of a type approved for the specific application.

e. All conductors shall be installed in raceways. Refer to CSI Division 26 Section 260533 "Raceways and Boxes for Electrical Systems" and CSI Division 26 Section 260543 "Underground Ducts and Raceways for Electrical Systems."

f. Conductor and conduit sizes shown on the drawings are based on copper conductors with Type THWN or XHHW insulation, unless otherwise noted. Increase conductor and conduit sizes as necessary for other approved insulation types.

g. Aluminum is not approved for conductors or wire.

h. Power conductors shall be a minimum of No. 12 AWG stranded unless otherwise noted. All wire shall be stranded unless otherwise noted. Control conductors shall be a minimum of No. 14 AWG stranded, unless otherwise noted.

i. When the distance from the panel to the first outlet on a 20 Amp 120 Volt circuit exceeds 100 feet and on a 20 Amp 240 Volt circuit exceeds 200 feet, the conductor shall be increased to No. 10 AWG.

j. Wires, conductors, and cables shall be single conductor, except as otherwise specified or indicated on drawings.

k. U.L. listed multiconductor (tray) control cable shall be No. 14 AWG Eaton Dekoron Type IC99, 600V control cable, with stranded copper conductors, an overall shield, nylon-coated PVC insulation, and an overall FR PVC outer jacket, or approved equal. Number of conductors shall be as shown on the drawings, or as required by the system manufacturer.

l. Cable meeting special requirements such as twisted pairs, triads, or individual shielding shall be provided where recommended by the system manufacturer.

m. Conductor insulation shall be color coded.

240Y/120 Volt	
Phase A	Black
Phase B	Red
Neutral	White
Ground	Green

n. Switch leg wiring shall be of the same color code as the corresponding phase.

o. System color coding shall be in accordance with color code furnished by system manufacturer and shown on wiring diagrams.

p. Colors, except colors for conductors No. 4 AWG and larger, shall be factory applied the entire length of the conductors by solid color compound, solid color coating, or colored striping or bands, 2 sets 180° apart. Onsite

coloring shall not be done, except color coding by means of paint or tapes is approved only for conductors No. 4 AWG and larger.

q. Voltage rating, manufacturer, type and conductor AWG size indication shall be continuous, factory applied the entire length of each conductor.

r. Joints and splices shall be made in a manner equivalent electrically and mechanically to the conductor itself. Connections shall be of the pressure or compression type.

s. All lugs terminating feeder conductors shall be of the solderless type UL listed for use with copper wire. All lugs and terminals shall be UL listed for 90°C application.

t. Branch circuit connections or joints shall have an approved type solderless connector suitable for copper conductors.

u. Wire connectors shall consist of a phenolic compound body with a cone-shaped coil spring insert and threaded skirt. Outer shell shall be knurled for each grip and capable of use with a wrench or pliers.

2.3 CONNECTORS AND SPLICES:

A. UL-listed, factory-fabricated wiring connectors of size, ampacity rating, material, type, and class for application and service indicated. Comply with Project's installation requirements and as specified in Part 3.2 "Wire and Insulation Applications".

2.4 AERIAL CONDUCTORS

A. Pre-assembled aerial cable shall be 7 strand aluminum containing a No. 10 AWG steel messenger with three No. 10 AWG cross-linked polyethylene insulated conductors rated at 600 volts. The pre-assembled aerial cable shall be attached to poles with insulators, including all connections as indicated on the plans or as directed by the engineer.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine raceways and building finishes to receive wires and cables for compliance with requirements for installation tolerances and other conditions affecting performance

of wires and cables. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 WIRE AND INSULATION APPLICATIONS:

A. Service Entrance: Type RHW or THWN, in raceway.

B. Feeders: Type THHN/THWN, in raceway.

C. Branch Circuits: Type THHN/THWN, in raceway.

3.3 INSTALLATION:

A. All conductors shall be installed in concealed metal raceways, RSC, EMT, PVC coated Steel, and PVC in accordance with the NEC except where specifically noted otherwise. Exposed wiring shall be installed in metal raceways. Exposed wiring in finished areas shall be installed in surface metal raceways.

B. Branch circuit phase wires shall be connected to separate phases of supply mains to assure balanced condition in that circuit and proper load balance on the panel. Circuit numbers assigned on drawings are used for convenience and need not necessarily designate the circuit on the panel to which that circuit may be connected. Actual circuiting shall suit job conditions.

C. Equipment requiring electric service is also named on the drawings or schedules of other disciplines, or in other Sections. Where receptacles or convenience outlets are specified to serve named equipment, the Contractor shall provide approved receptacle, plug, connection, and/or liquid-tight flexible conduit to equipment.

D. Drawings do not necessarily indicate the required number of conductors in each raceway. Unless it is specifically noted that raceways are empty by the word "spare", the Contractor shall provide all required conductors, power, control, supervisory, alarm, or branch circuits. The Contractor shall make all final connections, flexible or fixed, as required, to all equipment requiring final electrical connections.

E. Regardless of the number of conductors shown, each circuit (conductors No. 8 and smaller) to panels or equipment shall contain a full size neutral conductor, which, if not utilized, shall be taped and insulated at the final point of connection to equipment.

F. All grounding conductors shall have green color coded insulation and shall be sized in accordance with the NEC.

G. Install wires and cables as indicated, according to manufacturer's written instructions and NECA's "Standard of Installation."

H. Pull Conductors: Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

I. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

J. Cables shall be in conduit except where specifically noted otherwise and shall be supported according to CSI Division 26 Section 260529, "Hangers and Supports for Electrical Systems."

K. Identify wires and cables according to CSI Division 26 Section 260553, "Identification for Electrical Systems."

3.4 CONNECTIONS:

A. Conductor Splices: Keep to minimum.

B. Install splices and taps that possess equivalent or better mechanical strength and insulation ratings than conductors are being spliced.

C. Use splice and tap connectors compatible with conductor material.

D. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

E. Connect outlets and components to wiring and to ground as indicated and instructed by manufacturer.

F. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.5 FIELD QUALITY CONTROL:

A. Testing: On installation of wires and cables and before electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

1. Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

2. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

    a. Check for electrical continuity of circuits and for short circuits.
    b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.

3. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.

    a. Verify grounding connections.

B. Correct malfunctioning conductors and cables at Project Site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new conductors and retest.

END OF SECTION 260519

SECTION 260526 – GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

B. Related CSI Sections include the following:

1. Division 26 Section 260519, "Low-Voltage Electrical Power Conductors and Cables".

2. Division 26 Section 260533, "Raceways and Boxes for Electrical Systems".

3. Division 26 Section 260543, "Underground Ducts and Raceways for Electrical Systems".

C. System grounding shall be as shown on the plans. All grounding conductors incorporated to the existing system shall be approved by the Engineer.

1.2 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For the following:

1. Ground rods.
2. Hardware including clamps, connectors, etc.

C. Qualification Data: For firms and persons specified in Part 1.3, "Quality Assurance".

D. Field Test Reports: Submit written test reports to include the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.3 QUALITY ASSURANCE:

A. Testing Agency Qualifications: Testing agency as defined by OSHA in 29 CFR 1910.7 or a member company of the NETA and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the NETA to supervise on-site testing specified in Part 3.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1. Comply with UL 467 for grounding and bonding materials and equipment.

C. Comply with NFPA 70; for overhead-line construction and medium-voltage underground construction, comply with IEEE C2.

1.4 APPLICABLE STANDARDS:

A. Pertinent provision 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:

1. NFPA

a. 70, National Electrical Code.
b. 72, National Fire Alarm Code.
c. 110, Emergency and Standby Power Systems.

2. IEEE:

a. Standard 80, IEEE Guide for Safety in Substation Grounding.
b. Standard 81, Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.
c. Standard 142, Recommended Practice for Grounding of Industrial and Commercial Power Systems.

3. ASTM:

a. B 227, Hard-Down Copper-Clad Steel Wire.
b. B 229, Concentric-Lay-Stranded Copper and Copper-Clad-Steel Composite Conductors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Grounding Conductors, Cables, Connectors, and Rods:

a. Galvan Industries, Inc.
b. Salisbury: W.H. Salisbury & Co., Utility
c. Thomas & Betts, Electrical.

2.2 GROUNDING CONDUCTORS:

A. Ground Cable: annealed concentric stranded, copper cable the size shown on the plans and in accordance with ASTM 8 and Article 250 of the NEC. Ground conductors to the perimeter fencing shall be copper-clad steel. For insulated conductors, comply with CSI Division 26 Section 260519, "Low-Voltage Electrical Power Conductors and Cables".

B. Material: Copper.

C. Equipment Grounding Conductors: Insulated with green-colored insulation.

D. Isolated Ground Conductors: Insulated with green-colored insulation with yellow stripe. On feeders with isolated ground, use colored tape, alternating bands of green and yellow tape to provide a minimum of three bands of green and two bands of yellow.

E. Grounding Electrode Conductors: Annealed, concentric stranded, copper cable sized in accordance with ASTM B 8 and Article 250 of the NEC.

F. Underground Conductors shall be bare, tinned, stranded, unless otherwise indicated.

G. Bare Copper Conductors: Only the counterpoise wire shall be bare copper conductor all other conductor in conduit shall be insulated. Bare Copper Conductor shall comply with the following:

a. Assembly of Stranded Conductors: ASTM B 8.

H. Copper Bonding Conductors: As follows:

a. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG copper conductor, 1/4 inch in diameter.
b. Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.

c. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
d. Tinned Bonding Jumper: Tinned-copper tape, braided copper conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

I. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.

2.3 CONNECTOR PRODUCTS:

A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.

B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.

C. Welded Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions. Below–grade (embedded or buried) copper grounding cable connections shall be made by exothermic welding. Exothermic welded connectors shall be Erico products Company, Cadweld or approved equal.

2.4 GROUNDING ELECTRODES:

A. Ground Rods: Ground Rods: Shall be sectionalized, copper-clad steel, 3/4-inch in diameter and ten feet long (minimum) or as shown on plans.

1. Size: 3/4 by 120 inches or as called on plans.

PART 3 - EXECUTION

3.1 APPLICATION:

A. All electrical equipment enclosures and equipment, and all metallic parts of the installation, including structures, metallic conduits, wireways, frames, hand-rails, ladders, platforms, fence and metalwork, shall be bonded and connected to the nearest ground cable, whether shown on the Plans or not. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.

B. In raceways, use insulated equipment grounding conductors. The electrical continuity of wireways, air ducts, fence, enclosures, and handrails shall be maintained by bonding. Bonding of electrical raceway and enclosures shall assure electrical continuity and the capacity to conduct safety and fault current that could be imposed. Bonding shall comply fully with Article 250 of the NEC.

C. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections. Grounding connections shall be made in accordance with the Contract and as specified. Paint, scale, rust, corrosion, and other foreign matter shall be removed from the points of contact on metal surfaces before ground connections are made.

D. Ground tap connections to equipment shall be made at the points provided on the equipment for grounding in accordance with the equipment manufacturer's recommendations. Connections from ground conductors to the ground buses of switchgear, switchboards, power centers, motor control centers, and other cabinet-mounted equipment shall be made by means of an acceptable bolted fittings.

E. All electrical power apparatus shall be provided with a ground-fault-current return path. Motors and power receptacles shall utilize a grounded, identified separate grounding conductor in the feeder or branch circuit raceway which connects the motor frame or receptacle to the panelboard ground bus.

F. All electrical power equipment, other than motors and receptacles, shall be provided with a grounded, identified grounding conductor, unless rigid steel conduit in accordance with NEC 344, is used for the raceway.

G. The Grounding conductor shall in no case be a system neutral or a current-carrying conductor. Where a circuit consists of two or more power conductors in a conduit or wiring channel, the grounding conductor may be one standard wire size smaller than the power conductor, but in no case smaller than No. 14 nor larger than No. 4/0, and shall be stranded and covered by green insulation. In all cases, the white insulated wire shall be used for the current-carrying neutral only.

H. Metallic sheaths or shields of shielded cable for power and control shall be terminated by a copper grounding strip provided with a connector for connection to the station ground. The manufacturer of the cable shall furnish instructions for ground termination of shielded cable.

3.2 EQUIPMENT GROUNDING CONDUCTORS:

A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.

B. Install equipment grounding conductors in all feeders and circuits.

C. Install insulated equipment grounding conductor with circuit conductors for the following items, in addition to those required by NEC:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Single-phase motor and appliance branch circuits.
5. Flexible raceway runs.

D. Busway Supply Circuits: Install insulated equipment grounding conductor from the grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.

E. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways unless they are designated for telephone or data cables.

F. Metal Poles Supporting Outdoor Lighting Fixtures: Provide a grounding electrode in addition to installing a separate equipment grounding conductor with supply branch-circuit conductors.

G. Common Ground Bonding: Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.

3.3 INSTALLATION:

A. All grounding electrodes included but not limited to, rod and pipe electrodes, shall be bonded together to form the grounding electrode system.

B. Ground Rods: Install one ground rod at least at one-rod length from each other. If the 25 ohms resistance to ground can not be accomplished add an extra ground rod, unless if two rods are shown on the plans.

1. Drive ground rods until tops are 6 inches below finished floor or final grade, unless otherwise indicated.
2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, except as otherwise indicated. Make connections without exposing steel or damaging copper coating.

C. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

D. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic

structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.

3.4 CONNECTIONS:

A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
2. Make connections with clean, bare metal at points of contact.
3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.

C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.

E. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

F. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.5 UNDERGROUND DISTRIBUTION SYSTEM GROUNDING:

A. Underground Conduits: Install a grounding conductor with at least 50 percent ampacity of the largest phase conductor in the duct bank.

3.6 FIELD QUALITY CONTROL:

A. Perform a program of field testing of installed grounding and bonding systems. Field testing shall be thorough, continuing throughout the installation, fully documented, with the following as a minimum:

1. Electrical resistance tests shall be made during installation to verify continuity of the grounding system.
2. The Electrical Contractor shall perform a ground Megger Test. The Engineer shall be notified at least 5 days prior to the test. Ground and weather conditions shall be noted at the time of the test. The Contractor shall provide additional grounding equipment until the ground resistance is measured at consistently less than 25 ohms under dry conditions.

B. Testing: Perform the following field quality-control testing:

1. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with requirements.
2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells. Measure ground resistance not less than two full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests, by the fall-of-potential method according to IEEE 81.

4. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.

1.2 PERFORMANCE REQUIREMENTS:

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.3 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For the following:

1. Steel slotted support systems.

C. Shop Drawings: For the following:

1. Trapeze hangers.
2. Steel slotted channel systems.
3. Equipment supports.

D. Welding certificates.

1.4 QUALITY ASSURANCE:

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Comply with NFPA 70.

1.5 COORDINATION:

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in CSI Division 03 Section 033000, “Cast-In-Place Concrete.”.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS:

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.; a division of Cooper Industries.
c. ERICO International Corporation.
d. Thomas & Betts Corporation.

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4. Stainless steel for the Salt shed.
3. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel hangers, clamps, associated fittings, and hardware shall be designed for types and sizes of raceway or cable to be supported. Stainless steel support devices should be used inside the salt shed.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Supports shall be malleable iron. Provide stainless steel supports for conduit installed in the Salt Shed.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used. Fasteners installed in the Salt Shed should be Stainless Steel.

    a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

        1) Hilti Inc.
        2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        3) MKT Fastening, LLC.

2. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element. Stainless steel clamps shall comply with ASTM F2098-08
3. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325. Stainless steel bolts shall comply with ASTM F738M-02
4. Toggle Bolts: All-steel springhead type (Stainless steel in the Salt Shed).
5. Hanger Rods: Threaded steel (Stainless steel in the Salt Shed).

G. Hardware: For corrosive areas and wet locations all hardware shall be stainless steel. For all other areas use zinc plated hardware.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES:

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 3 - EXECUTION

3.1 APPLICATION:

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, PVC, and RMC as required by scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with stainless steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit clamps or approved clamps.

D. Spring-stainless steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION:

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified herein.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, PVC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts. Or Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
7. To Light Steel: Sheet metal screws.
8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS:

A. Comply with installation requirements in CSI Division 05 Section 055000, "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 PAINTING:

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Touchup: Comply with requirements in CSI Division 09 section 099113, “Exterior Painting” painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:

1. Raceways include the following:

a. RGSC
b. PVC externally coated, rigid steel conduits for conduit penetrations and below 10’ elevation in the salt shed. PVC above 10’ elevation.
c. LFMC.
d. FMC.
e. EMT for conduit above 10’ elevation in the existing maintenance facility.
f. Wireways.

2. Boxes, enclosures, and cabinets include the following:

a. Device boxes.
b. Outlet boxes.
c. Pull and junction boxes.
d. Cabinets and hinged-cover enclosures.

B. Related CSI Sections include the following:

1. Division 26 Section 260519, “Low Voltage Electrical Power Conductors and Cables”.
2. Division 26 Section 260526, “Grounding and Bonding for Electrical Systems”.
3. Division 26 Section 260529, “Hangers and Supports for Electrical Systems”.
4. Division 26 Section 260543, “Underground Ducts and Raceways for Electrical Systems”.
5. Division 26 Section 260544, "Sleeves and Sleeve Seals".
6. Division 26 Section 262726, "Wiring Devices".

1.2 DEFINITIONS:

1. EMT: Electrical metallic tubing.
2. FMC: Flexible metal conduit.
3. RGSC: Rigid galvanized metal conduit.
4. LFMC: Liquidtight flexible nonmetallic conduit.

5. PVC: Polyvinyl chloride conduit.

1.3 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20 -1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For surface raceways, wireways and fittings, hinged-cover enclosures, and cabinets.

C. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.

1. Custom enclosures and cabinets.
2. For boxes, including the following:

a. Conduit entry provisions, including locations and conduit sizes
b. Box cover design
c. Grounding details
d. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons
e. Joint details

1.4 QUALITY ASSURANCE:

A. Listing and Labeling: Provide raceways and boxes specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.

B. Comply with NEC's "Standard of Installation."

C. Comply with NFPA 70.

1.5 COORDINATION:

A. Coordinate layout and installation of raceways and boxes with other construction elements to ensure adequate headroom, working clearance, and access.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Metal Conduit and Tubing:

a. Alflex Corp.
b. Anamet, Inc.; Anaconda Metal Hose.
c. Anixter Brothers, Inc.

2. Conduit Bodies and Fittings:

a. American Electric; Construction Materials Group.
b. Crouse-Hinds; Div. of Cooper Industries.
c. Emerson Electric Co.; Appleton Electric Co.

3. Metal Wireways:

a. Hoffman Engineering Co.
b. Keystone/Rees, Inc.
c. Square D Co.

4. Surface Metal Raceways:

a. Airey-Thompson Co., Inc.; A-T Power Systems.
b. American Electric; Construction Materials Group.
c. Butler Manufacturing Co.; Walker Division.

5. Boxes, Enclosures, and Cabinets:

a. American Electric; FL Industries.
b. Butler Manufacturing Co.; Walker Division.
c. Crouse-Hinds; Div. of Cooper Industries.

2.2 METAL CONDUIT AND TUBING:

A. RGSC: ANSI C80.1.

B. Plastic-Coated Steel Conduit and Fittings: NEMA RN 1, coating thickness: 0.040 inch, minimum.

C. EMT and Fittings: ANSI C80.3. Fittings: Set-screw or compression type. Cast fittings shall be made of steel or malleable iron.

D. LFMC: Flexible steel conduit with PVC jacket.

E. FMC: Zinc-coated steel.

F. Conduit bodies and fittings: NEMA FB 1; compatible with conduit/tubing materials. Cast fittings shall be made of steel or malleable iron.

2.3 METAL WIREWAYS:

A. Material: Sized and shaped as indicated.

B. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

C. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70.

D. Wireway Covers: Hinged type.

E. Finish: Manufacturer's stainless steel

2.4 SURFACE RACEWAYS:

A. As specified in Part 1 1.1 A 1.

2.5 OUTLET AND DEVICE BOXES:

A. Sheet Metal Boxes: NEMA OS 1.

B. Steel-Metal Boxes: NEMA FB 1, Type FD, cast box with gasketed cover.

C. Nonmetallic Boxes: NEMA OS 2 and UL 514C.

D. All outlet and device boxes installed within the salt shed shall be of corrosive resistant type material.

E. Boxes and fittings: Boxes and fittings shall comply with the applicable provisions of NFPA 70, Article 314.

2.6 PULL AND JUNCTION BOXES:

A. Small Sheet Metal Boxes: NEMA OS 1.

B. Cast-Metal Boxes: NEMA FB 1, steel with gasketed cover.

C. Nonmetallic Boxes: NEMA OS 2 and UL 514C.

D. All pull and junction boxes installed in the salt shed shall be of corrosive resistant type material.

2.7 ENCLOSURES AND CABINETS: PULL AND JUNCTION BOXES:

A. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous hinge cover and flush latch (NEMA 4X for the salt shed).

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

2. Nonmetallic Enclosures: Plastic finished inside with radio-frequency-resistant paint.

B. Cabinets: NEMA 250, Type 1, galvanized steel box (NEMA 4X for salt shed), finished inside and out with manufacturer's standard enamel. Hinged door in front covers with flush latch and concealed hinge. Key latch to match panelboards. Include metal barriers to separate wiring of different systems and voltage, and include accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine surfaces to receive raceways, boxes, enclosures, and cabinets for compliance with installation tolerances and other conditions affecting performance of raceway installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 WIRING METHODS:

B. Indoors: Use the following wiring methods:
1. Damp locations: RGSC.
2. Wet location: PVC coated RGSC.
3. Salt shed: Provide PVC coated RGSC for sweeps and below 10’ elevation and stainless steel mounting hardware. Provide PVC above 10’ elevation.
4. Boxes and Enclosures: NEMA 250, Type 1, except as follows:

(a) Corrosive Locations: NEMA Type 4X, stainless steel.
(b) Damp or Wet Locations: NEMA 250, Type 4, nonmetallic,

C. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Maintenance Facility: RGSC up to 10’ elevation, EMT over 10’ elevation. EMT concealed in wall. For Calcium Chloride dispensing system installed within the maintenance facility use conduit as specified in specification #0177100A or as detailed on the contract plans.
2. Salt Shed: PVC coated RGS conduit and stainless steel mounting hardware. PVC coated RGS conduit up to 10’ elevation, PVC over 10’ elevation.

3.3 INSTALLATION:

A. Install raceways, boxes, enclosures, and cabinets as indicated, according to manufacturer's written instructions, following NEC and local codes. Install conduit clamps within 3’ of boxes and at 10’ maximum distance between junction points.

B. Minimum Raceway Size: 3/4-inch trade size (DN21).

C. Keep raceways at least 6 inches away from parallel runs of flues and hot-water pipes. Install horizontal raceway runs above water and steam piping.

D. Install raceways level and square and at proper elevations. Provide adequate headroom.

E. Complete raceway installation before starting conductor installation.

F. Support raceways as specified in CSI Division 26 Section 260529, "Hangers and Supports for Electrical Systems."

G. Use temporary closures to prevent foreign matter from entering raceways.

H. Stub-ups shall be PVC coated RGSC conduit. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portion of bends is not visible above the finished slab.

I. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.

J. Use raceway fittings compatible with raceways and suitable for use and location. For rigid steel conduit, use threaded rigid steel conduit fittings.

K. Install exposed raceways parallel or at right angles to nearby surfaces or structural members, and follow the surface contours as much as practical.

L. Join raceways with fittings designed and approved for the purpose and make joints tight.

1. Make raceway terminations tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.
2. Use insulating bushings to protect conductors.

M. Tighten set screws of threadless fittings with suitable tools.

N. Terminate where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against the box. Where terminations are not secure with 1 locknut, use 2 locknuts: 1 inside and 1 outside the box.

O. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align raceways so the coupling is square to the box and tighten the chase nipple so no threads are exposed.

P. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of the pull wire. Ends shall be capped.

Q. Install raceway sealing fittings according to manufacturer's written instructions. Locate fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

R. Where otherwise required by NFPA 70.

S. Stub-up Connections: Extend PVC coated rigid metal conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with the finished floor. Extend conductors to equipment with rigid steel conduit; LFMC may be used 6 inches above the floor.

T. Flexible Connections: Use maximum of 6 feet of LFMC conduit for equipment subject to vibration, noise transmission, or movement; and for all motors. Use LFMC conduit in wet or damp locations. Install separate ground conductor across flexible connections.

U. PVC Externally Coated, Rigid Steel Conduits: Use only fittings approved for use with that material. Mounting hardware shall be stainless steel. Patch all nicks and scrapes in PVC coating after installing conduits.

V. Surface Raceways: Install a separate, green, ground conductor in raceways from junction box supplying the raceways to receptacle or fixture ground terminals.

W. Select each surface raceway outlet box, to which a lighting fixture is attached, of sufficient diameter to provide a seat for the fixture canopy.

X. Install hinged-covered enclosures and cabinets plumb. Support at each corner.

Y. Conduits entering enclosures, other than threaded cast boxes, shall be securely fastened by means of two lock-nuts, one on each side of the enclosure. The conduit shall be terminated in a bushing. Conduit bushings made entirely of non-metallic materials shall not be used.

Z. Do not leave any box openings exposed. Install hole plugs on any knockout holes that are removed without any conduit attached.

AA. Install boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances. Flush mounted boxes shall be galvanized steel, unless otherwise noted.

BB. Removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in the enclosure.

CC. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.4 PROTECTION:

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure coatings, finishes, and cabinets are without damage or deterioration at the issuance of the Certificate of Compliance.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.5 CLEANING:

A. On completion of installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

END OF SECTION 260533

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY:

A. This section includes underground electrical work including the following:

1. Underground conduits and conduit accessories.

1.2 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR SUBMITTALS.

B. Product Data: For the following:

1. Underground Conduits
2. Conduits and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
3. Warning tape.

C. Shop Drawings for Precast or Factory-Fabricated Underground Utility Structures: Include plans, elevations, sections, details, attachments to other work, and accessories, including the following:

1. Conduit entry provisions, including locations and conduit sizes.
2. Reinforcement details
3. Frame and cover design and frame support rings
4. Grounding details
5. Dimensioned locations of cable rack inserts, pulling-in and lifting irons, and sumps.
6. Joint details.

1.3 DEFINITIONS:

A. RGSC: Rigid galvanized steel conduit

B. RNC: Rigid nonmetallic conduit

1.4 QUALITY ASSURANCE:

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Comply with ANSI C2.

C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUIT:

A. Rigid Steel Conduit: Galvanized. Comply with ANSI C80.1.

B. RNC: NEMA TC2, Type EPC-40-PVC, UL 651, with matching fittings by same manufacturer as the conduit, complying with NEMA TC 3 and UL 514B.

2.2 RACEWAY/DUCT SEALING COMPOUND:

A. Compound: Nonhardening, putty-like consistency workable at temperatures as low as 35°F. Compound shall not slump at a temperature of 300°F and shall readily adhere to clean surfaces of plastic ducts, metallic conduits, conduit coatings, concrete, masonry, lead, cable sheaths, cable jackets, insulation materials, and the common metals. Compound shall have no injurious effect on worker's hands or materials.

2.3 TRENCHING AND BACKFILLING MATERIALS:

A. Form 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% passes a No. 200 (75-micron) sieve. Topsoil, fertilizer, seed and mulch shall conform to Section M.13.

B. Backfill shall consist of satisfactory soil materials free of clay, rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter. Satisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, and SP. Satisfactory material encountered during the excavation may be stored in segregated stockpile for re-use as backfill.

PART 3 - EXECUTION

3.1 UNDERGROUND CONDUITS:

A. All underground conduits shall contain a pull wire, Greenlee No. 430 Poly Pull Line or equal, approved by the Designer. Install underground duct for primary power service per requirements of UI. All spare conduits shall be capped.

B. RGSC:

1. RGSC conduit shall be installed. All metallic conduits shall be installed in accordance with manufacturer's instructions. Minimum size shall be ¾ inches.
2. All conduit runs shall leave or enter structures perpendicularly.

C. Elbows or bends shall be in accordance the NEC.

D. Building Wall Penetrations: Install conduit penetrations of building walls as specified in CSI Division 26 Section 260544, "Sleeves and Sleeve Seals for Electrical Systems."

E. Sealing: Provide temporary closure at terminations of ducts that have cables pulled. Seal spare ducts at terminations. Use sealing compound and plugs to withstand at least 15-psig hydrostatic pressure.

F. Pulling Cord: Install test Greenlee No. 430 Poly Pull Line nylon cord in conduits, including spares.

3.2 CONDUIT – CLEANING AND TESTING:

A. After conduits and accessories have been installed and all concreting operations, if any, completed, carefully clean and clear all conduit runs of all obstructions and foreign matter to the satisfaction of the Engineer.

B. Test conduits in the presence of the Engineer, by pulling through each conduit 20 foot lengths of single conductor, Type THWN cable of the size and number given in the following table, or where called for, a flexible cylindrical mandrel having an outside diameter 1/4-inch less than the inside diameter of the conduit. Only nylon cable (no rope) that will withstand a reasonable stress shall be used to pull the mandrel through the conduit system.

Conduit Size	Wire Size or Mandrel
2 inch	3 - 250 kcmil
3 inch and larger	Mandrel

3.3 GROUNDING:

A. Ground underground ducts and utility structures (handholes) according to CSI Division 26 Section 260526 "Grounding and Bonding for Electrical Systems."

3.4 EXCAVATION AND BACKFILL:

A. The trench shall be backfilled in at least two layers with excavated material not larger than 4 inches in diameter and thoroughly tamped and compacted to at least the density of the surrounding undisturbed soil. If necessary to obtain the desired compaction, the backfill material shall be moistened or aerated as required.

B. Where trenching occurs in riprap or crushed stone areas, the surface material shall be replaced in kind. Where trenching in paved areas, the trench shall be sawcut and backfilled to the depth of the surface required to replace the removed pavement structure, which shall then be replaced. The edges of all trenches in paved surfaces shall be sawcut to neat lines prior to repaving.

C. Trenches shall not be excessively wet and shall not contain pools of water during backfilling operations.

D. The trench shall be completely backfilled and tamped level with the adjacent surface: except that, when sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

E. Any excess excavation material shall be removed and disposed of in accordance with instructions issued by then Engineer.

F. For ducts without concrete envelope, 8 inches of sand, soft earth, or other fine fill (loose measurement) shall be placed around the ducts and carefully tamped around and over them with hand tampers. The remaining trench may be filled with regular run of excavated material and thoroughly tamped as specified above.

G. Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the trenching, storing of dirt, cable laying, pad construction and other work shall be restored to its original condition. The restoration shall include any necessary topsoiling, fertilizing, liming, seeding, sprigging, or mulching. The Installer shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance.

3.5 FIELD QUALITY CONTROL:

A. Perform the following tests and inspections and prepare test reports:

1. Demonstrate capability and compliance with requirements on completion of installation of underground ducts and utility structures.
2. Pull aluminum or wood test mandrel through duct to prove joint integrity and test for out-of-round duct. Provide mandrel equal to 80 percent fill of duct. If obstructions are indicated, remove obstructions and retest.

B. Correct deficiencies and retest as specified above to demonstrate compliance.

3.6 CLEANING:

A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of ducts. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.

B. Clean internal surfaces handholes, including sump. Remove foreign material.

END OF SECTION 260543

SECTION 260544 – SLEEVE AND SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:

1. Sleeves for raceways and cables.
2. Sleeve-seal systems
3. Sleeve-seal fittings
4. Grout.
5. Silicon Sealants

1.2 DEFINITIONS:

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.3 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR SUBMITTALS.

B. Product Data: For sleeve seals and silicon sealants.

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES:

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Sleeves for Conduits penetrating Non-Fire-Rated Gypsum Board Assemblies: galvanized-steel sheet, 0.0239 inch minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

C. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

    a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
    b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE-SEAL SYSTEM:

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Manufacturers: Subject to compliance with requirements. Available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Advance Products & Systems, Inc.
    b. Calpico, Inc.
    c. Metraflex Co.
    d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: Interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
3. Pressure Plates: Stainless steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 SLEEVE-SEAL FITTINGS:

A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.

5. Manufacturers: Subject to compliance with requirements. Available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Presealed Systems.

2.4 GROUT:

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 SILICONE SEALANTS:

A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.

2. Sealant shall have VOC content of 43 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR RACEWAYS AND CABLES:

A. Comply with NECA 1.

B. Comply with NEMA VE 2 for cable tray and cable penetrations.

C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:

1. Interior Penetrations of Non-Fire-Rated Walls and Floors:

a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in CSI Division 07 Section, Section 079200 "Joint Sealants."
b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.

2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
3. Size pipe sleeves to provide ¼ annular clear space between sleeve and raceway unless sleeve seal is to be installed.

4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches above finished floor level. Install sleeves during erection of floors.

D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:

1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.

E. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing sleeve-seal system.

H. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION:

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.

B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

A. Install sleeve-seal fittings in new walls and slabs as they are constructed.

B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.

C. Secure nailing flanges to concrete forms.

D. Using grout, seal the space around outside of sleeve-seal fittings

END OF SECTION 260544

SECTION 260553 – IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes electrical identification materials and devices required to comply with ANSI C2, NFPA 70, OSHA standards, and authorities having jurisdiction.

1.2 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For each electrical identification product indicated.

C. Schedule of Nomenclature: An index of electrical equipment and system components used in identification signs and labels.

1.3 QUALITY ASSURANCE:

A. Comply with ANSI C2.

B. Comply with NFPA 70.

C. Comply with ANSI A13.1 and NFPA 70 for color-coding.

PART 2 - PRODUCTS

2.1 RACEWAY AND CABLE LABELS:

A. Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

1. Color: Black letters on orange field.
2. Legend: Indicates voltage and service.

B. Pretensioned, Wraparound Plastic Sleeves: Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the line it identifies and arranged to stay in place by pretensioned gripping action when placed in position.

C. Underground-Line Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape.

1. Not less than 6 inches wide by 4 mils thick
2. Compounded for permanent direct-burial service.
3. Embedded continuous strip or core.
4. Printed legend indicating type of underground line.

D. Aluminum-Faced, Card-Stock Tags: Weather-resistant, 18-point minimum card stock faced on both sides with embossable aluminum sheet, 0.002 inch thick, laminated with moisture-resistant acrylic adhesive, punched for fasteners, and preprinted with legends to suit each application.

E. Wrap Around Cable Markers: Black, non-smear legends on white background with plastic coated cloth material which remains flexible. Strong adhesive shall assure firm bond on wire.

2.2 NAMEPLATES AND SIGNS:

A. Safety Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145.

B. Engraved Plastic Nameplates and Signs: Engraving stock, melamine plastic laminate, minimum 1/16 inch thick for signs up to 20 sq. in. and 1/8 inch thick for larger sizes.

1. Engraved legend with white letters on black face.
2. Punched or drilled for mechanical fasteners.

C. Exterior, Metal-Backed, Butyrate Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for the application. 1/4-inch grommets in corners for mounting.

D. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32, stainless-steel machine screws with nuts and flat and lock washers.

2.3 MISCELLANEOUS IDENTIFICATION PRODUCTS:

A. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking, Type 6/6 nylon cable ties.

1. Minimum Width: 3/16 inch.
2. Tensile Strength: 18 lb minimum.
3. Color: Natural.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Identification Materials and Devices: Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations with corresponding designations in the Contract or with those required by codes and standards. Use consistent designations throughout Project.

C. Sequence of Work: If identification is applied to surfaces that require finish, install identification after completing finish work.

D. Color Banding Raceways and Exposed Cables: Band exposed and accessible raceways of the systems listed below:

1. Bands: Pretensioned, wraparound plastic sleeves; colored adhesive tape; or a combination of both. Make each color band 2 inches wide, completely encircling conduit, and place adjacent bands of two-color markings in contact, side by side.
2. Band Locations: At changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

E. Paths of Underground Electrical Lines: During trench backfilling, for exterior underground power, control, signal, and communication lines, install continuous underground plastic line marker located directly above line at 12 inches below finished grade. Where width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches overall, use a single line marker.

F. Secondary Service, Feeder, and Branch-Circuit Conductors: Color-code throughout the secondary electrical system.

1. Color-code 240/120-V system as follows:

a. Phase A: Black.
b. Phase B: Red.
c. Neutral: White.
d. Ground: Green.

2. Factory apply color the entire length of conductors, except the following field-applied, color-coding methods may be used instead of factory-coded wire for sizes larger than No. 10 AWG:

a. Colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made.

Apply last two turns of tape with no tension to prevent possible unwinding. Use 1-inch- wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification markings.

b. Colored cable ties applied in groups of three ties of specified color to each wire at each terminal or splice point starting 3 inches from the terminal and spaced 3 inches apart. Apply with a special tool or pliers, tighten to a snug fit, and cut off excess length.

G. Apply identification to conductors as follows:

1. Multiple Power or Lighting Circuits in the Same Enclosure: Identify each conductor with source, voltage, circuit number, and phase. Use color-coding to identify circuits' voltage and phase.
2. Multiple Control in the Same Enclosure: Identify each conductor by its system and circuit designation. Use a consistent system of tags, color-coding, or cable marking tape.

H. Apply warning, caution, and instruction signs as follows:

1. Warnings, Cautions, and Instructions: Install to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
2. Emergency Operation: Install engraved laminated signs with white legend on red background with minimum 3/8-inch high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.

I. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. This includes power, lighting, communication, signal, and alarm systems, unless units are specified with their own self-explanatory identification. Unless otherwise indicated, provide a single line of text with 1/2-inch- high lettering on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high. Use white lettering on black field. Apply labels for each unit of the following categories of equipment using mechanical fasteners:

1. Panelboards, electrical cabinets, and enclosures.
2. Disconnect switches.
3. Enclosed circuit breakers.
4. Motor starters.
5. Push-button stations.
6. Contactors.
7. Control devices.

END OF SECTION 260553

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes the following lighting control devices:

1. Outdoor photoelectric switches.
2. Lighting contactors.

B. Related Sections include the following:

1. CSI Division 26 Section 262726, "Wiring Devices" for wall manual light switches.
2. CSI Division 26 Section 265100, "Interior Lighting".
3. CSI Division 26 Section 265600, "Exterior Lighting".

1.2 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20 – 1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: Include dimensions and data on features, components, and ratings for lighting control devices.

1. Spare Parts: Include name, address, and telephone number of in-state supplier of spare parts. No out-of-state suppliers shall be permitted.

C. Shop Drawings:

1. Interconnection diagrams showing field-installed wiring.

D. Field quality-control test reports.

E. Maintenance Data: For lighting control devices to include in maintenance manuals specified in Form 816 Article 1.20 – 1.08.14 subsection 2 and described in NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS.

1.3 QUALITY ASSURANCE:

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, for their indicated use and installation conditions by a testing agency acceptable to authorities having jurisdiction.

B. Obtain lighting control devices from a single source with total responsibility for compatibility of lighting control system components specified in this Section.

C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 OUTDOOR PHOTOELECTRIC SWITCHES:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Area Lighting Research, Inc.; Tyco Electronics.
2. Lithonia Lighting; Acuity Lighting Group, Inc.
3. Square D; Schneider Electric.
4. Watt Stopper (The).

B. Description: Solid state, with DPST dry contacts rated for 1800 VA to operate connected load, relay, or contactor coils; complying with UL 773.

1. Light-Level Monitoring Range: 1.5 to 10 fc, with an adjustment for turn-on and turn-off levels within that range.
2. Time Delay: 30-second minimum, to prevent false operation.
3. Lightning Arrester: Air-gap type.
4. Mounting: As shown on plans.

2.2 LIGHTING CONTACTORS:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Watt Stopper (The).
2. GE Industrial Systems; Total Lighting Control.
3. Hubbell Lighting.
4. Lithonia Lighting; Acuity Lighting Group, Inc..
5. Square D; Schneider Electric.

B. Description: Electrically operated and mechanically held, complying with NEMA ICS 2 and UL 508.

1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 15 percent or less total harmonic distortion of normal load current).

2. Fault Current Withstand Rating: Equal to or exceeding the available fault current at the point of installation.
3. Enclosure: Comply with NEMA 250.
4. Provide with control and pilot devices as indicated on drawings and matching the NEMA type specified for the enclosure.

2.3 CONDUCTORS AND CABLES

A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in CSI Division 26 Section 260519, "Low-Voltage Electrical Power Conductors and Cables."

B. Class 1, Classes 2, and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 24 AWG. Comply with requirements in CSI Division 26 Section 260519, “Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Install equipment level and plumb and according to manufacturer’s written instructions.

B. Mount lighting control devices according to manufacturer’s written instructions and requirements in CSI Division 26 Section 260529, “Hangers and Supports for Electrical Systems”.

C. Control Accessibility: Lighting controls must be within the room and readily accessible. This means visible and easily operated by the occupants of the space.

D. Minimum number of controls: At least one control must be provided for each 1500 watts of connected lighting.

E. Mounting heights indicated are to bottom of unit for suspended devices and to center of unit for wall-mounting devices.

3.2 CONTACTOR INSTALLATION:

A. Mount mechanically held lighting contactors with elastomeric isolator pads, to eliminate structure-borne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.3 WIRING INSTALLATION:

A. Wiring Method: Comply with CSI Division 26 Section 260519, "Low-Voltage Electrical Power Conductors and Cables." and CSI Division 26 Section 260533, “Raceway and Boxes for Electrical Systems”.

B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.

C. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

E. Ground equipment.

3.4 IDENTIFICATION:

A. Identify components and power and control wiring according to CSI Division 26 Section 260533, "Identification for Electrical Systems."

1. Identify controlled circuits in lighting contactors.
2. Identify circuits or luminaries controlled by photoelectric sensors.

B. Label contactors with a unique designation.

3.5 FIELD QUALITY CONTROL:

A. Schedule visual and mechanical inspections and electrical tests with a least seven calendar days’ advance.

B. Electrical Tests: Use particular caution when testing devices containing solid-state components. Perform the following according to manufacturer’s written instructions:

1. Continuity tests of circuits.
2. Operational Tests: Set and operate devices to demonstrate their functions and capabilities in a methodical sequence that cues and reproduces actual operating functions. Note: Due to room conditions it may be necessary for the Contractor to make adjustments, change the location or type of sensor to obtain proper operation and coverage of the system in each room and should therefore make labor allowance for such changes and adjustments.

a. Include testing of devices under conditions that simulate actual operational conditions. Record control settings, operations, cues, and functional observations.

C. Correct deficiencies, make necessary adjustments, and retest. Verify that specified requirements are met.

D. Lighting control devices that fail tests and inspections are defective work.

E. Test labeling: After satisfactory completion of tests and inspections, apply a label to tested components indicating test results, date, and responsible agency and representative.

F. Reports: Written reports of tests and observations. Record defective materials and workmanship and unsatisfactory test results. Record repairs and adjustments.

3.6 CLEANING:

A. Cleaning: Clean equipment and devices internally and externally using methods and materials recommended by manufacturers, and repair damage finishes.

END OF SECTION 260923

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes lighting and power panelboards and associated auxiliary equipment rated 600 V and less.

B. Related CSI Sections include the following:

1. Division 26 Section 260553, "Identification for Electrical Systems" for labeling materials.

1.2 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20 – 1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For each type of panelboard, accessory item, and component specified.

1. Spare Parts: Include name, address, and telephone number of in-state supplier of spare parts. No out-of-state suppliers shall be permitted.

C. Shop Drawings: For panelboards. Include dimensioned plans, sections, and elevations. Show tabulations of installed devices, major features, and voltage rating. Include the following:

1. Enclosure type with details for types other than NEMA 250, Type 1.
2. Bus configuration and current ratings.
3. Short-circuit current rating of panelboard.
4. Features, characteristics, ratings, and factory settings of individual protective devices and auxiliary components.
5. Wiring Diagrams: Details of schematic diagram including control wiring and differentiating between manufacturer-installed and field-installed wiring.

D. Quality Assurance Submittals:

1. Qualification Data: For firms and persons specified in Part 1.4, “Quality Assurance.”
2. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

E. Maintenance Data: For panelboard components to include in the operational and maintenance manuals specified in Article 1.20 – 1.08.14 subsection 2 and described in NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS. Include manufacturer's written instructions for testing circuit breakers.

1.3 QUALITY ASSURANCE:

A. Listing and Labeling: Provide products specified in this Section that are listed and labeled.

1. The Terms “Listed” and “Labeled”: As defined in the NEC, Article 100.
2. Comply with NFPA 70.
3. Comply with NEMA PB 1.

1.4 COORDINATION:

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.

1.5 SPARE PARTS:

A. Furnish to the Engineer spare parts described below that match products installed and that are packaged with protective covering for storage and identified with labels described contents.

1. Keys: 6 spares of each type for new panelboard cabinet lock.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. American Circuit Breaker Corp.
2. Eaton Corp.; Westinghouse & Cutler-Hammer Products.
3. General Electric Co.; Electrical Distribution & Control Div.
4. Siemens Energy & Automation, Inc.
5. Square D Co.

2.2 PANELBOARD FABRICATION:

A. Enclosures: Flush- or surface-mounted cabinets as indicated. NEMA PB 1, Type 1, unless otherwise indicated to meet environmental conditions at installed location.

1. Outdoor Locations: NEMA 250, Type 3R.
2. Salt Shed: NEMA 250, Type 4X, stainless steel.
3. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
4. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7C.

B. Directory Frame: Metal, mounted inside each panelboard door.

C. Bus: Hard drawn copper of 98 percent conductivity.

D. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors. Bonded to box.

2.3 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS:

A. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

B. Doors: In panelboard front, with concealed hinges. Secure with flush catch and tumbler lock, all keyed alike.

2.4 DISTRIBUTION PANELBOARDS:

A. Doors: In panelboard front, except omit in fusible-switch panelboard, unless otherwise indicated. Secure door with vault-type latch with tumbler lock, all keyed alike.

B. Branch-Circuit Breakers: Where overcurrent protective devices are indicated to be circuit breakers, use bolt-on circuit breakers, except circuit breakers 225-A frame size and greater may be plug-in type where individual positive-locking device requires mechanical release for removal.

2.5 OVERCURRENT PROTECTIVE DEVICES:

A. Molded-Case Circuit Breaker: NEMA AB 1, handle lockable.

1. Characteristics: Frame size, trip rating, number of poles, and auxiliary devices as indicated and interrupting capacity rating to meet available fault current.
2. Application Listing: Appropriate for application, including Type SWD for switching High-intensigy discharge lighting loads and Type HACR for heating, air-conditioning, and refrigerating equipment.

3. Circuit Breakers, 200 A and Larger: Trip units interchangeable within frame size.
4. Circuit Breakers, 400 A and Larger: Field-adjustable short-time and continuous current settings.
5. Current-Limiting Trips: Where indicated, let-through ratings less than NEMA FU 1, Class RK-5.
6. Current Limiters: Where indicated, integral fuse listed for circuit breaker.
7. Lugs: Mechanical lugs and power-distribution connectors for number, size, and material of conductors indicated.
8. Shunt Trip: Where indicated.

B. Fusible Switch: NEMA KS 1, Type HD, clips to accommodate specified fuses, handle lockable.

2.6 ACCESSORY COMPONENTS AND FEATURES:

A. Accessory Set: Include tools and miscellaneous items as required for overcurrent protective device test, inspection, maintenance, and operation.

B. Portable Test Set: Arranged to permit testing of functions of solid-state trip devices without removal from panelboard.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Install panelboards and accessory items according to NEMA PB 1.1.

B. Mounting Heights: Center of panelboard shall be at 48 inches above finished floor, unless otherwise indicated.

C. Mounting: Plumb and rigid without distortion of box. Mount flush panelboards uniformly flush with wall finish.

D. Circuit Directory: Type directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing.

E. Install filler plates in unused spaces.

F. Wiring in Panelboard Gutters: Arrange conductors into groups, and bundle and wrap with wire ties after completing load balancing.

3.2 IDENTIFICATION:

A. Identify field-installed wiring and components and provide warning signs as specified in CSI Division 26 Section 260553, "Identification for Electrical Systems."

B. Panelboard Nameplates: Label each panelboard with engraved laminated-plastic or metal nameplates mounted with corrosion-resistant screws.

3.3 GROUNDING:

A. Make equipment grounding connections for panelboards as specified in CSI Division 26, Section 260526, "Grounding and Bonding for Electrical Systems."

3.4 CONNECTIONS:

A. Tighten electrical connectors and terminals, including grounding connections, according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.5 FIELD QUALITY CONTROL:

A. Prepare for acceptance tests as follows:

1. Make insulation-resistance tests of each panelboard bus, component, and connecting supply, feeder, and control circuits.
2. Make continuity tests of each circuit.

B. Testing: After installing panelboards and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

1. Procedures Perform each visual and mechanical inspection and electrical test stated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers and as specified by the manufacturer’s recommendations. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new units, and retest.

C. Balancing Loads: Contractor shall maintain 20 percent between phase loads within each panelboard during installation, or maintain panel layout according to plans.

3.6 CLEANING:

A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish.

END OF SECTION 262416

SECTION 262713 - ELECTRICITY METERING

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes electricity-metering components and coordination with electrical utilities United Illuminating, Co. (UI) and communication utility American Telephone and Telegraph, Inc. (AT&T).

1.2 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR SUBMITTALS.

B. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes. Describe electrical characteristics, features, and operating sequences, both automatic and manual. Include the following:

1. Electricity-metering equipment.

Spare Parts: Include name, address, and telephone number of in-state supplier of spare parts. No out-of-state suppliers shall be permitted.

C. Shop Drawings for Electricity-Metering Equipment:

1. Dimensioned plans and sections or elevation layouts.
2. Wiring Diagrams: Power, signal, and control wiring specific to this Project. Identify terminals and wiring designations and color codes to facilitate installation, operation, and maintenance. Indicate recommended types, wire sizes, and circuiting arrangements for field-installed wiring, and show circuit protection features.
3. Mounting and anchoring devices recommended by manufacturer to resist seismic forces.

D. Manufacturer Seismic Qualification Certification for Electricity-Metering Equipment: Submit certification that equipment components and their mounting and anchorage provisions have been designed to remain in place without separation of any parts or loosening of factory-made connections when subjected to the seismic forces. Include the following:

1. Basis for Certification: Indicate whether certification is based on actual test of assembled components or on calculations.
2. Detailed description of equipment mounting and anchorage devices on which the certification is based and their installation requirements.

E. Field quality-control test reports.

F. Maintenance Data: For electricity-metering equipment to include in emergency, operation, and maintenance manuals specified in Form 816 Article 1.20-1.08-14 subsection 2 and described in NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS.

1.3 QUALITY ASSURANCE:

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.4 DELIVERY, STORAGE, AND HANDLING:

A. Receive, store, and handle modular meter center as specified in NECA 400.

1.5 UI COORDINATION:

A. Coordinate electrical service connections to components furnished by utility companies.

1. Coordinate installation and connection of exterior underground utilities and services, including provision for electricity-metering components.
2. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.
3. Coordinate the installation of new transformer by minimizing the power outage to the existing service.

B. Electrical Service Salt Shed: UI shall furnish and install a pole with transformers rated to supply 120/240Y Volts, single phase power for both the proposed salt shed and the existing maintenance facility. Approximate location of the proposed pole and pole mounted transformer is shown on the plans. The Contractor shall furnish and install all conduit, pull lines, 90 degree conduit sweeps, stand-off brackets, weatherhead, grounding, conductors, etc. UI shall furnish and install 35’ support pole for the electrical service entrance conductors in the location indicated on the contract plans. The Contractor shall comply with UI requirements. The Contractor shall furnish and install a UI approved meter socket and all the conductors and conduit extensions as required leaving the system in complete working order for the proposed Salt Shed. UI shall provide the meter.

C. A charge of $2000.00 shall be included in the contract bid price for the service connections to the facility by the utility company and relocation of services for the existing facility. All Contractors will include the above amount for utility service charges in the Contract Bid Price. If it is determined that different charges apply, the Contractor’s bid will be adjusted to reflect the differential by construction order,

provided that the Contractor provides all applicable written billing documentation. The Contractor will be compensated only for the difference between the billed amount and the estimated amount. No additional Contractor markup will be allowed.

D. The Contractor shall call "Call Before You Dig!" at (800) 922-4455, before any excavation takes place. Contractor shall coordinate excavation with paving operation.

1.6 AT&T COORDINATION:

A. Coordinate communication service connections to components furnished by utility company.

1. Coordinate installation and connection of exterior overhead utilities and services.
2. Comply with requirements of authorities having jurisdiction and of utility company providing communication services.
3. Coordinate the installation of communication conductors on the proposed utility pole while minimizing the outage to the existing service.

B. Communication Service Maintenance building: AT&T shall furnish and install communication service conductors on the proposed utility pole. AT&T will remove the existing communication service conductors. The contractor shall supply and install an 8' mast arm on the existing building (location indicated on the plans) for the communications conductors.

C. There are no charges for this work. If it is determined that different charges apply, the Contractor's bid will be adjusted to reflect the differential by construction order, provided that the Contractor provides all applicable written billing documentation. The Contractor will be compensated only for the difference between the billed amount and the estimated amount. No additional Contractor markup will be allowed.

PART 2 - PRODUCTS

2.1 AVAILABLE MANUFACTURERS:

A. In other portions of Part 2 where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 EQUIPMENT FOR ELECTRICITY METERING:

A. Meter Sockets: Comply with requirements of electrical power utility company.

1. Available Manufacturers:

    a. Cutler-Hammer; Eaton Corporation.
    b. General Electric Company; Electrical Distribution & Control Div.
    c. Siemens Energy & Automation, Inc.
    d. Square D; Schneider Electric.

2. Housing: NEMA 250, Type 1 or 3R enclosure, depending the location.

    a. Structural strength of the housing, its anchorage and component attachment provisions, and anchorage devices recommended for anchoring the housing in place shall be adequate to prevent separation of equipment and its components from their installed positions during a seismic event.

3. Minimum Short-Circuit Rating: 22,000 amperes symmetrical at rated voltage.
4. Main Disconnect Device: Circuit breaker, fully rated for use with downstream feeder and branch circuit breakers.
5. Meter Socket: Type as approved by utility company, with rating coordinated with indicated tenant feeder circuit rating.

PART 3 - EXECUTION

3.1 ELECTRICAL EQUIPMENT INSTALLATION:

A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide the maximum possible headroom.

B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

D. Right of Way: Give to raceways and piping systems installed at a required slope.

3.2 ELECTRICAL SUPPORTING DEVICE APPLICATION:

A. Damp Locations and Outdoors: Hot-dip galvanized materials or nonmetallic, U-channel system components.

B. Dry Locations: Hot-dip galvanized materials.

C. Support Clamps for PVC coated RGSC Raceways: Click-type clamp system.

D. Selection of Supports: Comply with manufacturer's written instructions.

E. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four; minimum of 200-lb design load.

3.3 SUPPORT INSTALLATION:

A. Install supports devices to securely and permanently fasten and support electrical components.

B. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.

C. Install 1/4-inch- diameter or larger threaded steel hanger rods, unless otherwise indicated.

D. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.

E. Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.

F. Simultaneously install vertical conductor supports with conductors.

G. Separately support cast boxes that are threaded to raceways and used for fixture support. Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to raceways on opposite sides of the box and support the raceway with an approved fastener not more than 24 inches from the box.

H. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.

I. Securely fasten electrical items and their supports to the building structure, unless otherwise indicated. Perform fastening according to the following unless other fastening methods are indicated:

1. Wood: Fasten with wood screws or screw-type nails.
2. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
3. New Concrete: Concrete inserts with machine screws and bolts.
4. Steel: Welded threaded studs or spring-tension clamps on steel.
5. Welding to steel structure may be used only for threaded studs, not for conduits, pipe straps, or other items.
6. Light Steel: Sheet-metal screws.
7. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.

3.4 UTILITY COMPANY ELECTRICITY-METERING EQUIPMENT:

A. Conduct all site preparation, excavation and backfill for the installation of the underground facilities including all primary and secondary conduits, etc.

B. Install all conduit per the following:
   a. RGS conduit at all risers.
   b. 90 degree 36" radius : RGSC sweeps at poles and PVC coated RGSC for building penetrations.
   c. RGSC under roadway or paved parking areas.
   d. Size of conduit according to plans.

C. Install equipment according to utility company's written requirements. Provide grounding, empty conduits, and pullwire as required by utility company. Conduits within the building shall not be run in slab unless otherwise indicated.

D. Metering enclosure and conduit per UI specifications. The meter is to be located outside the building wall within 50 feet of the main switch.

E. All service entrance equipment including the appropriate size and type of conduit and service entrance conductors per the NEC and local authority having jurisdiction. Install continuous underground metallic markers during trench backfilling, for exterior underground power, located directly above power lines. Locate 12 inches below finished grade. Identify raceways and cables as noted in CSI Division 26 Section 260553, "Identification for Electrical Systems".

END OF SECTION 262713

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes the following:

1. Receptacles
2. Ground Fault Circuit Interrupter Receptacles
3. Plugs
4. Snap Switches
5. Wall Plates

B. Related CSI Sections include the following:

1. Division 26 Section 260519, "Low-Voltage Electrical Power Conductors and Cables"
2. Division 26 Section 260533, "Raceway and Boxes for Electrical Systems"

1.2 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20 – 1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For receptacles, GFCI receptacles, plugs, snap switches and wall plates.

1.3 QUALITY ASSURANCE:

A. Comply with NFPA 70.

B. UL and NEMA Compliance: Provide wiring devices which are listed and labeled by UL and comply with applicable UL and NEMA standards.

1.4 SEQUENCE AND SCHEDULING:

A. Schedule installation of finish plates after the surface upon which they are installed has received final finish.

PART 2 - PRODUCTS

2.1 WIRING DEVICES:

A. General: Provide specification grade wiring devices, in types, characteristics, colors, and electrical ratings for applications indicated which are UL listed and which comply with NEMA WD 1 and other applicable UL and NEMA standards.

1. General: Wiring devices include receptacles, switches and special outlets installed in raceway or conduit boxes, complete with cover plates. Devices shall conform to NEMA WD-1 and shall be UL approved.
2. All devices of a given type and all finished device plates shall be the products of a single manufacturer.
3. Plugs of types to match the associated receptacle shall be provided with each item of portable equipment as specified in other sections. In addition, are spare plugs to match each special receptacle as herein after specified shall be furnished.

B. Boxes and Pull Boxes: Enclosures: NEMA Type 4X for the salt shed or as indicated on plans. PVC coated boxes, non-metallic boxes, cabinets, and conduit fittings to match conduit systems, approved for use with PVC conduit and PVC coated RGSC (Salt Shed). Cast fittings are not allowed. Use metallic boxes in the maintenance facility and conduit fittings to match conduit systems approved for use with RGSC and EMT. For Calcium Chloride dispensing system installed within the maintenance facility use boxes and enclosures as specified in specification #0177100A or as detailed on the contract plans.

C. Switches:

1. AC tumbler-toggle switches: Meeting minimum requirements of UL 20 and further requirements herein specified and of specification grade, heavy duty, of the type indicated on the plans.

a. Provide switches that operate in any position and are fully enclosed cup type with entire body and cover of molded phenolic, urea or melamine. Do not use fiber, paper or similar insulating material for body or cover.
b. Equip switches with metal mounting yoke with plaster ears, insulating from the mechanism and fastened to the switch body by bolts, screws, rivets or other substantial means that meet test requirements.
c. Provide a green-colored equipment grounding screw on the yoke.
d. Provide the section of yoke normally intended to bear on the surface outside the box with a minimum overall dimension of 3/4 inch, measured at right angles to the longitudinal axis of the yoke.
e. Make switch contacts between silver or silver alloys.
f. Switches shall be side wired with terminal of screw or combination screw-clamp type. Provide access holes for back wiring.

g. Wiring terminals capable of receiving and holding proper wire sizes as shown below:

Switch Rating	Wire Size, AWG No.
20 amperes	12
30 amperes	10

2. Switches for Heavy Duty: Unless specified otherwise, use standard tumble-toggle switches of the AC single unit, toggle type, heavy duty, general use snap switches in accordance with NEMA WD 1 for heavy duty general use type.
3. Switches for Use on Incandescent, Fluorescent, Metal Halide, or High Pressure Sodium Lighting Circuits: Fully rated 20 or 30 amperes at 120 or 240 volts, as indicated on the plans. Actual connected lamp wattage not to exceed the following:

Switch Rating at 120 and 240 Volts	Maximum Wattage Allowed
20 amperes	1,400
30 amperes	2,400

4. Switches for Power Equipment: Switches controlling outlets other than lighting, such as motors less than 1/4 horsepower, may be specification grade, flush type, AC/DC contacts rated ten amperes, 125 volts. Switches controlling straight resistance loads may be snap switches as specified herein, of the proper rating up to 30 amperes at 120-240 volts. Switches used for controlling motors shall be rated for at least the horsepower of the motor controlled.
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

    a. Arrow-Hart Division, Crouse-Hinds Company.
    b. Bryant Electric Company.
    c. Hubbell, Inc.
    d. General Electric.
    e. Pass and Seymour.

D. Receptacles and Plugs:

1. General Use: Grounding duplex type, conforming to NEMA WD-1, configuration 5-20R. Bodies shall be of thermosetting plastic supported on a metal mounting strap. Wiring terminals shall be of the screw type, back or side wired.
2. Ground Fault Interrupter Receptacle: NEMA Designation 5-20R, duplex, two pole, three wire, 20 amperes, 125 volt, ground fault interrupter type with pilot

light to indicate if receptacle is working or faulted (tripped). Do not arrange to protect connected downstream receptacles on same circuit unless called for on plans or approved by Designer. Design units for installation in a 2-3/4-inch-deep outlet box without an adapter.

3. Type G: 250 volt, single phase, 20 amperes, two pole, three wire, grounding type, NEMA Configuration 6-20R.
4. Calcium Chloride motor receptacle: 250 volt, three phase, 30 amperes, two pole, three wire, grounding type NEMA Configuration L6-30R. Rated for 3HP motor.
5. Available Manufacturers: Subject to compliance with requirements, manufacturers of other devices offering products which may be incorporated in the work include, but are not limited to, the following:

    a. Arrow-Hart Division, Crouse-Hinds Company.
    b. Square D Company.
    c. Harvey Hubbell, Inc.

E. Device Plates:

1. All device plates shall be 0.040 inch minimum with struck-up beveled edges, void of sharp corners and burrs.
2. Unless otherwise noted herein and on drawings, all device plates for wall outlets and switches shall be brush satin finish stainless steel for the maintenance area.
3. Receptacle covers for wet locations and for receptacles installed in the salt shed shall be gasketed with a self-closing hinged cover (in-use type).
4. Plate for floor receptacle shall be forged brass with duplex flap type openings and specifically designed for the associated floor box.
5. Plate-Securing Screws: Metal with head color to match plate finish.
6. PVC weatherproof covers shall be provided for all switches in the salt shed.

PART 3 - EXECUTION

3.1 INSTALLATION OF WIRING DEVICES AND ACCESSORIES:

A. Install wiring devices and accessories as indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC and in accordance with recognized industry practices to fulfill project requirements.

B. Coordinate with other Work, including painting, electrical boxes and wiring installations, as necessary to interface installation of wiring devices with other Work.

C. Install wiring devices only in electrical boxes which are clean; free from building materials, dirt, and debris.

D. Protect devices and assemblies during painting. Install wall plates after painting work is completed.

E. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for wiring devices. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Standard 486A. Use properly scaled torque indicating hand tool.

F. Switches and Receptacles: Unless otherwise indicated, mount flush, with long dimension vertical. Wall switches shall be mounted 4’ above finished floor opposite hinge side of door, 4” from door trim, and ganged under one cover where more than one switch is shown. Disconnect switches shall be mounted 5’ above finished floor and receptacles shall be mounted 24” above finished floor, and in office areas unless otherwise noted. Where finned tube radiation exists, mount receptacles 2” above finned tube radiation unless otherwise noted on plans. All wall switches and receptacles shall be flush mounted in finished areas.

3.2 PROTECTION:

A. Protect installed components from damage. Replace damaged items prior to final acceptance.

3.3 FIELD QUALITY CONTROL:

A. Testing: Prior to energizing circuits, test wiring for electrical continuity, and for short-circuits. Ensure proper polarity of connections is maintained. Subsequent to energizing, test wiring devices and demonstrate compliance with requirements, operating each operable device at least six times.

B. Test ground fault interrupter operation with both local and remote fault simulations in accordance with manufacturer recommendations.

C. Remove malfunctioning units, replace with new units, and retest as specified above.

3.4 CLEANING:

A. General: Internally clean devices, device outlet boxes, and enclosures. Replace stained or improperly painted wall plates or devices.

END OF SECTION 262726

SECTION 262813 - FUSES

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:

1. Fuses.

1.2 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20 – 1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For each fuse type specified. Include the following:

1. Descriptive data and time-current curves.
2. Let-through current curves for fuses with current-limiting characteristics.
3. Coordination charts and tables and related data.

Spare Parts: Include name, address, and telephone number of in-state supplier of spare parts. No out-of-state suppliers shall be permitted.

C. Maintenance Data: For tripping devices to include in the operation and maintenance manuals specified in Form 816 Article 1.20 – 1.08.14 subsection 2 and described in NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS.

1.3 QUALITY ASSURANCE:

A. Source Limitations: Obtain fuses from one source and by a single manufacturer.

B. Comply with NFPA 70 for components and installation.

C. Listing and Labeling: Provide fuses specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in the NEC, Article 100.

1.4 SPARE PARTS:

A. Furnish to the Engineer spare parts described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Spare Fuses: Furnish quantity equal to 20 percent of each fuse type and size installed, but not less than 1 set of 3 of each type and size.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering fuses that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper Industries, Inc.; Bussmann Div.
2. Eagle Electric Mfg. Co., Inc.
3. Edison Fuse, Inc.
4. General Electric Co.; Wiring Devices Div.

2.2 CARTRIDGE FUSES:

A. Characteristics: NEMA FU 1, nonrenewable cartridge fuse; class as specified or indicated; current rating as indicated; voltage rating consistent with circuit voltage.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine utilization equipment nameplates and installation instructions to verify proper fuse locations, sizes, and characteristics.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS:

A. Main Service: Class L, fast acting.

B. Main Feeders: Class J, time delay.

C. Motor Branch Circuits: Class RK1, time delay.

D. Other Branch Circuits: Class RK5, non-time delay.

3.3 INSTALLATION:

A. Install fuses in fusible devices as indicated. Arrange fuses so fuse ratings are readable without removing fuse.

3.4 IDENTIFICATION:

A. Install labels complying with requirements for identification specified in CSI Division 26, Section 260553 “Identification for Electrical Systems” and indicate fuse replacement information on inside door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 262813

SECTION 265100 - INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes interior lighting fixtures, lamps, ballasts, and accessories for the complete indoor lighting as shown on plans.

B. Related CSI Sections include the following:

1. Division 26 Section 260519, “Low Voltage Electrical Power Conductors and Cables”.
2. Division 26 Section 260529, “Hangers and Supports for Electrical Systems”.
3. Division 26 Section 260533, "Raceways and Boxes for Electrical Systems".
4. Division 26 Section 260543, “Underground Ducts and Raceways for Electrical Systems”.
5. Division 26 Section 260923, “Lighting Control Devices” for automatic control lighting, including time switches, photoelectric relays, and multipole lighting relays contactors.
6. Division 26 Section 262726, “Wiring Devices.”

C. Description:

1. The lighting system shall operate from 240/120 volts, single phase, three wire, 60 Hertz systems or as called for on the Contract plans. Metal halide luminaires, complete with ballasts, shall be installed utilizing c-channels or as shown on the plans.
2. Panelboards, fixtures, outlets, receptacles, switches and all other applicable lighting system components and details shall be as shown on the plans or as specified.
3. The plans show the location, number, size and type of lighting units and fixture schedule. All fixtures shall be UL listed.
4. Lighting plans are diagrammatic, with fixture outlets located approximately to scale but not dimensioned. Raceways are not generally shown. The Contractor shall check lighting drawings against field conditions and the drawings of other disciplines for interferences and shall select and lay out locations for outlets and obtain approval for final locations from our field Engineer.
5. Fixtures to be installed in wet, damp, moist, or corrosive locations will be acceptable only when designed and manufactured specifically for designated location or shall be UL 595 listed marine fixture if designated as such on the plans. Each part, component, nut, bolt, rivet and spring shall be made of materials of effective corrosion resistance or have been subjected to finishing

treatment which will assure such resistance. Fixtures shall be certified by manufacturer for intended purpose.

1.2 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20 – 1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: Include photometric curves, illustrations, specifications, schedules and material lists with quantities showing complete details of all proposed equipment.

1. Spare Parts: Include name, address, and telephone number of in-state supplier of spare parts. No out-of-state suppliers shall be permitted.

C. Maintenance Data: For interior lighting to include in the operation and maintenance manuals specified in Form 816 Article 1.20-1.08-14 subsection 2 and described in NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS.

1.3 QUALITY ASSURANCE:

A. Comply with applicable local code requirements of the authority having jurisdiction and NEC Articles 220, 410, and 510 as applicable to installation, and construction of interior building lighting fixtures.

B. Comply with UL standards, including UL 486A and B, pertaining to interior lighting fixtures. Provide interior lighting fixtures and components which are UL-listed.

1.4 SEQUENCING AND SCHEDULING:

A. Coordinate with other work including conductors and cable, raceways and boxes, to properly interface installation of interior lighting fixtures with other work.

1.5 COORDINATION:

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them.

1.6 SPARE PARTS:

A. Furnish to the Engineer spare parts described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fifteen percent spare lamps, but not less than 4, of each type and size lamp used in each fixture.

1.7 WARRANTIES:

A. Refer to Form 816 Article 1.20 – 1.06.08 and NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS for additional information.

B. HID lighting systems, consisting of a core and ballast. Starting aid (where required) capacitor and wiring inside HID fixtures shall carry a warranty from the manufacturer covering defects in material and workmanship for five (5) years from the issuance of Certificate of Compliance date of manufacture. All other lighting fixtures and components shall carry a manufacture's warranty covering defects in material and workmanship for a minimum of two (2) years from the issuance of Certificate of Compliance.

C. Replace defective and burned out lamps for a period of one year following the date of Certificate of Compliance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Available Manufacturers: Subject to compliance with CDOT Maintenance requirements, lighting manufacturers offering products that may be incorporated in the work are the following or an approved equal:

1. Holophane
2. Columbia
3. Hubbell
4. Lightolier
5. Lithonia

B. Available Manufacturers: Subject to compliance with CDOT Maintenance requirements, emergency lighting and LED exit sign manufacturers offering products that may be incorporated in the work are the following or an approved equal:

1. Emergilite
2. Lithonia
3. Neo-ray
4. Prescolite
5. Holophane

C. Available Manufacturers: Subject to compliance with CDOT Maintenance requirements, lamp manufacturers offering products that may be incorporated in the work are the following or an approved equal:

1. General Electric
2. Philips
3. Osram (Sylvania)

2.2 MATERIALS:

A. General: Lighting fixtures (luminaires) shall be complete with ballasts, mounting brackets and hardware, lamps, installation accessories, fixture wire, and all accessories as required, as specified in the Fixture Schedule, as shown on the Contract and as required by NEC.

B. Lighting Fixtures: The specified manufacturers and catalog numbers are consistent with lighting fixtures currently utilized at other CDOT facilities.

C. Salt Shed: Interior Salt Shed Fixture – (Type "A)

1. Housing: Smooth, aluminum housing with polyester powder coat finish.
2. Lamp Type: 400 watt metal halide
    a) CRI: 65
    b) Color temperature: 4000 K
3. Ballast Type: Energy saving pulse start ballast. (see section 2.2 F for ballast details.
4. Voltage: 240 Volt
5. Optics: Acrylic prismatic lens
6. Options: 3 foot, conductor cord and water tight NEMA plug.
7. Fuse assembly: Double

D. Pulse Start Ballast for Metal-Halide Lamps: Include the following features unless otherwise indicated:

1. Minimum Starting Temperature: Minus 20 deg F for single-lamp ballasts.
2. Rated Ambient Operating Temperature: 130 deg F.
3. Lamp end-of-life detection and shutdown circuit.
4. Sound Rating: Class A.
5. Total Harmonic Distortion Rating: Less than 20 percent.
6. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
7. Lamp Current Crest Factor: 1.8 or less.
8. Power Factor: 0.90 or higher.
9. Interference: Comply with 47 CFR 18, Ch. 1, Subpart C, for limitations on

electromagnetic and radio-frequency interference for nonconsumer equipment.

10. Protection: Class P thermal cutout.

K. Refractors and Reflectors: All glassware and plastic shall be uniform, free from defects and photometrically tested for distribution by an independent testing laboratory. Plastic diffusers shall be of new virgin-acrylic plastic material. Designer reserves the right to review photometric test.

L. Conduits: Conduit, including hangers and fittings, shall be installed where shown on the Contract Drawings and shall be in accordance with CSI Division 26 Section 260533, "Raceways & Boxes for Electrical Systems".

M. Lamps: All lamps shall be as shown in the Fixture Schedule on the plans.

N. Fixture Wire: Fixture wire for lighting fixtures shall be as specified in CSI Division 26 Section 260519, "Low-Voltage Electrical Power Conductors & Cables."

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine areas and conditions under which lighting fixtures are to be installed, and substrate for supporting lighting fixtures. Notify Engineer in writing of conditions detrimental to proper completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer and with approval of Engineer.

3.2 INSTALLATION:

A. Install all luminaires, lamps and associated supports, fittings, conduit, boxes, wiring and grounding conductors as called for in this section, as shown on the plans, as required and in accordance with the manufacturer's instructions and recommendations.

B. Prior to the issuance of the Certificate of Compliance, thoroughly clean the luminaires, lamps and accessories and shall replace all lamps which were used for a period equivalent to 50 percent or more of their rated life, at no additional cost.

C. All fixtures shall be aligned and directed as shown or so as to illuminate the desired area properly. Fixtures shall be directly and rigidly mounted on their supporting structures using bolted connections. The conduit system shall not be used to support fixtures unless called for.

D. Where aluminum contacts concrete or dissimilar metal, separate contact surfaces with gasket, nonabsorptive tape or bituminous coating to prevent corrosion. Use stainless steel fasteners.

E. Fixtures shall be mounted plumb, level and in straight lines. Group-mounted fluorescent fixtures shall appear as one unit. Rows of fixtures shall be installed accurately as to line and level. Fastenings and supports shall be firmly set so that the fixtures will not be distorted by handling incident to normal maintenance. All parts including lamps shall be secured to prevent falling or dislocation. The use of tong type hangers for suspending fluorescent fixtures is prohibited.

F. Lighting fixtures shall be positioned to clear all obstructions.

G. All auxiliary steel, supports and brackets of all kinds for safety erecting the fixtures shall be furnished and installed in place by the Installer.

H. Where coordination with other equipment is necessary some departure from the locations shown may be permitted on approval of Engineer.

I. All lighting units when installed shall be set true and shall be free of leaks, warps, dents or other imperfections.

J. All lighting fixtures shall be directly grounded to the equipment grounding system by means of a conductor of size not less than that required by NEC. If insulated, the ground conductor insulation shall be colored green.

K. The Installer shall fill in circuit designations on the panelboard directory as soon as permanent connections are completed.

L. Taps and splices shall be made with insulated wire nut connectors of the setscrew or spring type or with indent compression type connectors. Solid wire shall be terminated at screw type connections by looping around the terminal screw. At panelboards, solid wire may be terminated using screw type pressure terminals; stranded wire may be terminated using saddle type pressure terminals.

M. All fixtures shall be installed for seismic requirements.

3.3 GROUNDING:

A. Provide equipment grounding connections for interior lighting fixtures as indicated under CSI Division 26 Section 260526, "Grounding and Bonding for Electrical Systems".

3.4 FIELD QUALITY CONTROL:

A. The Installer is not responsible for the foot candles of illumination provided by the completed systems. However, if after the lighting is installed and in operation, any areas are noted which are obviously under or overlit, the Installer shall promptly advise the Engineer.

B. Lamps furnished for temporary use during the construction period shall be similar to those shown on the fixture schedule. Fixtures shall be protected and maintained in good condition during construction. At the completion of the work, all fixtures shall be cleaned, inspected, and repaired, or replaced if damaged, and a complete set of new incandescent lamps shall be installed.

C. Perform an insulation resistance test on the lighting wiring before energizing and verify correct operation.

3.5 ADJUSTING AND CLEANING:

A. Clean interior lighting fixtures of dirt and construction debris upon completion of installation. Clean finger-prints and smudges from lenses.

B. Protect installed fixtures from damage during remainder of construction period.

END OF SECTION 265100

SECTION 265600 - EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes exterior lighting fixtures, lamps, ballasts, poles, and accessories for the complete outdoor lighting as shown on plans.

B. Related CSI Sections include the following:

1. Division 26, Section 260519, “Low Voltage Electrical Power Conductors and Cables”.
2. Division 26, Section 260529, “Hangers and Supports for Electrical Systems”.
3. Division 26, Section 260533, "Raceways and Boxes for Electrical Systems".
4. Division 26, Section 260543, “Underground Ducts and Raceways for Electrical Systems”.
5. Division 26, Section 260923, “Lighting Control Devices.”
6. Division 26, Section 262726, “Wiring Devices.”

C. Description:

1. The lighting system shall operate from 240/120 volts, single phase, three wire, 60 Hertz systems or as called for on the project plans. High-pressure sodium and metal halide luminaires, complete with ballasts, shall be installed as shown on the plans.
2. Panelboards, fixtures, outlets, receptacles, switches and all other applicable lighting system components and details shall be as shown on the plans or as specified.
3. The plans show the location, number, size and type of lighting units and fixture schedule. All fixtures shall be UL listed.
4. Lighting plans are diagrammatic, with fixture outlets located approximately to scale but not dimensioned. Raceways are not generally shown. The Installer shall check lighting drawings against field conditions and the drawings of other disciplines for interferences and shall select and lay out locations for outlets and obtain approval for final locations from Engineer.
5. Fixtures to be installed in wet, damp, moist, corrosive or outdoor locations will be acceptable only when designed and manufactured specifically for outdoor, rugged, weatherproof services. Each part, component, nut, bolt, rivet and spring shall be made of materials of effective corrosion resistance or have been subjected to finishing treatment which will assure such resistance. Fixtures shall be certified by manufacturer for intended purpose.

1.2 SUBMITTALS:

A. Submit the following in accordance with Form 816 Article 1.20 – 1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: Include photometric curves, illustrations, specifications, schedules and material lists with quantities showing complete details of all proposed equipment.

1. Spare Parts: Include name, address, and telephone number of in-state supplier of spare parts. No out-of-state suppliers shall be permitted.

C. Maintenance Data: For interior lighting to include in the operation and maintenance manuals specified in Form 816 Article 1.20-1.08-14 subsection 2 and described in NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS.

1.3 QUALITY ASSURANCE:

A. Comply with applicable local code requirements of the authority having jurisdiction and NEC Articles 225, 250, and 410 as applicable to installation, and construction of exterior building lighting fixtures.

B. Comply with requirements of UL standards, including Standards 484A and B, pertaining to exterior lighting fixtures. Provide exterior lighting fixtures and components which are UL-listed and labeled.

C. Comply with ANSI C2, "National Electrical Safety Code."

1.4 SEQUENCING AND SCHEDULING:

A. Coordinate with other work including conductors and cable, raceways and boxes, to properly interface installation of interior lighting fixtures with other work.

1.5 STORAGE AND HANDLING OF POLES:

A. General: Store poles on decay-resistant treated skids at least 1 ft above grade and vegetation. Support pole to prevent distortion and arrange to provide free air circulation.

B. Metal Poles: Retain factory-applied pole wrappings until just before pole installation. For poles with nonmetallic finishes, handle with web fabric straps.

1.6 SPARE PARTS:

A. Furnish to the Engineer spare parts described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fifteen percent spare lamps, but not less than 4, of each type and size lamp used in each fixture.

1.7 WARRANTIES:

A. Refer to Form 816 Article 1.20-1.06.08 and NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS for additional information.

B. Warranty period: 5 years from the issuance of Certificate of Compliance for HID fixture, factory-installed electrical component system; a minimum of two years for other luminaire components. The warranty shall cover both parts and labor for the complete warranty period.

C. Replace defective and burned out lamps for a period of one year following the date of Certificate of Compliance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Available Manufacturers: Subject to compliance with CDOT Maintenance requirements, lighting manufacturers offering products that may be incorporated in the work are the following or an approved equal:

1. Holophane
2. Lithonia
3. Hubbell

B. Available Manufacturers: Subject to compliance with CDOT Maintenance requirements, lamp manufacturers offering products that may be incorporated in the work are the following or an approved equal:

1. General Electric
2. Philips
3. Osram (Sylvania)

2.2 MATERIALS:

A. General: Lighting fixtures (luminaires) shall be complete with ballasts, mounting brackets and hardware, lamps, installation accessories, fixture wire, and all accessories as required, as specified in the Fixture Schedule, as shown on the Contract plans and as required by NEC.

B. Lighting Fixtures: The specified manufacturers and catalog numbers are consistent with lighting fixtures currently utilized at other CDOT facilities.

C. Ballasts for HID lamps: Shall comply with ANSI C82.4 and UL 1029 and capable of open-circuit operation without reduction of average lamp life. Include the following features unless otherwise indicated:

1. Ballast Circuit: Constant-wattage autotransformer or regulating high-power-factor type.
2. Minimum Starting Temperature: Minus 20 deg F.
3. Normal Ambient Operating Temperature: 104 deg F.
4. Ballasts shall have a power factor of 90% or above and a published ballast factor of "1", for production ballasts.
5. Ballasts shall comply with FCC and NEMA limits governing EMI and RFI and shall not interfere with operation of other normal electrical equipment.
6. Ballasts shall meet any applicable ANSI standards (i.e., harmonic distortion, surge protection, etc.).
7. High pressure sodium lamps shall be HPS auto-regulated magnetic type, designed to operate the HPS lamp within the lamp's trapezoidal wattage/voltage limitations throughout the rated lamp life.
8. Each ballast shall have separate exterior fuse protection. Fixtures shall contain fuse and fuse holder mounted in the ballast compartment, sized as recommended by the ballast manufacturer. Fuses shall provide rapid interruption of short circuits or ground fault current within the fixture or ballast. Fuse protection shall be provided for each type of ballast including metal halide and high pressure sodium.
9. Ballasts shall be per utility list for possible rebate.

D. High-Pressure Sodium Ballasts: Electromagnetic type with solid-state igniter/starter and capable of open-circuit operation without reduction of average lamp life. Igniter/starter shall have an average life in pulsing mode of 10,000 hours at an igniter/starter-case temperature of 90 deg C.

1. Instant-Restrike Device: Integral with ballast, or solid-state potted module, factory installed within fixture and compatible with lamps, ballasts, and mogul sockets up to 150 W.

    a. Restrike Range: 105- to 130-V ac.
    b. Maximum Voltage: 250-V peak or 150-V ac rms.

E. High-Pressure Sodium Lamps: ANSI C78.42, CRI 21 (minimum), CCT color temperature 1900K, and average rated life of 24,000 hours, minimum.

1. Dual-Arc Tube Lamp: Arranged so only one of two arc tubes is lighted at one time and, when power is restored after an outage, the cooler arc tube, with lower internal pressure, lights instantly, providing an immediate 8 to 15 percent of normal light output.

F. Refractors and Reflectors: All glassware and plastic shall be uniform, free from defects and photometrically tested for distribution by an independent testing laboratory. Plastic diffusers shall be of new virgin-acrylic plastic material. Designer reserves the right to review photometric test.

G. Conduits: Conduit, including hangers and fittings, shall be installed where shown on the Contract plans and shall be in accordance with CSI Division 26 Section 260533, "Raceways & Boxes for Electrical Systems."

H. Type “LO”, (Salt Shed) pole mounted “predator-style” site lighting luminaires, are required around the sand pile area. Site luminaires shall be mounted upon luminaire poles consisting of a 20’ tapered aluminum pole, transformer base/handhole, foundation, with bracket arm to accommodate a double fixture.

I. Type “LO” fixture housings shall be constructed of heavy duty die cast, low copper aluminum housing. Housing shall be finished with seven-stage pretreatment and electrostatically applied and baked polyester powder paint. All exposed parts shall be stainless steel. The yoke shall be constructed of stainless steel. Door shall be sealed with hollow core silicone gaskets.

J. Type “LO” fixture Ballasts: Ballasts shall have a high power factor of 90% or above, be copper wound provide full rated wattage to lamp. Electrical components shall be removable and replaceable as a single unit. Each ballast shall be capable of starting and operating a specified lamp at minus 22 degrees Fahrenheit. The ballast shall operate under a +/- 10% line voltage variation. Fixture shall be listed to US safety standards, Wet Locations and Marine outside.

K. Heavy Duty Wall Mounted Wallpack Luminaire with full cut-off optics (Salt Shed) (Fixture Type “B”).

1. Housing: Low copper die cast aluminum
2. Optics: vertical lamp, segmented reflector, maintained lateral throw
3. Light Distribution: Full cutoff, flat glass
4. Wiring: Standard recessed box and surface conduit
5. Paint: 800 series powder paint
6. UL Listing: Suitable for “wet location”

2.3 FIXTURE SUPPORT COMPONENTS:

A. Wind-Load Strength: 110 mph and 1.0 gust factor for total support assembly, including pole, base, and anchorage, where used, to carry the fixtures, supports, and appurtenances at the indicated heights above grade without deflection or whipping.

B. Arm, Bracket, and Tenon Mount Materials: Match the poles.

C. Mountings, Fastenings, and Appurtenances:

1. Corrosion-resistant components compatible with the poles and fixtures that will not cause galvanic action at contact points. Provide mountings that will correctly position the luminaire to provide the indicated light distribution.
2. Type "B" fixtures shall be wall-mounted as shown on Salt Shed plan. Mount wallpack units on flat wooden block on front wall.

D. Pole Shafts:

1. 20 foot pole for sand pile lighting, Round tapered aluminum with transformer base.

E. Pole Bases: Aluminum box-type assembly placed under the pole and used for wiring access or as a breakaway device. Transformer base in locations as indicated.

F. Aluminum Poles: 6063 aluminum alloy. Conform to AASHTO 1994.

G. Metal Pole Grounding Provisions: Welded 3/8-16 threaded lug.

H. Pole-Top Tenons: Fabricated to support the fixtures indicated and securely fastened to the pole top. Equipped with single, double (“2U” style)) bullhorn type tenon mounts and appropriate slip fit connector.

I. Finish: Bronze

J. Wind Rating: 110 MPH with 1.0 Gust Factor

K. Bolt Circle: Per Manufacturer’s Recommendation

L. Foundation: Per plan detail. Bolt circle per pole manufacturer recommendation.

M. Anchor bolts: Galvanized “J” bolt, sized in accordance with pole manufacturer’s recommendation. Pole shall be rated to withstand 110 MPH winds and a 1.0 gust factor.

2.4 LAMPS:

A. Conform to ANSI Standards, C78 series, applicable to each type of lamp as indicated on the drawings, and recommended by the manufacturer.

2.5 FINISH:

A. Metal Parts: Manufacturer's standard finish except as otherwise indicated. For fixtures mounted on poles, match finish of poles and luminaire fixtures. Finish applied over corrosion-resistant primer, free of streaks, runs, holidays, stains, blisters, and similar defects. Remove poles, fixtures, and accessories showing evidence of corrosion or finish failure during Project warranty period and replace with new items.

B. Other Parts: Manufacturer's standard finish except as otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine areas and conditions under which lighting fixtures are to be installed, and substrate for supporting lighting fixtures. Notify Engineer in writing of conditions detrimental to proper completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer and with approval of Engineer.

3.2 INSTALLATION:

A. Install all luminaires, lamps and associated supports, fittings, conduit, boxes, wiring and grounding conductors as called for in this section, as shown on the plans, as required and in accordance with the manufacturer's instructions and recommendations.

B. Prior to the issuance of the Certificate of Compliance, thoroughly clean the luminaires, lamps and accessories and shall replace all lamps which were used for a period equivalent to 50 percent or more of their rated life, at no additional cost.

C. All fixtures shall be aligned and directed as shown or so as to illuminate the desired area properly. Fixtures shall be directly and rigidly mounted on their supporting structures using bolted connections. The conduit system shall not be used to support fixtures unless called for.

D. Where aluminum contacts concrete or dissimilar metal, separate contact surfaces with gasket, non-absorptive tape or bituminous coating to prevent corrosion. Use stainless steel fasteners.

E. Fixtures shall be mounted plumb, level and in straight lines. Rows of fixtures shall be installed accurately as to line and level. Fastenings and supports shall be firmly set so that the fixtures will not be distorted by handling incident to normal maintenance. All parts including lamps shall be secured to prevent falling or dislocation.

F. Lighting fixtures shall be positioned to clear all obstructions.

G. All auxiliary steel, supports and brackets of all kinds for safety erecting the fixtures shall be furnished and installed in place by the Installer.

H. Where coordination with other equipment is necessary some departure from the locations shown may be permitted on approval of Engineer.

I. All lighting units when installed shall be set true and shall be free of leaks, warps, dents or other imperfections.

J. All lighting fixtures shall be directly grounded to the equipment grounding system by means of a conductor of size not less than that required by NEC. If insulated, the ground conductor insulation shall be colored green.

K. The Installer shall fill in circuit designations on the panelboard directory as soon as permanent connections are completed.

L. Taps and splices shall be made with insulated wire nut connectors of the setscrew or spring type or with indent compression type connectors. Solid wire shall be terminated at screw type connections by looping around the terminal screw. At panelboards, solid wire may be terminated using screw type pressure terminals; stranded wire may be terminated using saddle type pressure terminals.

M. Install poles plumb. Provide shims or double nits to adjust plumb. Grout around each base.

N. All fixtures shall be installed for seismic requirements.

3.3 GROUNDING:

A. Provide equipment grounding connections for interior lighting fixtures as indicated under CSI Division 26 Section 260526, "Grounding and Bonding for Electrical Systems."

3.4 FIELD QUALITY CONTROL:

A. The Installer is not responsible for the foot candles of illumination provided by the completed systems. However, if after the lighting is installed and in operation, any

areas are noted which are obviously under or overlit, the Installer shall promptly advise the Engineer.

B. Lamps furnished for temporary use during the construction period shall be similar to those shown on the fixture schedule. Fixtures shall be protected and maintained in good condition during construction. At the completion of the work, all fixtures shall be cleaned, inspected, and repaired, or replaced if damaged, and a complete set of new incandescent lamps shall be installed.

3.5 ADJUSTING AND CLEANING:

A. Clean lighting fixtures of dirt and construction debris upon completion of installation. Clean finger-prints and smudges from lenses.

B. Protect installed fixtures from damage during remainder of construction period.

C. Adjust aim-able fixtures to provide required light intensities.

END OF SECTION 265600

PERMITS

DEEP Flood Management Certification
DEEP Coastal Consistency Review
Registration for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

Connecticut Department of Energy & Environmental Protection

CPPU USE ONLY
App #:
Doc #:
Check #:

Permit Application Transmittal Form

Please complete this transmittal form in accordance with the instructions in order to ensure the proper handling of your application(s) and the associated fee(s). Print legibly or type.

Part I: Applicant Information:

- ***If an applicant is a corporation, limited liability company, limited partnership, limited liability partnership, or a statutory trust, it must be registered with the Secretary of State. If applicable, applicant's name shall be stated ***exactly*** as it is registered with the Secretary of State.***
- *If an applicant is an individual, provide the legal name (include suffix) in the following format: First Name; Middle Initial; Last Name; Suffix (Jr, Sr., II, III, etc.).*

Applicant: **Connecticut Department of Transportation**

Mailing Address: **District 3, 140 Pond Lily Avenue**

City/Town: **New Haven** State: **CT** Zip Code: **06515**

Business Phone: **203-389-3020** ext.: Fax: **203-389-3169**

Contact Person: **Mark D. Rolfe** Phone: **203-389-3100** ext.

E-Mail: **Mark.Rolfe@ct.gov**

Applicant (check one): ☐ individual ☐ ***business entity** ☐ federal agency ☒ state agency ☐ municipality ☐ tribal

***If a business entity, list type (e.g., corporation, limited partnership, etc.):

☐ Check if any co-applicants. If so, attach additional sheet(s) with the required information as supplied above.

Please provide the following information to be used for *billing purposes only*, if different:

Company/Individual Name:

Mailing Address:

City/Town: State: Zip Code:

Contact Person: Phone: ext.

Part II: Project Information

Brief Description of Project: *(Example: Development of a 50 slip marina on Long Island Sound)*

Construction of a Salt Storage Shed, replacement of calcium chloride tank and site improvements.

Location (City/Town): **New Haven**

Other Project Related Permits (*not* included with this form):

Permit Description	Issuing Authority	Submittal Date	Issuance Date	Denial Date	Permit #
FM	**DEEP**	**9/2012**			
CAM	**DEEP**	**9/2012**			

Part III: Individual Permit Application and Fee Information

New, Mod. or Renew	Individual Permit Applications	Initial Fees	No. of Permits Applied For	Total Initial Fees	Original + Required Copies
	AIR EMISSIONS				
	New Source Review	$940.00			1 + 0
	Title V Operating Permits	none			1 + 0
	Title IV	none			1 + 0
	Clean Air Interstate Rule (CAIR)	none			1 + 0
	WATER DISCHARGES				
	To Groundwater	$1300.00			1 + 1
	To Sanitary Sewer (POTW)	$1300.00			1 + 1
	To Surface Water (NPDES)	$1300.00			1 + 2
	INLAND WATER RESOURCES-multiple permits 1 + 6 total copies				
	Dam Construction	none			1 + 2
	Flood Management Certification	none			1 + 1
	Inland 401 Water Quality Certification	none			1 + 5
	Inland Wetlands and Watercourses	none			
	Stream Channel Encroachment Lines	★			
	Water Diversion	★			1 + 5
	OFFICE OF LONG ISLAND SOUND PROGRAMS				
	Certificate of Permission	$375.00			1 + 3
	Coastal 401 Water Quality Certification	none			1 + 3
	Structures and Dredging/Tidal Wetlands	$660.00			1 + 3
	WASTE MANAGEMENT				
	Aerial Pesticide Application	★			1 + 2
	Aquatic Pesticide Application	$200.00			1 + 0
	CGS Section 22a-454 Waste Facilities	★			1 + 1
	Hazardous Waste Treatment, Storage and Disposal Facilities	★			1 + 1
	Marine Terminal License	$125.00			1 + 0
	Stewardship	$4000.00			1 + 1
	Solid Waste Facilities	★			1 + 1
	Waste Transportation	★			1 + 0
		Subtotal ➡			
	GENERAL PERMITS and AUTHORIZATIONS	Subtotals Page 3 ➡	1		
	Enter subtotals from Part IV, pages 3 & 4 & 5 of this form	Subtotals Page 4 ➡			
		Subtotals Page 5 ➡			
		TOTAL ➡	1	625.00	
	☐ Indicate whether municipal discount or state waiver applies.	Less Applicable Discount ➡			
		AMOUNT REMITTED ➡		625.00	

Check # ➡ _____ Check or money order should be made payable to: "Department of Energy and Environmental Protection"

★ **See fee schedule on individual application.**

Part IV: General Permit Registrations and Requests for Other Authorizations Application and Fee Information

✓	General Permits and Other Authorizations	Initial Fees	No. of Permits Applied For	Total Initial Fees	Original + Required Copies
	AIR EMISSIONS				
☐	Limit Potential to Emit from Major Stationary Sources of Air Pollution	$2760.00			1 + 0
☐	Ionizing Radiation Registration	$200.00			1 + 0
☐	Emergency/Temporary Authorization	★★			★★
☐	Other, (please specify):				
	WATER DISCHARGES				
☐	Domestic Sewage	$500.00			1 + 0
☐	Food Processing Wastewater	$500.00			1 + 0
☐	Groundwater Remediation Wastewater to a Sanitary Sewer	$500.00			1 + 0
	Groundwater Remediation Wastewater to a Surface Water				
☐	Registration Only	$625.00			1 + 0
☐	Approval of Registration by DEP	$1250.00			
	Hydrostatic Pressure Testing Wastewater				
☐	Registration Only	$625.00			1 + 0
☐	Approval of Registration by DEP (natural gas pipelines)	$1250.00			
	Miscellaneous Discharges of Sewer Compatible Wastewater				
☐	Flow < 5,000 gpd and fire sprinkler system testwater	$625.00			1 + 1
☐	Flow > 5,000 gpd	$1250.00			
☐	Non-Contact Cooling and Heat Pump Water (Minor)	$625.00			1 + 1
☐	Photographic Processing Wastewater (Minor)	$100.00			1 + 0
☐	Printing & Publishing Wastewater (Minor)	$500.00			1 + 0
	Flow < 40 gpd	$100.00			
☐	Stormwater Associated with Commercial Activities	$500.00			1 + 0
	Stormwater Associated with Industrial Activities				
☐	<500 employees–see general permit for additional requirements	$500.00			1 + 0
	>500 employees–see general permit for additional requirements	$1000.00			
	Stormwater & Dewatering Wastewaters-Construction Activities				
☒	5 – 10 acres	$625.00	1		1 + 0
☐	> 10 acres	$1250.00			
☐	Stormwater from Small Municipal Separate Storm Sewer Systems (MS4)	$250.00			1 + 0
☐	Swimming Pool Wastewater - Public Pools and Contractors	$500.00			1 + 0
☐	Tumbling or Cleaning of Parts Wastewater (Minor)	$1000.00			1 + 1
	Vehicle Maintenance Wastewater				
☐	Registration Only	$625.00			1 + 0
☐	Approval of Registration by DEP	$1250.00			
☐	Water Treatment Wastewater	$625.00			1 + 0
☐	Emergency/Temporary Authorization - Discharge to POTW	$1500.00			1 + 0
☐	Emergency/Temporary Authorization - Discharge to Surface Water	$1500.00			1 + 0
☐	Emergency/Temporary Authorization - Discharge to Groundwater	$1500.00			1 + 0
☐	Other, (please specify):				
	Note: Carry subtotals over to Part III, page 2 of this form. Subtotal ➡		1		

★★ Contact the specific permit program for this information (Contact numbers are provided in the instructions).

Part IV: General Permit Registrations and Requests for Other Authorizations (continued)

✓	General Permits and Other Authorizations	Initial Fees	No. of Permits Applied For	Total Initial Fee	Original + Required Copies
	AQUIFER PROTECTION PROGRAM				
☐	Registration for Regulated Activities	$625.00			1 + 0
☐	Permit Application to Add a Regulated Activity	$1250.00			1 + 0
☐	Exemption Application from Registration	$1250.00			1 + 0
	INLAND WATER RESOURCES				
☐	Dam Safety Repair and Alteration	$1000.00			1 + 2
☐	Diversion of Water for Consumptive Use: Reauthorization Categories	$1000.00			1 + 2
☐	Diversion of Water for Consumptive Use: Authorization Required	$2500.00			1 + 5
☐	Diversion of Water for Consumptive Use: Filing Only	$1500.00			1 + 4
☐	Habitat Conservation	$1000.00			1 + 2
☐	Lake, Pond and Basin Dredging	$1000.00			1 + 2
☐	Minor Grading	$1000.00			1 + 2
☐	Minor Structures	$1000.00			1 + 2
☐	Utilities and Drainage	$1000.00			1 + 2
☐	Emergency/Temporary Authorization	★★			★★
☐	Other, (please specify):				
	OFFICE OF LONG ISLAND SOUND PROGRAMS				
☐	4/40 Docks	$700.00			1 + 1
☐	Beach Grading	$100.00			1 + 1
☐	Coastal Remedial Activities Required by Order	$700.00			1 + 1
☐	Marina and Mooring Field Reconfiguration	$700.00			1 + 1
☐	Non-harbor Moorings	$100.00			1 + 1
☐	Osprey Platforms and Perch Poles	none			1 + 1
☐	Pump-out Facilities (no fee for Clean Vessel Act grant recipients)	$100.00			1 + 1
☐	Removal of Derelict Structures	$100.00			1 + 1
☐	Residential Flood Hazard Mitigation	$100.00			1 + 1
☐	Swim Floats	$100.00			1 + 1
☐	Emergency/Temporary Authorization	★★			★★
☐	Other, (please specify):				
	Note: Carry subtotals over to Part III, page 2 of this form.	**Subtotal** ➡			

★ **See fee schedule on registration/application.** ★★ **Contact the specific permit program for this information.**

Part IV: General Permit Registrations and Requests for Other Authorizations (continued)

✓	General Permits and Other Authorizations	Initial Fees	No. of Permits Applied For	Total Initial Fee	Original + Required Copies
	WASTE MANAGEMENT				
☐	Addition of Grass Clippings at Registered Leaf Composting Facilities	$500.00			1 + 0
☐	Asbestos Disposal Authorization	$300.00			1 + 0
	Certain Recycling Facilities				
☐	Drop-site Recycling Facility	$200.00			1 + 0
☐	Limited Processing Recycling Facility	$500.00			1 + 0
☐	Recyclables Transfer Facility	$500.00			1 + 0
☐	Single Item Recycling Facility	$500.00			1 + 0
	Contaminated Soil and/or Staging Management (Staging/Transfer)				
☐	Registration Only	$250.00			1 + 0
☐	Approval of Registration by DEP	$1500.00			1 + 0
☐	Connecticut Solid Waste Demonstration Project	$1000.00			1 + 0
☐	Disassembling Used Electronics	$400.00			1 + 0
☐	Leaf Composting Facility	none			1 + 1
☐	Municipal Transfer Station	$800.00			1 + 1
☐	One Day Collection of Certain Wastes and Household Hazardous Waste	$1000.00			1 + 0
☐	Special Waste Authorization	$660.00			1 + 0
☐	Storage and Distribution of Two (2) Inch Nominal Tire Chip Aggregate	$500.00			1 + 0
☐	Storage and Processing of Asphalt Roofing Shingle Waste and/or Storage and Distribution of Ground Asphalt Aggregate	★			1 + 0
☐	Storage and Processing of Scrap Tires for Beneficial Use	$1000.00			1 + 0
☐	Emergency/Temporary Authorization	★★			★★
☐	Other, (please specify):				
	REMEDIATION				
☐	In Situ Groundwater Remediation: Enhance Aerobic Biodegradation	★			1 + 2
	Note: Carry subtotals over to Part III, page 2 of this form.	Subtotal ➡			

★See fee schedule on registration/application. ★★Contact the specific permit program for this information.

The Department of Energy and Environmental Protection is an affirmative action/equal opportunity employer and service provider. In conformance with the Americans with Disabilities Act, DEEP makes every effort to provide equally effective services for persons with disabilities. Individuals with disabilities who need this information in an alternative format, to allow them to benefit and/or participate in the agency's programs and services, should call 860-424-3035 or e-mail the ADA Coordinator at DEP.aaoffice@ct.gov. Persons who are hearing impaired should call the State of Connecticut relay number 711.

General Permit Registration Form for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

Please complete this form in accordance with the general permit (DEP-PED-GP-015) in order to ensure the proper handling of your registration. Print or type unless otherwise noted. You must submit the *Permit Application Transmittal Form* (DEP-APP-001) and the registration fee along with this form.

DEP USE ONLY

Application No. _____

Permit No. _____

Facility I.D. _____

Part I: Registration Type

Enter a check mark in the appropriate box identifying the registration type.

This registration is for (check one):	Please identify any existing permit number in the space provided:
☒ A *new* general permit registration	Existing permit number:
☐ A *modification* of an existing general permit	***GSN***

Part II: Fee Information

☒	***Registration only***	A registration fee of $625.00 is to be submitted with *each* registration that you are submitting at least 30 days before the initiation of construction activities.
☐	***Registration and Plan Review***	All construction projects that result in the disturbance of ten or more acres require the submittal of a Stormwater Pollution Control Plan and a $625.00 plan review fee. The plan and the fee must be submitted 30 days prior to initiation of the construction activity. $625.00 registration fee + $625.00 review fee = $1,250.00 total fee

For municipalities, a 50% discount applies. The registration will not be processed without the fee. The fee shall be non-refundable and shall be paid by certified check or money order payable to the Department of Environmental Protection.

Part III: Registrant Information

1. Fill in the name of the registrant(s) as indicated on the *Permit Application Transmittal Form* (DEP-APP-001):

   Registrant: **Connecticut Department of Transportation**

   Phone: **860-594-2000** ext. Fax:

   ☐ Check here if there are co-registrants. If so, label and attach additional sheet(s) with the required information as supplied above.

Part III: Registrant Information (cont.)

2. List primary contact for departmental correspondence and inquiries, if different than the registrant.

   Name: **Mark Rolfe**

   Mailing Address: **140 Pond Lily Avenue**

   City/Town: **New Haven** State: **CT** Zip Code: **06515**

   Business Phone: **860-389-3100** ext. Fax: **860-389-3169**

   Site Phone: Emergency Phone:

   Contact Person: Title:

   Association (e.g. developer, general or site contractor, etc.):

3. List owner of the property on which the activity will take place, if different from registrant:

   Name:

   Mailing Address:

   City/Town: State: Zip Code:

   Business Phone: ext. Fax:

   Contact Person: Title:

4. List developer, if different from registrant or primary contact:

   Name:

   Mailing Address:

   City/Town: State: Zip Code:

   Business Phone: ext. Fax:

   Contact Person: Title:

5. 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:

6. List any engineer(s) or other consultant(s) employed or retained to assist in preparing the registration and Stormwater Pollution Plan.

   ☒ Check here if additional sheets are necessary, and label and attach them to this sheet.

   Name: **Connecticut Department of Transportation**

   Mailing Address: **2800 Berlin Turnpike, P. O. Box 317546**

   City/Town: **Newington** State: **CT** Zip Code: **06131-2613**

   Business Phone: **860-594-3305** ext. Fax: **860-594-3375**

   Contact Person: **Robert C. Messina** Title: **Trans. Supv. Engineer**

   Service Provided:

Part IV: Site Information

1. Site or Project Name (if any): **Sea Street Salt Storage Facility**

   Street Address or Description of Location: **At site of existing highway maintenance facility on Sea Street in New Haven.**

   City/Town: **New Haven** State: **CT** Zip Code: **06515**

2. Brief description of construction activity: **Removal of exist. storage sheds, construction of new salt shed and replacement of existing calcium chloride tank.**

3. Start Date: **4/2013** Anticipated Completion Date: **9/2013**

4. Estimated total number of acres to be disturbed: **1.56**

Part V: Stormwater Discharge Information

1. Where does stormwater discharge to:

   ☐ Municipal Separate Storm System? ☐ Yes ☐ No (Name):

   ☒ Surface water body or wetlands? ☒ Yes ☐ No (Name): **Long Island Sound**

2. Is the discharge located less than 500 feet from a tidal wetland, which is not a fresh-tidal wetland?

   ☐ Yes ☒ No

3. Name of the watershed where the site is located OR nearest waterbody to which it discharges:

   5000-48-1

4. Is construction in accordance with the Guidelines established under Section 22a-329 of the Soil Erosion and Sedimentation Act? ☒ Yes ☐ No

5. 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.

6. Will the construction project disturb over ten acres? ☐ Yes ☒ No

   If yes, enclose a copy of the Stormwater Pollution Control Plan and plan review fee.

7. Has the construction project been reviewed for compliance with the following DEP programs?

   a. Coastal Management Act (Section 22a-92 of the Connecticut General Statutes) ☒ Yes ☐ No

   b. Endangered and Threatened Species (Section 26-306 of the Connecticut General Statutes) ☒ Yes ☐ No

   c. State and Federal Historic Preservation statutes? ☒ Yes ☐ No

Part VI: Supporting Documents

Check the box by the attachments being submitted 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.*

☒	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 facility or site. Indicate the quadrangle name on the map. (To obtain a copy of the relevant USGS Quadrangle Map, call your town hall or DEP Maps and Publications Sales at 860-424-3555.)
☐	Attachment B:	A copy of the Stormwater Pollution Control Plan and plan review fee of $625.00, if the construction project disturbs over 10 acres

Part VII: Environmental Professional Certification

The following certification must be signed by a professional engineer, licensed to practice in Connecticut.

"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 in 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 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."

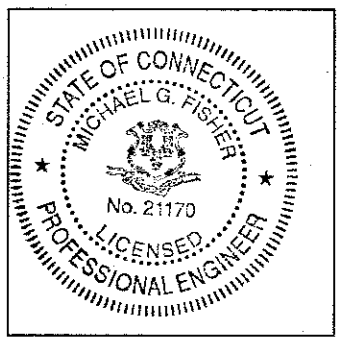
Michael G. Fisher — Signature of Professional Engineer

9/12/12 — Date

MICHAEL G. FISHER — Name of Professional Engineer (print or type)

21170 — P. E. Number (if applicable)

Affix P. E. Stamp Here

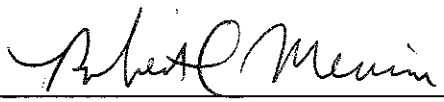


Part VIII: Registrant Certification

The registrant *and* the individual(s) responsible for actually preparing the registration must sign this part. A registration will be considered incomplete unless all required signatures are provided.

"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 certify that this general permit registration is on complete and accurate forms as prescribed by the commissioner without alteration of the text. 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 Connecticut General Statutes, pursuant to section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute.

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, 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
Mark D. Rolfe Name of Registrant (print or type)	**District Engineer, District 3** Title (if applicable)
 Signature of Preparer (if different than above)	8/31/12 Date
Robert C. Messina Name of Preparer (print or type)	**Trans. Supv. Engineer** Title (if applicable)

☐ Check here 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*, the Registration Form, Fee(s), and all Supporting Documents 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.

SCALE 1:24 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

QUADRANGLE NO.

95

NEW HAVEN, CONN

41072-C8-TF-024
1967
DMA 6466 IV SW- SERIES V816

STATE PROJECT NO.: 92-549

COUNTY: NEW HAVEN

CITY/TOWN: NEW HAVEN

APPLICATION BY:

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

NEW HAVEN SALT SHED

OFFICE OF ENGINEERING

DATE:

AUGUST 2012

General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

Notice of Termination Form

Please complete and submit this form in accordance with the general permit (DEP-PED-GP-015) in order to ensure the proper handling of your termination. Print or type unless otherwise noted.

Note: Ensure that for commercial and industrial facilities, registrations under the *General Permit for the Discharge of Stormwater Associated with Industrial Activity* (DEP-PED-GP-014) or the *General Permit for the Discharge of Stormwater from Commercial Activities* (DEP-PED-GP-004) have been filed where applicable. For questions about the applicability of these general permits, please call the Department at 860-424-3018.

Part I: Registrant Information

1. Permit number: ***GSN***
2. Fill in the name of the registrant(s) as indicated on the registration certificate:

   Registrant: **Mark D. Rolfe, Department of Transportation, District III**
3. Site Address: **Sea Street**

   City/Town: **New Haven** State: **CT** Zip Code: **06515**
4. Date all storm drainage structures were cleaned of construction sediment:

   Date of Completion of Construction:

   Date of Last Inspection (must be at least three months after final stabilization pursuant to Section 6(b)(6)(D) of the general permit):
5. Check the post-construction activities at the site (check all that apply):

   ☐ Industrial ☐ Residential ☐ Commercial ☐ Capped Landfill

   ☒ Other (describe): **Highway Mainteance Facility**

Part II: 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 this document or its attachments may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute."

Signature of Permittee	Date
Mr. Mark D. Rolfe	**District Engineer**
Name of Permittee (print or type)	Title (if applicable)

Note: Please submit this Notice of Termination Form to:

STORMWATER PERMIT COORDINATOR
BUREAU OF WATER MANAGEMENT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

STORMWATER POLLUTION CONTROL PLAN

Sea Street Salt Shed
New Haven, CT

State Project No.: 92-549

Connecticut Department of Transportation

August 2012

This Stormwater Pollution Control Plan (SPCP) is prepared to comply with the requirements for the General Permit for Stormwater Discharges (GPSD) from Construction Activities. Also to be considered part of the SPCP are the proposed construction plans, special provisions, and the Connecticut Department of Transportation's "Standard Specifications for Roads, Bridges and Incidental Construction" (Form 816) including supplements thereto and the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control

Table of Contents

Site Description

1.1 Project Description

This project consists of the construction of a new Salt Shed at the site of the existing maintenance facility located on Sea Street in New Haven. The existing, fabric-covered shed will be disassembled and disposed of by the contractor.

The project will include the demolition of the existing salt shed and two outbuildings. Lead and asbestos have been identified in some of the elements of these structures and will be remediated.

Site work includes demolition of the structures described above; excavation and grading; removal of portions of the existing pavement and other site elements (beam rail, fencing, jersey barriers); construction of a small drainage basin to connect to the existing drainage outlet; installation of three catchbasins and a hydrodynamic separator to handle the stormwater in the operations area; and installation of new pavement, fencing, landscaping, and exterior site lighting.

The new 96’ long salt shed will be constructed of structural glued laminated timber arches, laminated tongue and groove wood decking, asphalt shingle roofing, and wood siding on a concrete spread-footing foundation.

A new double-walled calcium chloride tank will be installed behind the existing maintenance garage to replace the existing single-walled tank.

Environmental work associated with this facility includes handling and disposal of polluted soils. The existing Salt Shed will be used as the Waste Stockpile Area for the contaminated soil before it is demolished.

This project needs to be completed ahead of State Project 92-522, which includes the construction of a new I-95 on-ramp within the limits of the existing shed.

1.2 Estimated Disturbed Area

The total maximum disturbed area for this project is 1.56 acres.

1.3 Estimated Runoff Coefficient

The runoff coefficient assumed for pavement is 0.9 and 1.0 for the building's roof. For the pervious areas, a coefficient of 0.3 was assumed.

Pre Construction

$$\frac{(0.51 \text{ ac.} \times 0.3)+(0.90 \text{ ac.} \times 0.94)+(0.15 \text{ ac.} \times 1.0)}{0.51 \text{ ac.} + 0.90 \text{ ac.} + 0.15 \text{ ac.}} = 0.71$$

Post-Construction

$$\frac{(0.94 \text{ ac.} \times 0.3)+(0.51 \text{ ac.} \times 0.94)+(0.11 \text{ ac.} \times 1.0)}{0.94 \text{ ac.} + 0.51 \text{ ac.} + 0.11 \text{ ac.}} = 0.55$$

The estimated runoff coefficients, with the corresponding contributing areas, are shown on Figures 2 and 3.

1.4 Receiving Waters

The site drainage, both pre-construction and post-construction, ties into an adjacent, state roadway drainage system, then discharges to the Long Island Sound. The discharge location is shown on Figure 1

Construction Sequencing

The contractor will be given approximately six months for the construction of all phases of the project.

The suggested sequence of construction for the building site is as follows:

1. Conduct a preconstruction meeting.
2. Install erosion controls at the affected inlets and at limits of disturbed slopes.
3. Perform clearing and grubbing activities.
4. Begin cut and fill operations for drainage basin and building foundation.
5. Construct building (to end of project).
6. Continue cut and fill operations for paved areas. Install site utilities, stormwater system and pavement structure.
7. Grade grass slopes and immediately stabilize. Establish turf, per plan, on all remaining disturbed areas. Install landscaping.
8. Remove erosion controls when it is determined that disturbed areas have been stabilized. (This determination will be made by the Engineer).
9. All post-construction stormwater structures shall be cleaned of construction sediment and any remaining silt fence shall be removed prior to the filing of the "Notice of Termination Form".
10. Perform project cleanup.

Erosion and Sedimentation Controls

CT DOT will have construction inspection personnel assigned to the project in order to oversee the Contractor's operations to insure compliance with the provisions of the Standard Specifications. Further CT DOT oversight is provided by the District 3 Environmental Coordinator and the Office of Environmental Planning.

The following timelines will be followed for the proposed construction activities:

- If construction activities are complete or have been temporarily halted for more than seven (7) days, stabilization activities will be implemented within three (3) days.
- When final grades are completed in any part of the site, stabilization activities will be implemented within 3 days.
- Disturbed areas that do not establish a vegetative cover within 30 days of seeding shall have erosion control blankets installed. Prior to the erosion control blanket installation, the soil would be prepared with the application of lime, fertilizer, and seed.
- Areas that will be disturbed past the planting season will be covered with a long-term, non-vegetative stabilization method that will provide protection through the winter.
- Stabilization practices will be implemented as quickly as possible in accordance with the Guidelines.
- The Contractor shall stabilize disturbed areas with temporary or permanent measures as quickly as possible after the land is disturbed. Driveway roadbed shall be stabilized immediately upon completion of rough grading with compacted road aggregate. Requirements for soil stabilization are detailed in Form 816 article 1.10.03, Best Management Practices.

3.1 Temporary Stabilization Practices:

- Erosion Control Matting: Matting shall be used to stabilize the topsoil on disturbed slopes where a stable, vegetated cover is not established within 30 days, or on temporary slopes steeper than 2:1.
- Silt Fence: Silt fence shall be placed at the toe of all disturbed slopes.
- Anti-Tracking Pads: Construction entrances (gravel anti-tracking pads) shall be constructed at truck access points to off –road route.
- Dust Control: Routine sweeping and application of dust suppression agents, including water and calcium chloride, over exposed subbase shall be completed for dust control.

Stabilization practices shall be implemented no more than three days after completion, as final grades are reached, or if work has been suspended for more than seven days.

Temporary seeding shall be spread over any disturbed areas which will remain inactive for at least 30 days. Areas to remain disturbed through winter shall be protected with non-vegetative stabilization measures. The Contractor must provide an Erosion and Sedimentation Control plan for each winter season during construction operations.

The Contractor may use other controls in the project as necessary if they conform to the 2002

Connecticut Erosion and Sedimentation Guidelines and are approved by the Engineer. The contractor will be required to provide the necessary details for any erosion controls not specifically called for on the project plans.

3.2 Permanent Stabilization Practices:

All new embankments disturbed by construction and unpaved areas that are graded or disturbed by construction will receive topsoil and turf establishment or landscape plantings. The Contractor may use other permanent stabilization practices approved by the Engineer and conforming to Connecticut's Erosion and Sedimentation Control Guidelines (2002).

3.3 Temporary and Permanent Structural Practices

- Storm Basin: A stormwater basin shall be constructed as shown on plans and will function as WQV storage, to encourage infiltration, and to minimize increases in flow at site stormwater outlet.
- Riprap Outlet Protection: Permanent riprap outlet protection shall be installed at all storm drain outlets
- Stone Check Dam: A temporary stone check dam shall be constructed in the storm basin as shown on the plans to reduce the potential for sediment transport during construction.

3.4 General Note

Temporary and/or permanent seeding shall be placed over all disturbed areas which are inactive for an extended period of time per the requirements of Form 816 Section 1.10.03 – Best Management Practices, paragraph 11.

3.5 Maintenance

All construction activities and related activities shall conform to the requirements of Section 1.10 "Environmental Compliance" of ConnDOT's Standard Specifications, Form 816. In general, all construction activities shall proceed in such a manner so as not to pollute any wetlands, watercourses, water body, and conduit carrying stormwater. The Contractor shall limit, in so far as possible, the surface area of earthen materials exposed by construction activity and immediately provide temporary and permanent pollution control to prevent soil erosion and contamination on the site. Water pollution control provisions and best management practices per Article 1.10.03 of the Standard Specifications shall be administered during construction.

Dewatering Wastewaters

4.1 Dewatering Guidelines

If encountered, dewatering wastewaters will be either treated on-site and released to the sanitary sewer system, or transported off-site to a treatment facility. The contractor will follow the methods outlined in Item No. 0204213A, Handling Contaminated Groundwater. Prior to any dewatering, the Contractor must submit to the Engineer a written proposal for specific methods and devices to be used, and must obtain the Engineer's written approval of such methods and devices.

Post-Construction Stormwater Management

5.1 Post-construction Guidelines

After the project is complete, the Department will perform the following maintenance and restorative measures:

- Litter/debris will be removed from the site regularly.
- Mowing and maintenance of the turf areas and vegetated areas will occur as needed.
- Drainage structure sumps and hydrodynamic separator will be inspected regularly and sediment will be removed when sumps are more than half full.
- Riprap outlet protection will be inspected and repaired annually or as needed.
- Stone check dams will be inspected and repaired annually or as needed. Sediment will be removed when it reaches half the height of the check dam.
- The stormwater basin will be inspected and repaired annually or as needed. Sediment will be removed when it interferes with the detention capacity of the basin. Outlets will be checked for excessive scour and repaired as needed.

Other Controls

6.1 Waste Disposal

Construction site waste shall be properly managed and disposed of during the entire construction period. Additionally,

- A waste collection area will be designated. The selected area will minimize truck travel through the site and will not drain directly to the adjacent wetlands.
- Waste collection shall be scheduled regularly to prevent the containers from overfilling.
- Spills shall be cleaned up immediately.
- Defective containers that may cause leaks or spills will be identified through regular inspection. Any found to be defective will be repaired or replaced immediately.
- Any stockpiling of materials should be confined to the designated area as defined by the engineer.

6.2 Anti-tracking Pads and Dust Control

Temporary anti-tracking pads from the active work site to the existing maintenance facility pavement will be installed and maintained at the locations shown on the plans. Maintain the entrance in a condition which will prevent tracking and washing of sediment onto paved surfaces. Provide periodic top dressing with additional stone or additional length as conditions demand. Repair any measures used to trap sediment as needed. Immediately remove all sediment spilled, dropped, washed or tracked onto paved surfaces. Roads adjacent to a construction site shall be left clean at the end of each day. If the construction entrance is being properly maintained and the action of a vehicle traveling over the stone pad is not sufficient to remove the majority of the sediment, then either increase the length of the construction entrance, or modify the construction access road surface. Construction site dust will be controlled by sprinkling the ground surface with water until it is moist on an as-needed basis.

6.3 Post-Construction

All post-construction stormwater structures, including the storm basin, shall be cleaned of construction sediment and any remaining silt fence shall be removed prior to acceptance of the project by the DOT.

6.4 Maintaining and Storing Vehicles and Equipment

The contractor shall take measures to prevent any contamination to wetlands and watercourses while maintaining and storing construction equipment on the site.

Inspections

7.1 Inspection Guidelines

During construction, all areas disturbed by the construction activity that have not been stabilized, structural control measures, and locations where vehicles enter or exit the site shall be inspected at least once every seven calendar days. These areas shall also be inspected within 24 hours following any storm in which 0.1 inches or greater of rain occurs.

Qualified personnel provided by the DOT District 3 Office shall conduct inspections.

Items to be inspected: the following items shall be inspected as described below:

Item	Procedure
Silt Fence	Silt fence shall be inspected to insure that the fence line is intact with no breaks or tears. The fence shall be firmly anchored to the ground. Areas where the fence is excessively sagging or where support posts are broken or uprooted shall be noted. Depth of sediment behind the fence shall be noted.
Catch Basin Protection	Protective measures shall be inspected to insure that sediment is not entering the catch basins. Catch basin sumps shall be monitored for sediment deposition. Hay bales shall be inspected to insure they have not clogged.
Vehicle Entrances / Exits	Locations where vehicles enter or exit the site shall be inspected for evidence of off-site tracking.
General	Construction areas and the perimeter of the site shall be inspected for any evidence of debris that may blow or wash off site or that has blown or washed off site. Construction areas shall be inspected for any spills or unsafe storage of materials that could pollute off site waters.

Keeping Plans Current

8.1 Revisions to Stormwater Pollution Control Plans:

If the results of the inspections require modifications to the Stormwater Pollution Control Plan, the plans shall be revised as soon as practicable after the inspection. Such modifications shall provide for a timely implementation of any changes to the site within 24 hours and implementation of any changes to the plan within three calendar days following the inspection.

Record Keeping: A written report summarizing the scope of the inspection, the name(s) and qualifications of inspection personnel, the date and time of the inspection, major observations relative to the implementation of the Pollution Control Plan, and actions taken shall be completed within 24 hours of the inspection. This report shall be retained as part of the Stormwater Pollution Control Plan for at least three years after the date of the inspection

Contractors

This section shall identify all Contractors and Subcontractors who will perform on site actions which may reasonably be expected to cause or have the potential to cause pollution of the waters of the State.

9.1 Contractor/ Subcontractor Certification Statement

All contractors and subcontractors must sign the attached statement. All certification will be included in the Stormwater Pollution Control Plan.

State Project No. 92-549

Sea Street Salt Shed
New Haven, CT

"I certify under penalty of law that I have read and understand the terms and conditions of the general permit for the discharge of stormwater associated with construction activity. I understand that as Contractor on the project, I am covered by this general permit, and must comply with the terms and conditions of this permit, including, but not limited to, the requirements of the Stormwater Pollution Control Plan prepared for this project."

GENERAL CONTRACTOR

Signed:_____ Date:_____

Title:_____

Firm:_____ Telephone:_____

Address:_____

_____

_____

SUBCONTRACTOR

Signed:_____ Date:_____

Title:_____

Firm:_____ Telephone:_____

Address:_____

_____

_____

Appendix A - Figures

Appendix B – Drainage Calculations

Appendix C – Plan Sheets

SEA STREET SALT SHED
NEW HAVEN

FIGURE 1 - AERIAL PHOTO

1"=120'

ROOF - 0.15 AC

PAVED - 0.90 AC

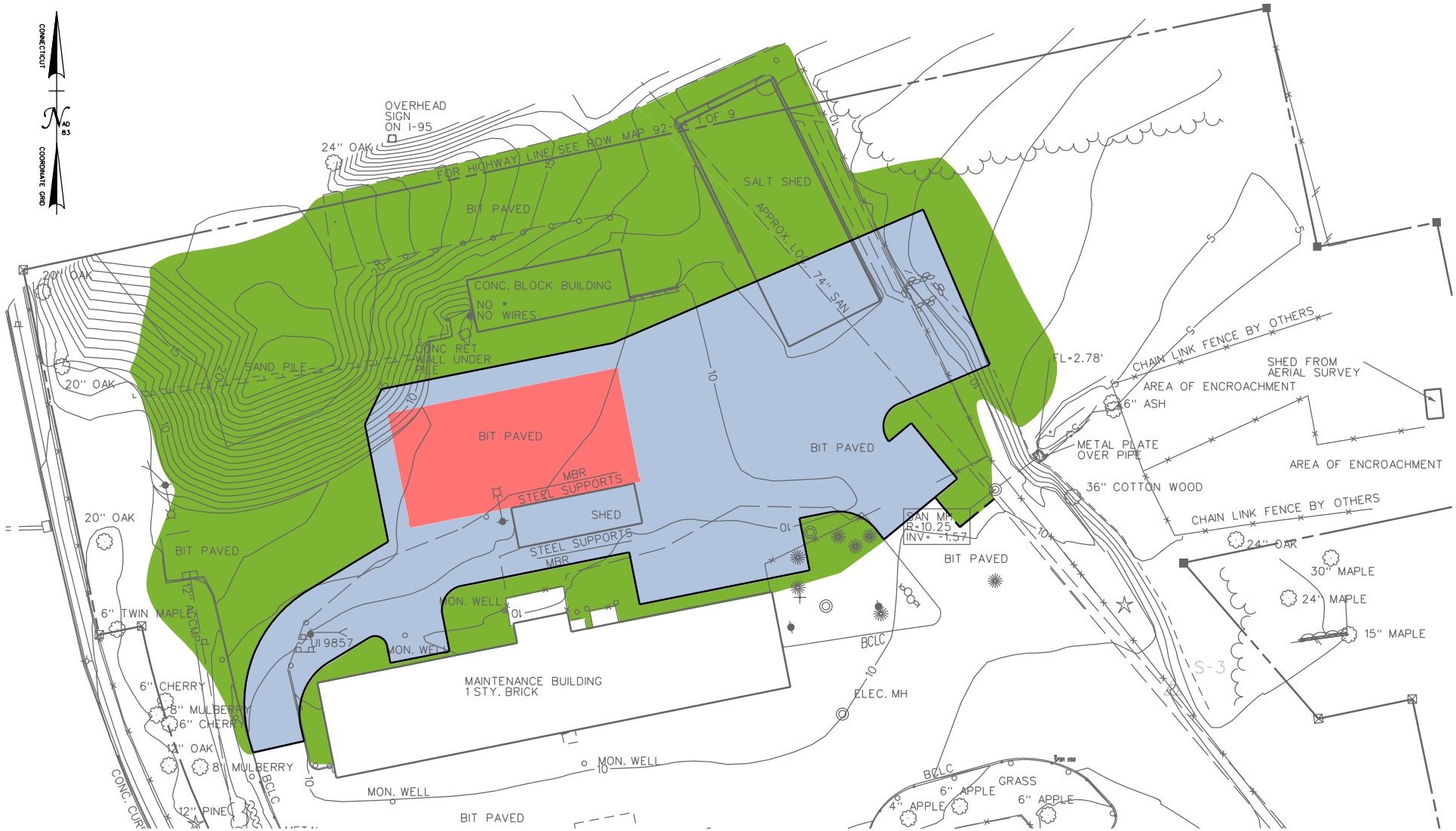
UNPAVED - 0.51 AC

ESTIMATED RUNOFF COEFFICIENT $= \frac{(1.0)(0.15)+(0.9)(0.90)+(0.3)(0.51)}{(0.15+0.90+0.51)} = 0.71$

SEA STREET SALT SHED
NEW HAVEN

PRE-CONSTRUCTION
ESTIMATED RUNOFF COEFFICIENT

1"=60'



ROOF - 0.11 AC

PAVED - 0.51 AC

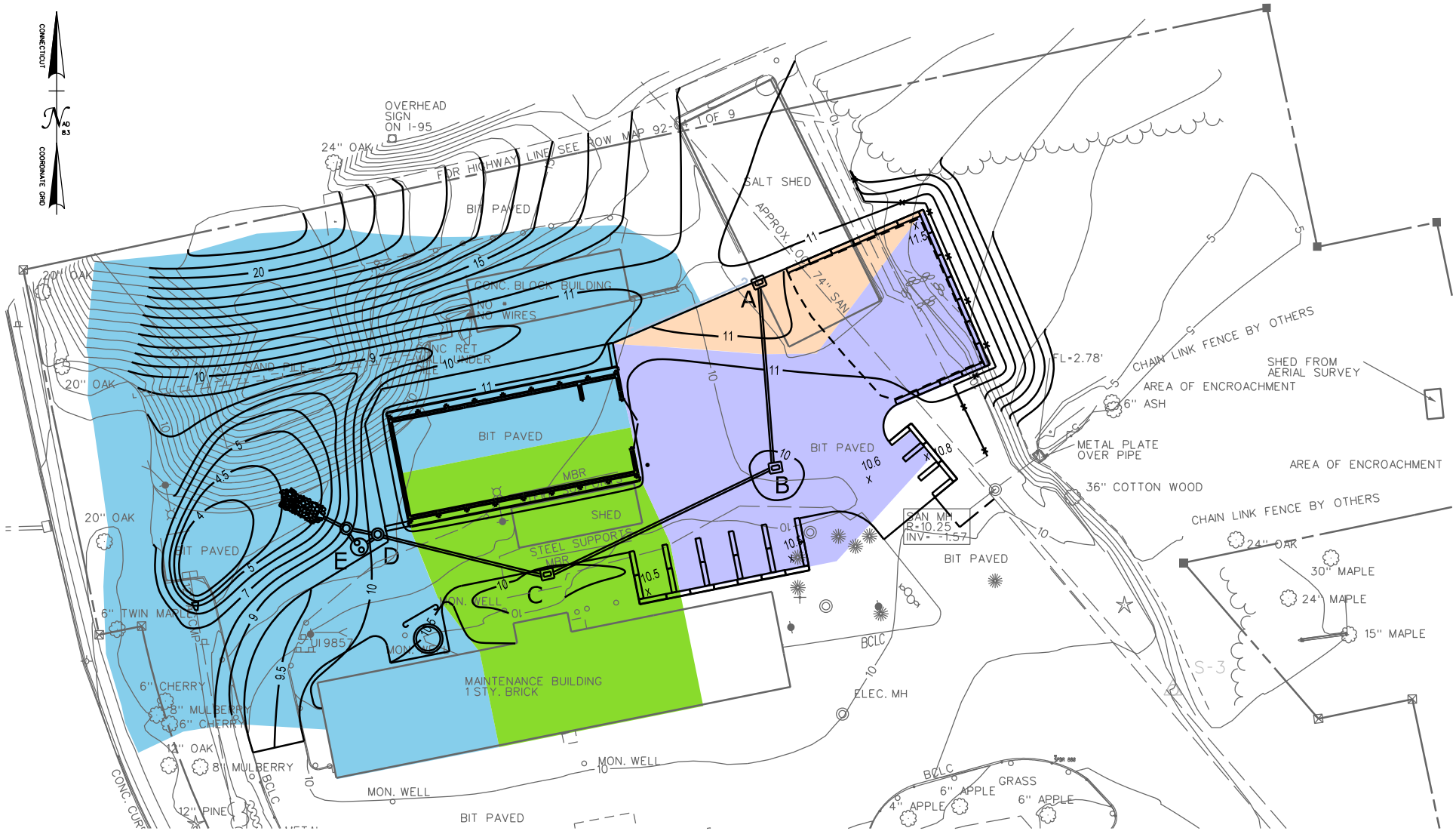
UNPAVED - 0.94 AC

ESTIMATED RUNOFF COEFFICIENT $= \frac{(1.0)(0.11)+(0.9)(0.51)+(0.3)(0.94)}{(0.11+0.51+0.94)} = 0.55$

SEA STREET SALT SHED
NEW HAVEN

POST-CONSTRUCTION
ESTIMATED RUNOFF COEFFICIENT

1"=60'



AREA #1 - 0.06 AC PAVEMENT
AI=(0.9)(0.06)=0.05

AREA #2 - 0.26 AC PAVEMENT
AI=(0.9)(0.26)=0.23

AREA #3 - 0.13 AC ROOF, 0.07 AC PAVEMENT, 0.05 AC GRASS/GRAVEL
AI=(1.0)(0.13)+(0.9)(0.07)+(0.2)(0.05)=0.20

AREA #4 - 0.11 AC ROOF, 0.11 AC PAVEMENT, 0.64 AC GRASS/GRAVEL
AI=(1.0)(0.11)+(0.9)(0.11)+(0.3)(0.64)=0.40

TOTAL IMPERVIOUS AREA = 0.74 AC

SEA STREET SALT SHED
NEW HAVEN

BASIN DRAINAGE AREA

1"=60'

NEW HAVEN SALT SHED **STATE PROJECT 92-549**

Storm Drainage Piping Calculations - Pavement area only

Line	Time to	Time in	Accum.	Contrib.	Surface	Imperv.	AI to	Sum of AI	Rainfall	Q in	Pipe	Length of	Slope	"n"	Average	Maximum
Segment	Inlet	Pipe	Time	Area		Coeff.	C.B.	in System	Intensity	System	Size	Pipe			Velocity	Capacity
	min	*min*	*min*	*acre*					*in/hr*	*cfs*	*in*	*ft*	*ft/ft*		*ft/sec*	*cfs*
A-B	5	0.55	5.00	0.06	pavement	0.9	0.05	0.05	6	**0.32**	12	76	0.013	0.013	2.309	4.37
B-C	5	0.48	5.55	0.26	pavement	0.9	0.23	0.29	5.9	**1.70**	12	100	0.005	0.013	3.46	2.71
C-D	5	0.29	6.03	0.13	roof	1	0.19	0.48	5.8	**2.79**	15	68	0.005	0.013	3.92	4.91
				0.07	pavement	0.9										
D-E	-	0.02	6.32	-	-	-	-	0.48	5.7	**2.74**	15	8	0.05	0.013	7.46	15.54
E-Basin	-	0.03	6.34	-	-	-	-	0.48	5.7	**2.74**	15	8	0.01	0.013	4.89	6.95
			6.37													

NEW HAVEN SALT SHED **STATE PROJECT 92-549**

Basin Routing Calculations

Inlet pipe: 15" RCP inv. at 4.95, s=0.010 ft/ft

Outlet pipe: 12" accmp inv. @ elev. 4.65, S= .0032 ft/ft for 124'

Total AI in (pavement + grass): 0.88

Basin Volumes

	elevation	area in sf at elev.	cf per 1/2 ft depth	Total Vol.-cf
0	4	841	0	0
0.5	4.5	1265	527	527
1	5	2791	1014	1541
1.5	5.5	3086	1469	3010
2	6	3318	1601	4611
2.5	6.5	3584	1726	6336
3	7	3851	1859	8195

10 year storm

WQV = 2657

31 = % of WQV retained below the outlet

	T(min)= **10**		R(in/hr)= 4.8		AI= 0.88		Q(cfs)= 4.224				velocity
60 sec. intervals	1	2	3	4	5	6	7	8	9	10	(ft/sec)
in (cf)	253	253	253	253	253	253	253	253	253	253	**1.528**
out (cf)	0.0	0.0	0.0	0.0	0.4	3.9	12.1	21.6	33.0	41.5	**flow**
											(cfs)
storage in basin (cf)	253	507	760	1014	1267	1516	1758	1990	2210	2422	**0.826**
storage head (ft) basin	0.24	0.48	0.62	0.74	0.86	0.99	1.07	1.15	1.23	1.30	**basin**
storage head (ft) in pipe	0.00	0.00	0.00	0.09	0.21	0.34	0.42	0.50	0.58	0.65	**depth**
flow depth in pipe (in)	0.00	0.00	0.00	1.08	2.58	4.05	5.09	6.03	6.93	7.80	**(ft)**
adjusted slope											**1.30**

	T(min)= **30**		R(in/hr)= 2.8		AI= 0.88		Q(cfs)= 2.464				velocity
180 sec. intervals	1	2	3	4	5	6	7	8	9	10	(ft/sec)
in (cf)	444	444	444	444	444	444	444	444	444	444	**1.407**
out (cf)	0.0	0.0	0.0	16.3	64.7	115.9	153.2	182.8	202.8	211.2	**flow**
											(cfs)
storage in basin (cf)	444	887	1331	1758	2137	2464	2755	3015	3256	3488	**1.105**
storage head (ft) basin	0.42	0.68	0.90	1.07	1.20	1.31	1.41	1.50	1.58	1.65	**basin**
storage head (ft) in pipe	0.00	0.00	0.25	0.42	0.55	0.66	0.76	0.85	0.93	1.00	**depth**
flow depth in pipe (in)	0.00	0.00	2.95	5.09	6.63	7.97	9.16	10.22	11.12	11.99	**(ft)**
adjusted slope											**1.65**

	T(min)= **40**		R(in/hr)= 2.5		AI= 0.88		Q(cfs)= 2.2				velocity
240 sec. intervals	1	2	3	4	5	6	7	8	9	10	(ft/sec)
in (cf)	528	528	528	528	528	528	528	528	528	528	**2.589**
out (cf)	0.0	0.0	2.9	59.0	141.8	200.7	245.2	272.8	281.8	327.5	**flow**
											(cfs)
storage in basin (cf)	528	1056	1584	2053	2439	2767	3049	3304	3551	3751	**2.033**
storage head (ft) basin	0.50	0.76	1.01	1.17	1.31	1.42	1.51	1.59	1.67	1.73	**basin**
storage head (ft) in pipe	0.00	0.11	0.36	0.52	0.66	0.77	0.86	0.94	1.02	1.08	**depth**
flow depth in pipe (in)	0.00	1.33	4.38	6.29	7.87	9.21	10.35	11.30	12.23	12.98	**(ft)**
adjusted slope									0.0050	0.0111	**1.73**

	T(min)= **50**		R(in/hr)= 2.1		AI= 0.88		Q(cfs)= 1.848				velocity
300 sec. intervals	1	2	3	4	5	6	7	8	9	10	(ft/sec)
in (cf)	554	554	554	554	554	554	554	554	554	554	**2.239**
out (cf)	0.0	0.0	6.1	88.1	191.8	260.3	309.5	339.4	351.8	343.2	**flow**
											(cfs)
storage in basin (cf)	554	1109	1663	2129	2492	2786	3031	3246	3449	3660	**1.758**
storage head (ft) basin	0.53	0.79	1.04	1.20	1.32	1.42	1.51	1.57	1.64	1.70	**basin**
storage head (ft) in pipe	0.00	0.14	0.39	0.55	0.67	0.77	0.86	0.92	0.99	1.05	**depth**
flow depth in pipe (in)	0.00	1.64	4.70	6.60	8.08	9.29	10.28	11.08	11.84	12.64	**(ft)**
adjusted slope										0.0083	**1.70**

Water Quality Volume Calculations for Storm Basin

The basin receives flow from a total of 1.43 acres, of which 0.74 acres is impervious. This area includes the entire project area and most of the roof of the existing maintenance garage. The required storage for the "first flush" is as follows:

WQV = (1”)(0.05+0.009I)(A) / 12

WQV = Water Quality Volume
I = Percent Impervious Cover (%)
A = Area (acre)

WQV = (1”)[0.05+0.009 x ((0.74/1.43) x 100%)] x 1.43/12

WQV = 0.061 acre-ft x 43560sf/acre= 2657 cf

As designed, the basin will have a total storage volume of 831 cf below the invert of the outlet pipe. This equals a 31% retention of the WQV.

A sediment forebay is not included in the basin, due to it's small size and the fact that 100% of the stormwater will go through a hydrodynamic separator or will flow a considerable distance over grass before entering the basin.

NOTES:

1. SALT SHALL BE REMOVED FROM SHED BY OTHERS PRIOR TO CONSTRUCTION.

2. EXISTING SALT SHED IS CONSTRUCTED OF CONCRETE BLOCKS WITH A STEEL SUPERSTRUCTURE AND FABRIC ROOF. REMOVE AND DISPOSE OF FABRIC AND STEEL SUPERSTRUCTURE AND CONCRETE BLOCKS.

3. PRE-LOADING AREA CONSISTS OF CONCRETE BLOCKS FILLED WITH SAND. REMOVE AND DISPOSE OF SAND. BLOCKS SHALL BE RELOCATED TO A STATE FACILITY WITHIN A 40 MILE RADIUS, AS DIRECTED BY THE ENGINEER.

4. REMOVE BLOCK WALL. BLOCKS SHALL BE RELOCATED TO A STATE FACILITY WITHIN A 40 MILE RADIUS, AS DIRECTED BY THE ENGINEER.

5. INSTALL ANTI-TRACKING PAD AT POINT WHERE TRUCKS PASS FROM BITUMINOUS PAVEMENT TO DISTURBED SOIL.

6. REFER TO D-002 FOR DEMOLITION OF ELECTRICAL ITEMS.

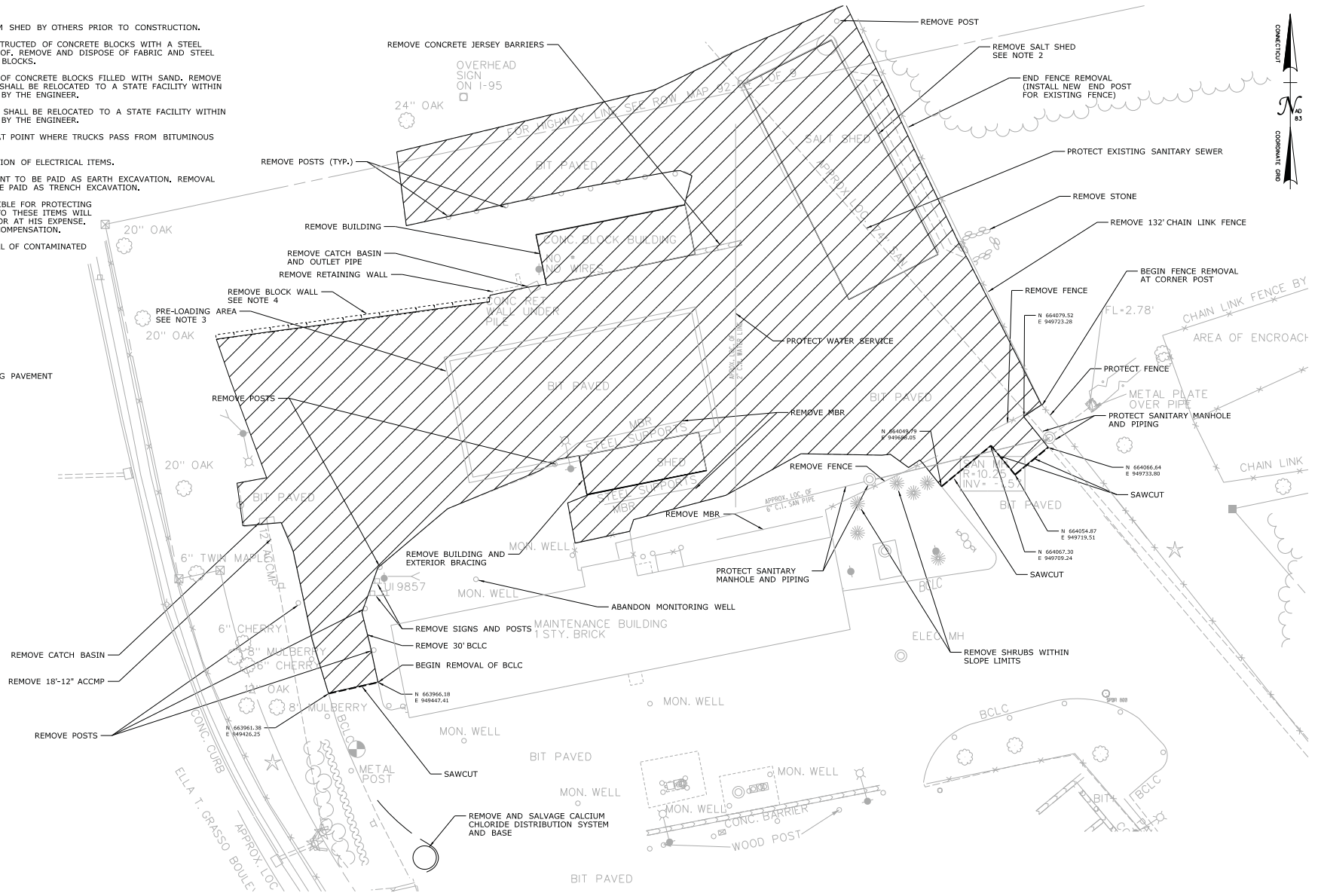
7. REMOVAL OF EXISTING PAVEMENT TO BE PAID AS EARTH EXCAVATION. REMOVAL OF CATCH BASIN AND PIPE TO BE PAID AS TRENCH EXCAVATION.

8. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING ITEMS INDICATED. ANY DAMAGE TO THESE ITEMS WILL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE. THERE WILL BE NO ADDITIONAL COMPENSATION.

9. REFER TO ENV-1 FOR DISPOSAL OF CONTAMINATED MATERIALS.

LEGEND

REMOVE EXISTING PAVEMENT



REV.	DATE	REVISION DESCRIPTION	SHEET NO.
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Plotted Date: 8/20/2012

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

DESIGNER/DRAFTER: SLM
CHECKED BY: LM
SCALE IN FEET 0 20 40
SCALE 1"=20'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\FD_MSH_DMO_0092_0549_D001.dgn

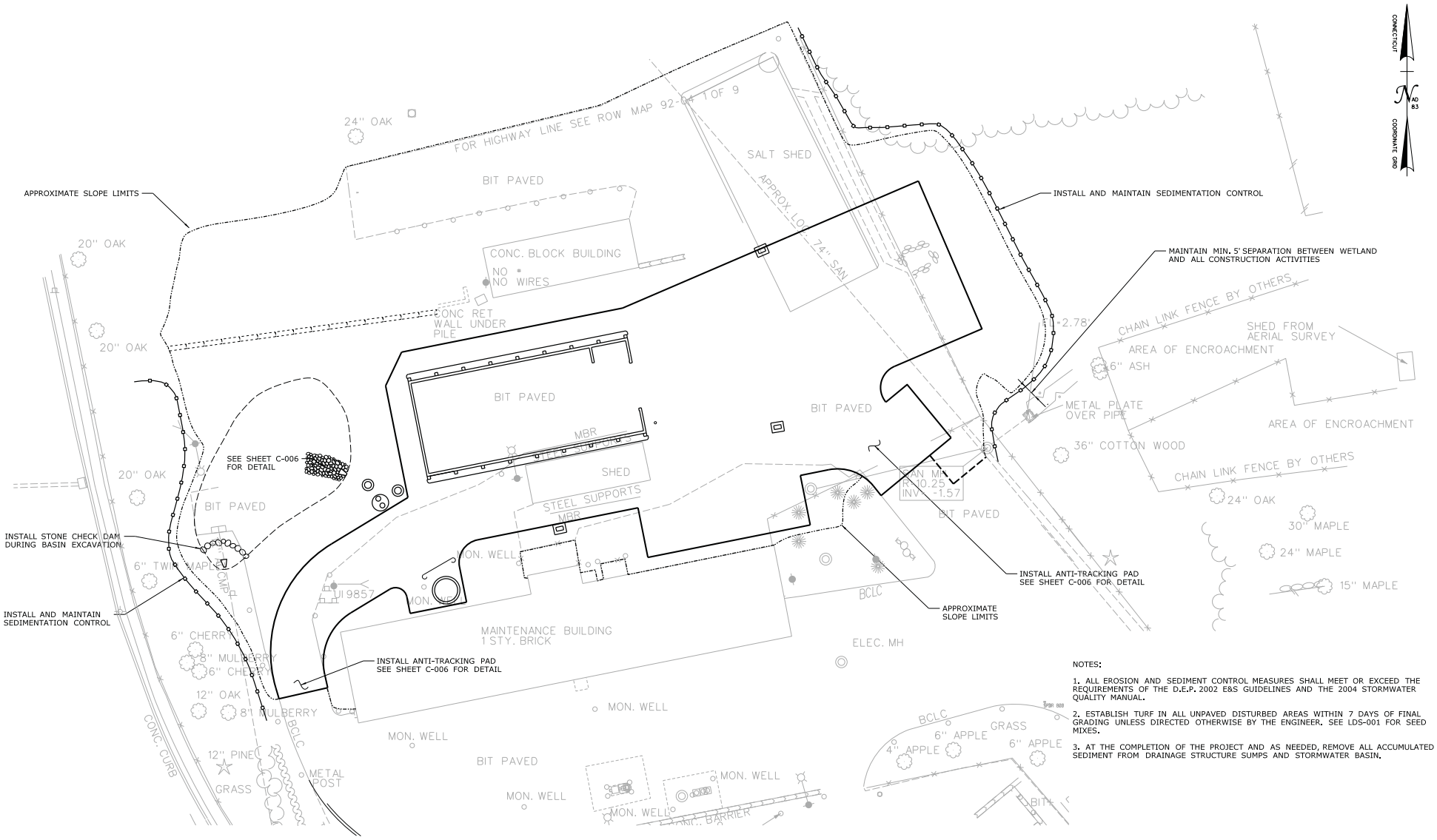
SIGNATURE/ BLOCK:
OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

TOWN: NEW HAVEN

DRAWING TITLE:
SITE DEMOLITION PLAN

PROJECT NO. 92-549
DRAWING NO. D-001
SHEET NO.



NOTES:

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL MEET OR EXCEED THE REQUIREMENTS OF THE D.E.P. 2002 E&S GUIDELINES AND THE 2004 STORMWATER QUALITY MANUAL.

2. ESTABLISH TURF IN ALL UNPAVED DISTURBED AREAS WITHIN 7 DAYS OF FINAL GRADING UNLESS DIRECTED OTHERWISE BY THE ENGINEER. SEE LDS-001 FOR SEED MIXES.

3. AT THE COMPLETION OF THE PROJECT AND AS NEEDED, REMOVE ALL ACCUMULATED SEDIMENT FROM DRAINAGE STRUCTURE SUMPS AND STORMWATER BASIN.

REV.	DATE	REVISION DESCRIPTION	SHEET NO.
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Plotted Date: 8/20/2012

DESIGNER/DRAFTER: SLM
CHECKED BY: LM
SCALE IN FEET 0 20 40
SCALE 1"=20'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\FD_MSH_SED_0092_0549_C001.dgn

SIGNATURE/BLOCK: OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

TOWN: **NEW HAVEN**

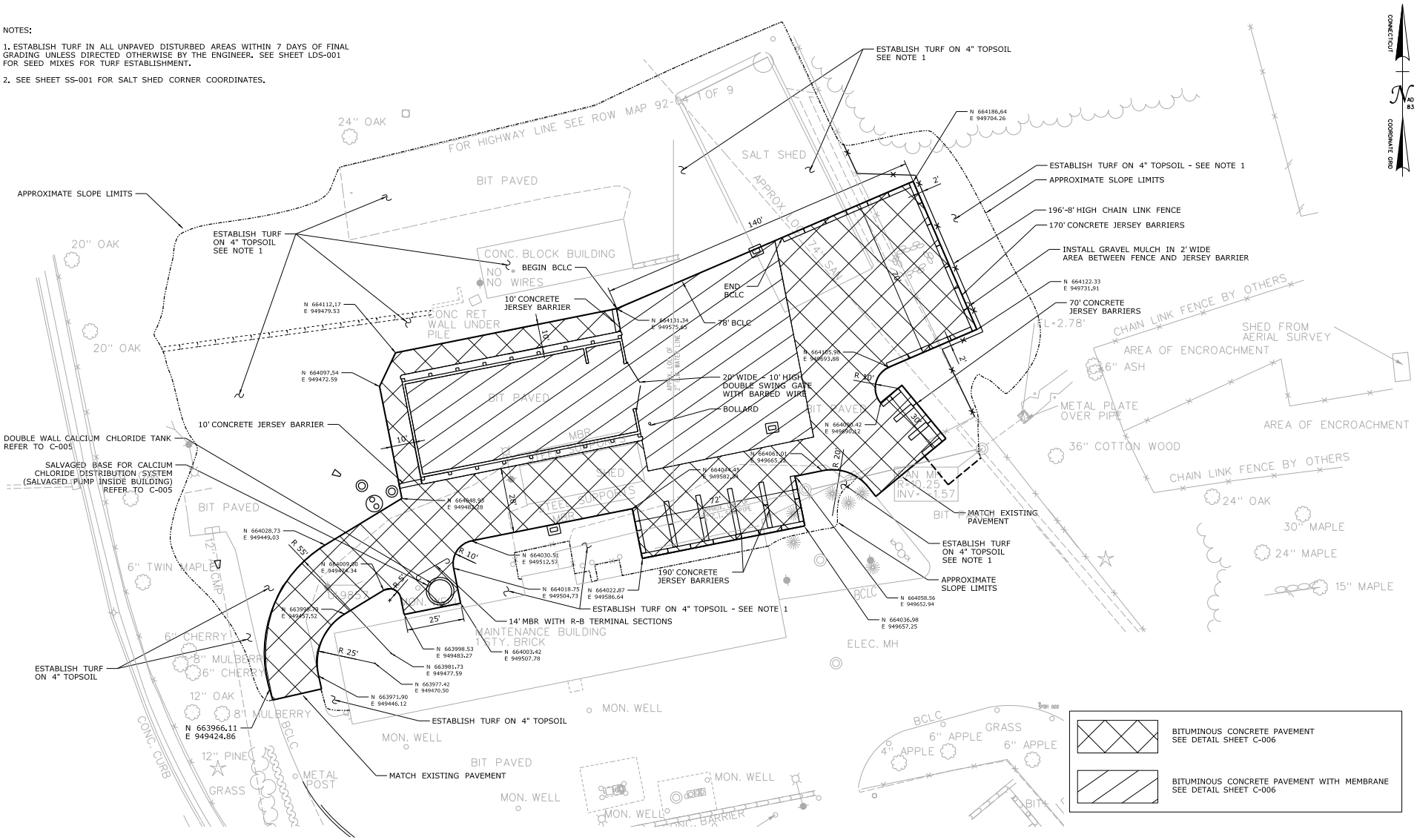
DRAWING TITLE:
SEDIMENTATION AND EROSION CONTROL

PROJECT NO. **92-549**
DRAWING NO. **C-001**
SHEET NO.

NOTES:

1. ESTABLISH TURF IN ALL UNPAVED DISTURBED AREAS WITHIN 7 DAYS OF FINAL GRADING UNLESS DIRECTED OTHERWISE BY THE ENGINEER. SEE SHEET LDS-001 FOR SEED MIXES FOR TURF ESTABLISHMENT.

2. SEE SHEET SS-001 FOR SALT SHED CORNER COORDINATES.



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Plotted Date: 8/20/2012

DESIGNER/DRAFTER: SLM
CHECKED BY: LM
SCALE IN FEET 0 20 40
SCALE 1"=20'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\FD_MSH_CIV_0092_0549_C002.dgn

SIGNATURE/ BLOCK:
OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

TOWN: NEW HAVEN

DRAWING TITLE: SITE PLAN

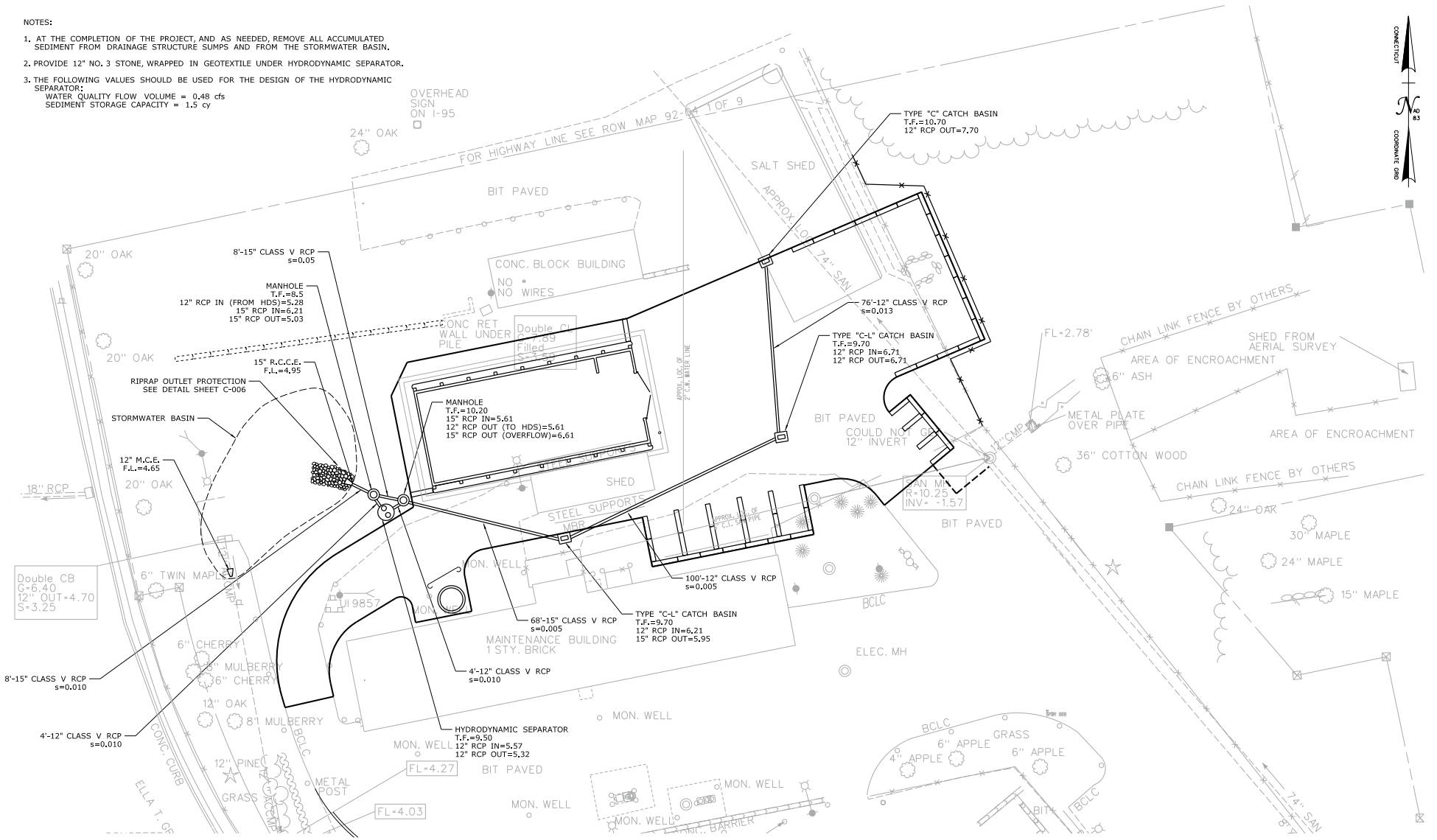
PROJECT NO. 92-549
DRAWING NO. C-002
SHEET NO.

NOTES:

1. AT THE COMPLETION OF THE PROJECT, AND AS NEEDED, REMOVE ALL ACCUMULATED SEDIMENT FROM DRAINAGE STRUCTURE SUMPS AND FROM THE STORMWATER BASIN.

2. PROVIDE 12" NO. 3 STONE, WRAPPED IN GEOTEXTILE UNDER HYDRODYNAMIC SEPARATOR.

3. THE FOLLOWING VALUES SHOULD BE USED FOR THE DESIGN OF THE HYDRODYNAMIC SEPARATOR:
   WATER QUALITY FLOW VOLUME = 0.48 cfs
   SEDIMENT STORAGE CAPACITY = 1.5 cy



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Plotted Date: 8/20/2012

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DESIGNER/DRAFTER: SLM
CHECKED BY: LM
SCALE IN FEET 0 20 40
SCALE 1"=20'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\FD_MSH_DRG_0092_0549_C003.dgn

SIGNATURE/BLOCK: OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

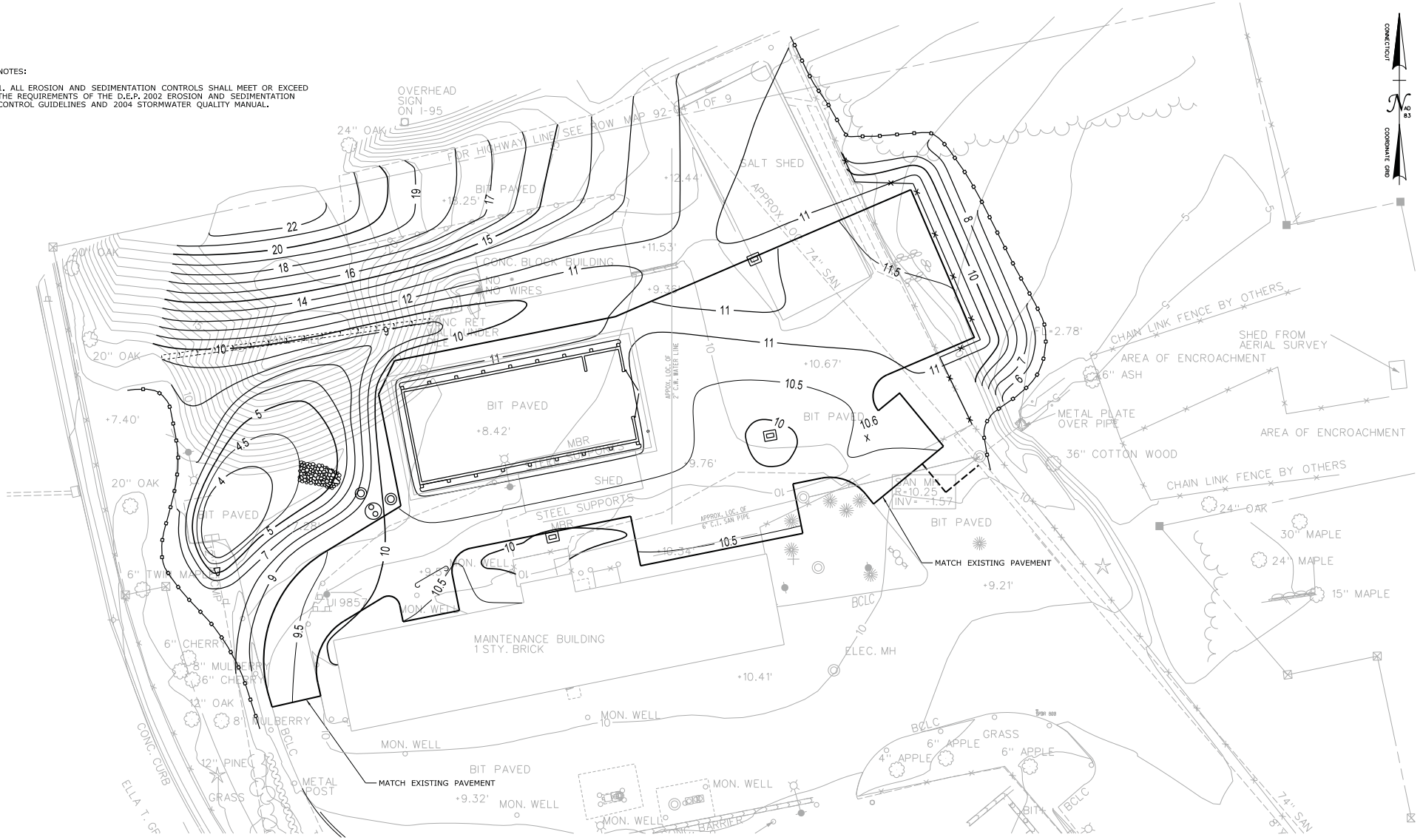
TOWN: NEW HAVEN

DRAWING TITLE: DRAINAGE PLAN

PROJECT NO. 92-549
DRAWING NO. C-003
SHEET NO.

NOTES:

1. ALL EROSION AND SEDIMENTATION CONTROLS SHALL MEET OR EXCEED THE REQUIREMENTS OF THE D.E.P. 2002 EROSION AND SEDIMENTATION CONTROL GUIDELINES AND 2004 STORMWATER QUALITY MANUAL.



REV.	DATE	REVISION DESCRIPTION	SHEET NO.
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Plotted Date: 8/10/2012

DESIGNER/DRAFTER: SLM
CHECKED BY: LM
SCALE IN FEET 0 20 40
SCALE 1"=20'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\FD_MSH_GRD_0092_0549_C004.dgn

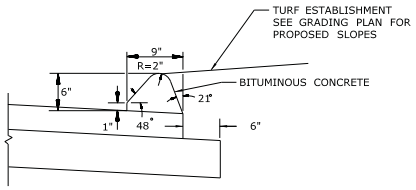
SIGNATURE/BLOCK:
OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

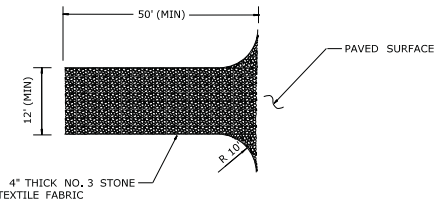
TOWN: **NEW HAVEN**

DRAWING TITLE: **GRADING PLAN**

PROJECT NO. **92-549**
DRAWING NO. **C-004**
SHEET NO.



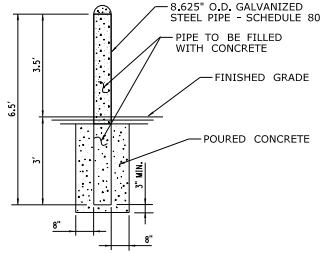
BITUMINOUS CONCRETE CURBING
NOT TO SCALE



NOTES:

1. STONE SHALL BE REPLACED AS NEEDED TO ENSURE SUFFICIENT CAPTURE OF SEDIMENT.
2. ANY SEDIMENT TRACKED OFF-SITE SHALL BE IMMEDIATELY REMOVED BY THE CONTRACTOR.

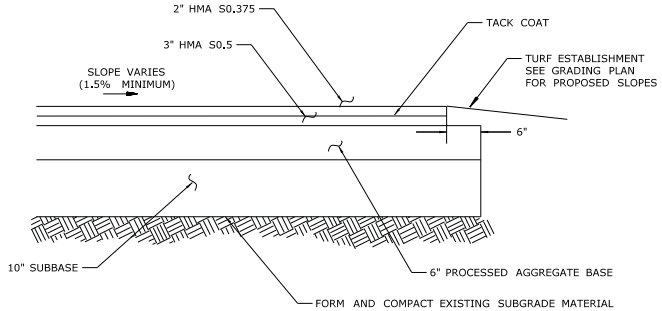
ANTI-TRACKING PAD
NOT TO SCALE



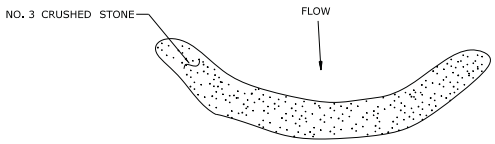
NOTES:

1. BOLLARDS SHALL BE COVERED WITH ¼" YELLOW POLYETHYLENE COVER.
2. TRIM BOLLARD COVER TO FIT.

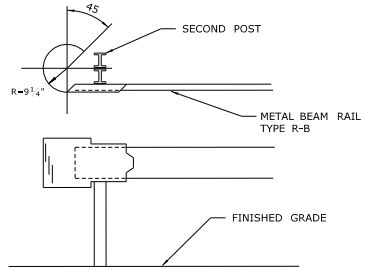
BOLLARD
NOT TO SCALE



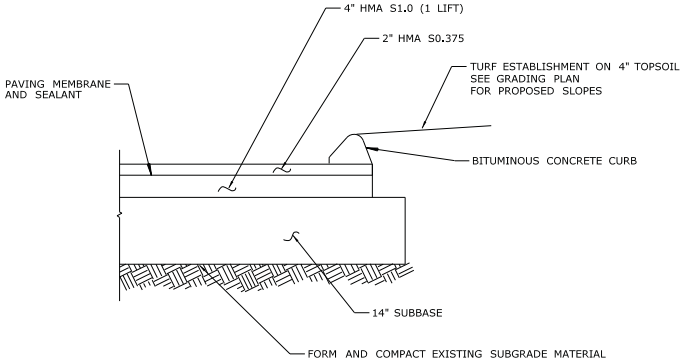
BITUMINOUS CONCRETE PAVEMENT
NOT TO SCALE



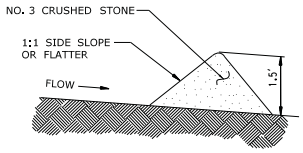
TOP VIEW



R-B TERMINAL SECTION
NOT TO SCALE



BITUMINOUS CONCRETE PAVING - WITH MEMBRANE
NOT TO SCALE

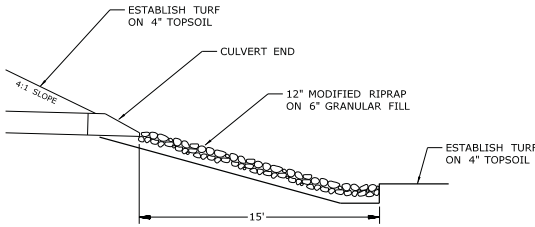


SIDE VIEW

NOTES:

1. STONE CHECK DAM SHALL EXTEND THE FULL WIDTH OF THE BASIN, PLUS 18 INCHES KEYED INTO THE BANKS ON EACH SIDE.
2. THE HEIGHT OF THE CENTER OF THE CHECK DAM SHALL BE 6 INCHES LOWER THAN THE HEIGHT OF THE OUTER EDGES.

STONE CHECK DAM
NOT TO SCALE



NOTE:
1. AT DISCHARGE POINT, PROVIDE 12" MODIFIED RIPRAP ON 6" GRANULAR FILL. RIPRAP SHALL EXTEND 3' ON EITHER SIDE OF THE CULVERT END AND 15' BEYOND THE CULVERT END.

RIPRAP OUTLET PROTECTION
NOT TO SCALE

REV.	DATE	REVISION DESCRIPTION	SHEET NO.
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Plotted Date: 8/20/2012

DESIGNER/DRAFTER: SLM
CHECKED BY: LM
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\FD_MSH_DET_0092_549_C006.dgn

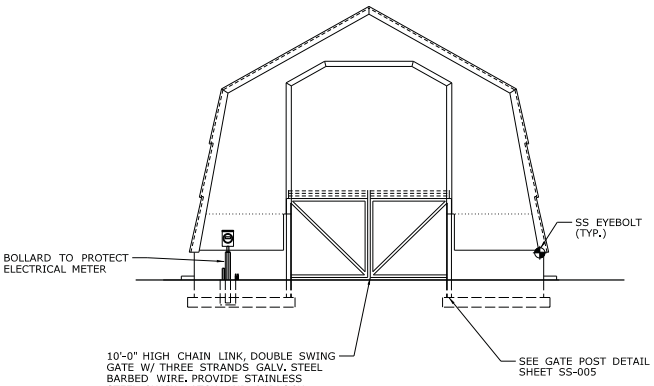
SIGNATURE/BLOCK:
OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

TOWN: NEW HAVEN

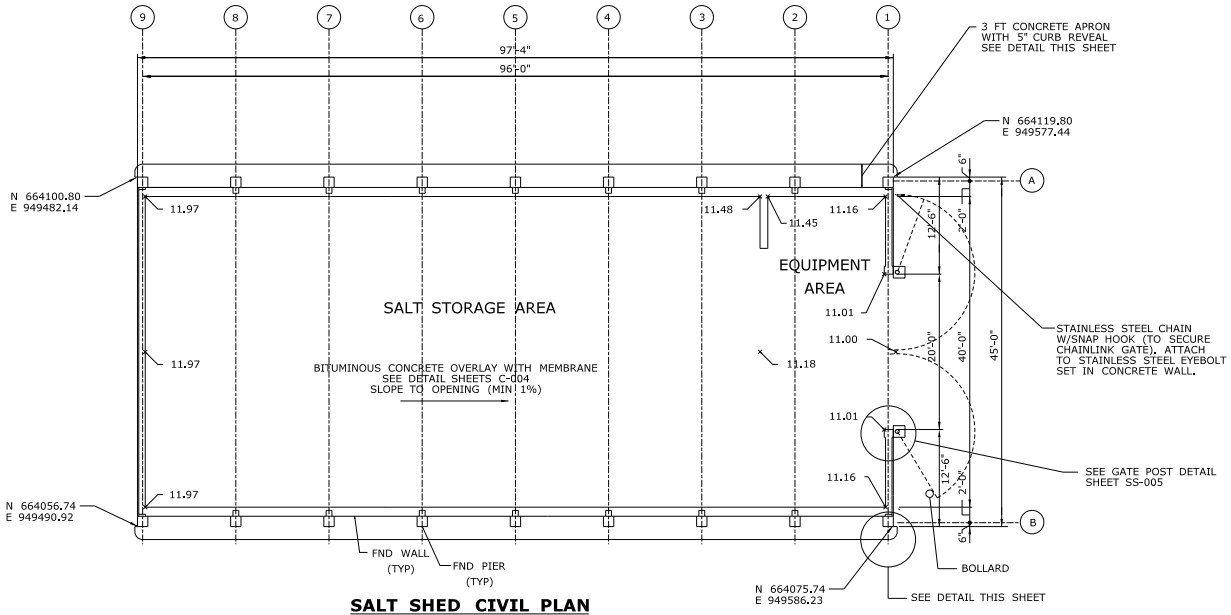
DRAWING TITLE: CIVIL DETAILS

PROJECT NO. 92-549
DRAWING NO. C-006
SHEET NO.



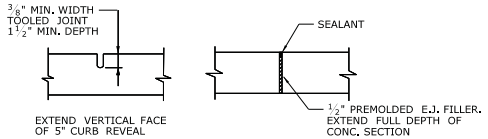
SALT SHED FRONT ELEVATION

SCALE: $\frac{1}{8}$" = 1'-0"



SALT SHED CIVIL PLAN

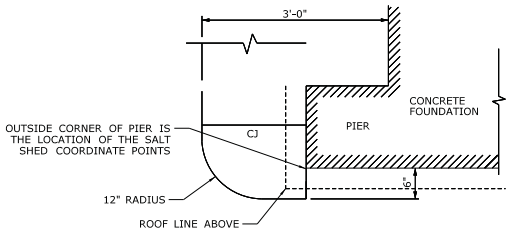
SCALE: $\frac{1}{8}$" = 1'-0"



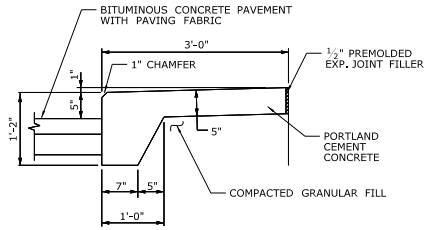
PLACE CONTRACTION JOINTS AT 6' O.C. BEGINNING AT ℄ OF PIER. EXPANSION JOINTS SHALL BE LOCATED 12' (MIN.) FROM CORNER PIERS AND HAVE A MAX. SPACING OF 36' O.C..

CONTRACTION JOINT **EXPANSION JOINT**

CONTROL JOINTS



TYPICAL APRON PLAN AT CORNER



TYPICAL APRON SECTION

CONCRETE APRON DETAILS

NOT TO SCALE

REV.	DATE	REVISION DESCRIPTION	SHEET NO.
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Plotted Date: 8/24/2012

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

DESIGNER/DRAFTER: SLM
CHECKED BY: LM
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\FD_MSH_SS_0092_549_SS001.dgn

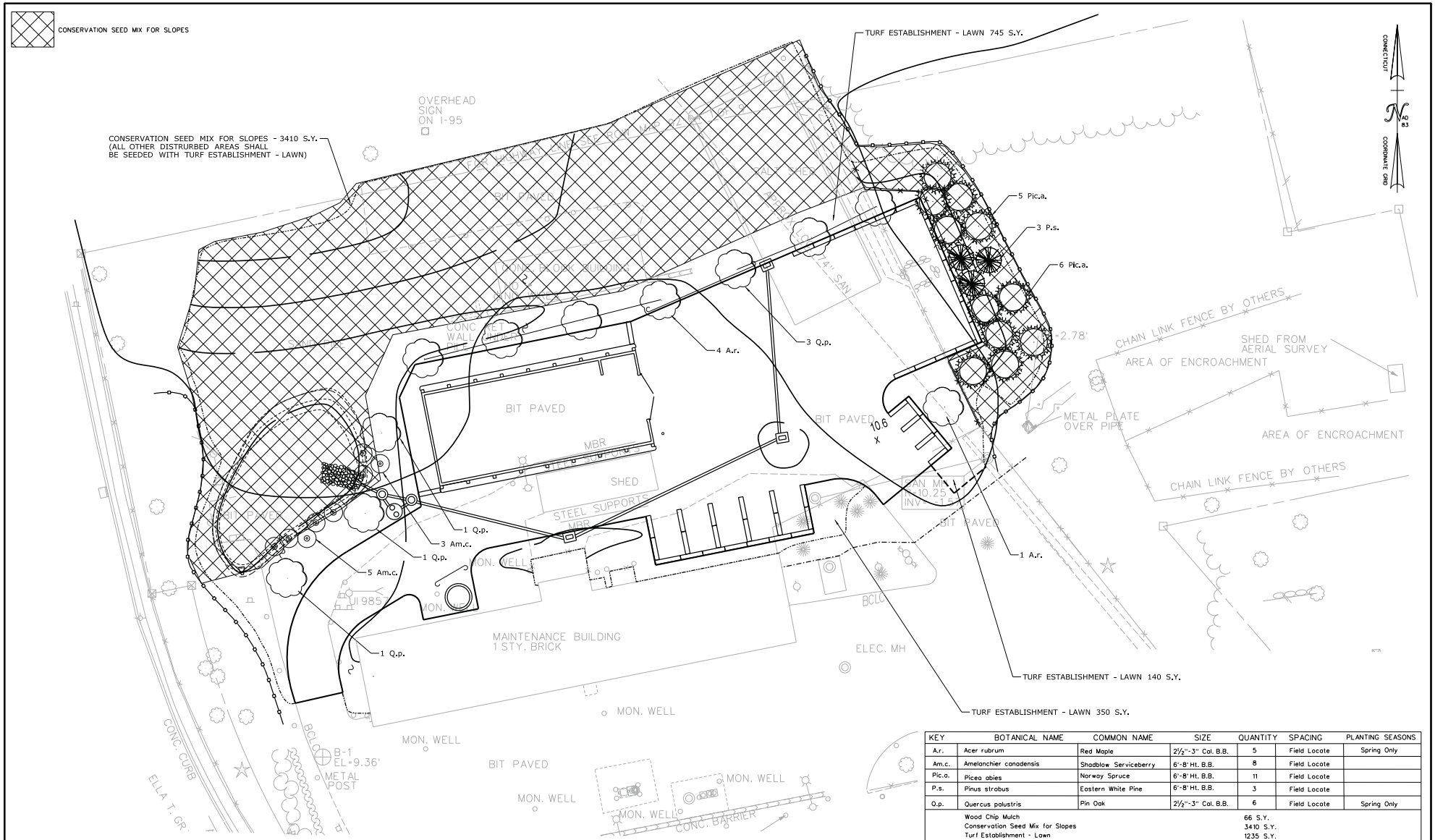
SIGNATURE/ BLOCK:
OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

TOWN: NEW HAVEN

DRAWING TITLE:
CIVIL GRADING PLAN & MISC. DETAILS

PROJECT NO. 92-549
DRAWING NO. SS-001
SHEET NO.



KEY	BOTANICAL NAME	COMMON NAME	SIZE	QUANTITY	SPACING	PLANTING SEASONS
A.r.	Acer rubrum	Red Maple	2½"-3" Cal. B.B.	5	Field Locate	Spring Only
Am.c.	Amelanchier canadensis	Shadblow Serviceberry	6'-8' Ht. B.B.	8	Field Locate	
Pic.a.	Picea abies	Norway Spruce	6'-8' Ht. B.B.	11	Field Locate	
P.s.	Pinus strobus	Eastern White Pine	6'-8' Ht. B.B.	3	Field Locate	
Q.p.	Quercus palustris	Pin Oak	2½"-3" Cal. B.B.	6	Field Locate	Spring Only
	Wood Chip Mulch			66 S.Y.		
	Conservation Seed Mix for Slopes			3410 S.Y.		
	Turf Establishment - Lawn			1235 S.Y.		

REV.	DATE	REVISION DESCRIPTION	SHEET NO.
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Plotted Date: 8/15/2012

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

DESIGNER/DRAFTER: **M. Rylander**
CHECKED BY: **D. Barnes**
SCALE IN FEET 0 20 40
SCALE 1"=20'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW-MSH-0092-0549-LDS-02.dgn

SIGNATURE/BLOCK: **OFFICE OF ENGINEERING**
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

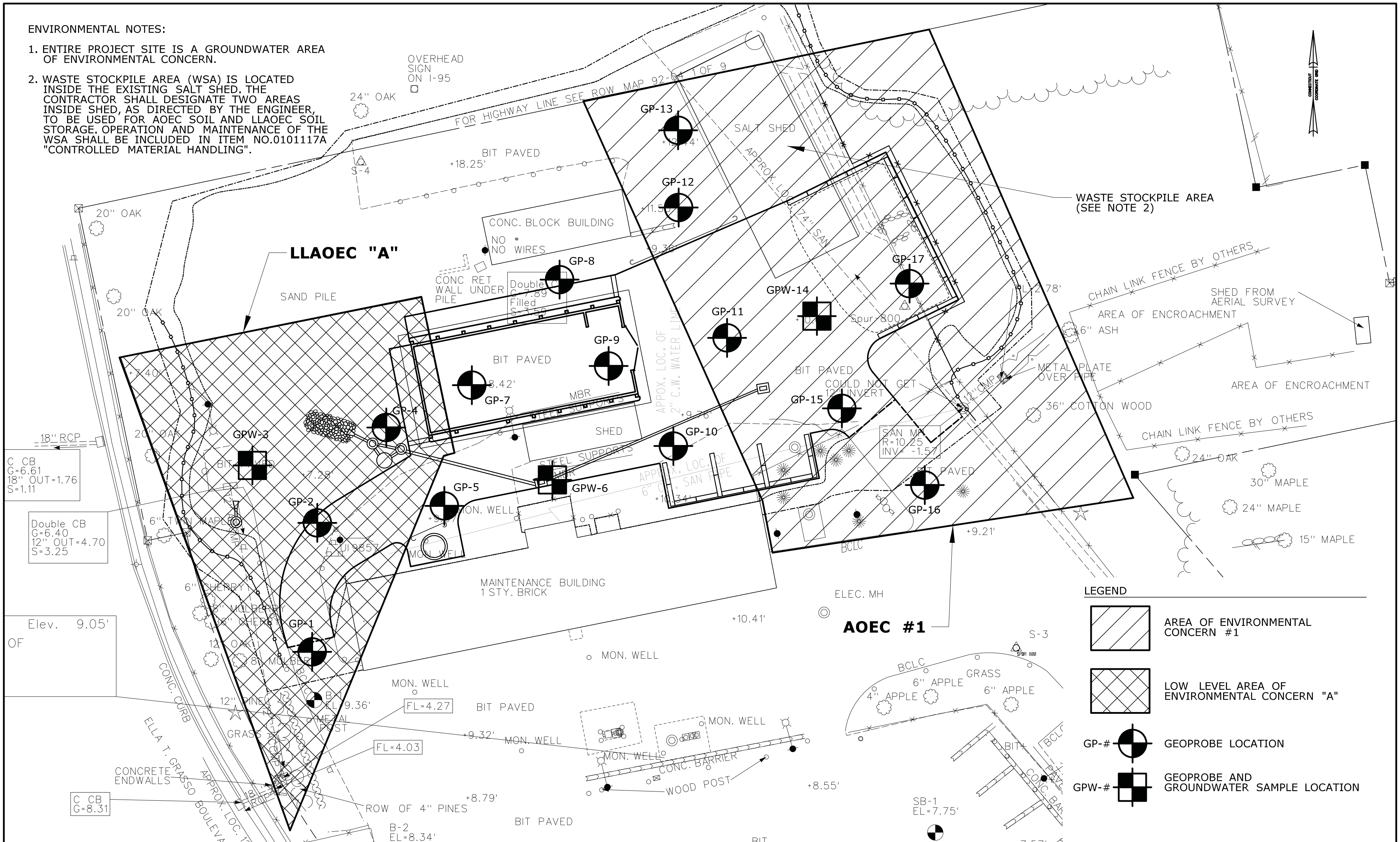
TOWN: **NEW HAVEN**

DRAWING TITLE: **LANDSCAPE DESIGN SHEET**

PROJECT NO. **92-549**
DRAWING NO. **LDS-02**
SHEET NO. **06.02**

ENVIRONMENTAL NOTES:

1. ENTIRE PROJECT SITE IS A GROUNDWATER AREA OF ENVIRONMENTAL CONCERN.
2. WASTE STOCKPILE AREA (WSA) IS LOCATED INSIDE THE EXISTING SALT SHED. THE CONTRACTOR SHALL DESIGNATE TWO AREAS INSIDE SHED, AS DIRECTED BY THE ENGINEER, TO BE USED FOR AOEC SOIL AND LLAOEC SOIL STORAGE. OPERATION AND MAINTENANCE OF THE WSA SHALL BE INCLUDED IN ITEM NO.0101117A "CONTROLLED MATERIAL HANDLING".



LEGEND

AREA OF ENVIRONMENTAL CONCERN #1

LOW LEVEL AREA OF ENVIRONMENTAL CONCERN "A"

GP-# GEOPROBE LOCATION

GPW-# GEOPROBE AND GROUNDWATER SAMPLE LOCATION

REV.	DATE	REVISION DESCRIPTION	SHEET NO.
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 8/7/2012

DESIGNER/DRAFTER: CAD
CHECKED BY: DRS
SCALE IN FEET 0 20 40
SCALE 1"=20'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_0092_0549_ENV-02.dgn

SIGNATURE/BLOCK: Maguire Group, Inc.

PROJECT TITLE: **SEA STREET SALT STORAGE FACILITY**

TOWN: **NEW HAVEN**

DRAWING TITLE: **AREAS OF ENVIRONMENTAL CONCERN**

PROJECT NO. 92-549
DRAWING NO. ENV-2
SHEET NO. 09.02

Border Version: 11/14/08

MEMO

To: Mark Alexander, DOT Transportation Assistant Planning Director

From: Carol Szymanski, OLISP

Date: October 11, 2012

Re: Demo salt shed, construct new salt shed, New Haven Maintenance Garage, Sea Street

Finding: Consistent

The proposed project involves demolishing an existing salt shed and constructing a new salt shed in New Haven one foot above the 100 year flood elevation. Coastal resources on or adjacent to the site include coastal hazard area and general coastal resources. The site is not waterfront but is located entirely within the coastal boundary.

Best management practices will be employed, including use of hydrodynamic separators.

Accordingly, we find the proposal to be consistent with the goals, policies and standards of the Connecticut Coastal Management Act.

Connecticut Department of Energy & Environmental Protection

CPPU USE ONLY
App #:
Doc #:
Check #:

Permit Application Transmittal Form

Please complete this transmittal form in accordance with the instructions in order to ensure the proper handling of your application(s) and the associated fee(s). Print legibly or type.

Part I: Applicant Information:

- ***If an applicant is a corporation, limited liability company, limited partnership, limited liability partnership, or a statutory trust, it must be registered with the Secretary of State. If applicable, applicant's name shall be stated ***exactly*** as it is registered with the Secretary of State.***
- *If an applicant is an individual, provide the legal name (include suffix) in the following format: First Name; Middle Initial; Last Name; Suffix (Jr, Sr., II, III, etc.).*

Applicant: **Connecticut Department of Transportation**

Mailing Address: **2800 Berlin Turnpike, P.O. Box 317546**

City/Town: **Newington** State: **CT** Zip Code: **06131-7546**

Business Phone: **860-594-2132** ext.: Fax: **860-594-3028**

Contact Person: **Mark W. Alexander** Phone: **860-594-2931** ext.

E-Mail: **Mark.W.Alexander@ct.gov**

Applicant (check one): ☐ individual ☐ ***business entity** ☐ federal agency ☒ state agency ☐ municipality ☐ tribal

***If a business entity, list type (e.g., corporation, limited partnership, etc.):

☐ Check if any co-applicants. If so, attach additional sheet(s) with the required information as supplied above.

Please provide the following information to be used for *billing purposes only*, if different:

Company/Individual Name:

Mailing Address:

City/Town: State: Zip Code:

Contact Person: Phone: ext.

Part II: Project Information

Brief Description of Project: *(Example: Development of a 50 slip marina on Long Island Sound)*

Construction of a salt storage shed at an existing highway maintenance facility.

Location (City/Town): **New Haven**

Other Project Related Permits (*not* included with this form):

Permit Description	Issuing Authority	Submittal Date	Issuance Date	Denial Date	Permit #
CAM	**DEEP-OLISP**	**pending**			

Part III: Individual Permit Application and Fee Information

New, Mod. or Renew	Individual Permit Applications	Initial Fees	No. of Permits Applied For	Total Initial Fees	Original + Required Copies
	AIR EMISSIONS				
	New Source Review	$940.00			1 + 0
	Title V Operating Permits	none			1 + 0
	Title IV	none			1 + 0
	Clean Air Interstate Rule (CAIR)	none			1 + 0
	WATER DISCHARGES				
	To Groundwater	$1300.00			1 + 1
	To Sanitary Sewer (POTW)	$1300.00			1 + 1
	To Surface Water (NPDES)	$1300.00			1 + 2
	INLAND WATER RESOURCES-multiple permits 1 + 6 total copies				
	Dam Construction	none			1 + 2
New	Flood Management Certification	none	1	$0	1 + 1
	Inland 401 Water Quality Certification	none			1 + 5
	Inland Wetlands and Watercourses	none			
	Stream Channel Encroachment Lines	★			
	Water Diversion	★			1 + 5
	OFFICE OF LONG ISLAND SOUND PROGRAMS				
	Certificate of Permission	$375.00			1 + 3
	Coastal 401 Water Quality Certification	none			1 + 3
	Structures and Dredging/Tidal Wetlands	$660.00			1 + 3
	WASTE MANAGEMENT				
	Aerial Pesticide Application	★			1 + 2
	Aquatic Pesticide Application	$200.00			1 + 0
	CGS Section 22a-454 Waste Facilities	★			1 + 1
	Hazardous Waste Treatment, Storage and Disposal Facilities	★			1 + 1
	Marine Terminal License	$125.00			1 + 0
	Stewardship	$4000.00			1 + 1
	Solid Waste Facilities	★			1 + 1
	Waste Transportation	★			1 + 0
		Subtotal ➡	1	$0	
	GENERAL PERMITS and AUTHORIZATIONS	Subtotals Page 3 ➡			
	Enter subtotals from Part IV, pages 3 & 4 & 5 of this form	Subtotals Page 4 ➡			
		Subtotals Page 5 ➡			
		TOTAL ➡	1	$0	
	☐ Indicate whether municipal discount or state waiver applies.	Less Applicable Discount ➡			
		AMOUNT REMITTED ➡		$0	

Check # ➡ _____ Check or money order should be made payable to: "Department of Energy and Environmental Protection"

★ **See fee schedule on individual application.**

Part IV: General Permit Registrations and Requests for Other Authorizations Application and Fee Information

✓	General Permits and Other Authorizations	Initial Fees	No. of Permits Applied For	Total Initial Fees	Original + Required Copies
	AIR EMISSIONS				
☐	Limit Potential to Emit from Major Stationary Sources of Air Pollution	$2760.00			1 + 0
☐	Ionizing Radiation Registration	$200.00			1 + 0
☐	Emergency/Temporary Authorization	★★			★★
☐	Other, (please specify):				
	WATER DISCHARGES				
☐	Domestic Sewage	$500.00			1 + 0
☐	Food Processing Wastewater	$500.00			1 + 0
☐	Groundwater Remediation Wastewater to a Sanitary Sewer	$500.00			1 + 0
	Groundwater Remediation Wastewater to a Surface Water				
☐	Registration Only	$625.00			1 + 0
☐	Approval of Registration by DEP	$1250.00			
	Hydrostatic Pressure Testing Wastewater				
☐	Registration Only	$625.00			1 + 0
☐	Approval of Registration by DEP (natural gas pipelines)	$1250.00			
	Miscellaneous Discharges of Sewer Compatible Wastewater				
☐	Flow < 5,000 gpd and fire sprinkler system testwater	$625.00			1 + 1
☐	Flow > 5,000 gpd	$1250.00			
☐	Non-Contact Cooling and Heat Pump Water (Minor)	$625.00			1 + 1
☐	Photographic Processing Wastewater (Minor)	$100.00			1 + 0
☐	Printing & Publishing Wastewater (Minor)	$500.00			1 + 0
	Flow < 40 gpd	$100.00			
☐	Stormwater Associated with Commercial Activities	$500.00			1 + 0
☐	Stormwater Associated with Industrial Activities				
	<500 employees–see general permit for additional requirements	$500.00			1 + 0
	>500 employees–see general permit for additional requirements	$1000.00			
	Stormwater & Dewatering Wastewaters-Construction Activities				
☐	5 – 10 acres	$625.00			1 + 0
☐	> 10 acres	$1250.00			
☐	Stormwater from Small Municipal Separate Storm Sewer Systems (MS4)	$250.00			1 + 0
☐	Swimming Pool Wastewater - Public Pools and Contractors	$500.00			1 + 0
☐	Tumbling or Cleaning of Parts Wastewater (Minor)	$1000.00			1 + 1
	Vehicle Maintenance Wastewater				
☐	Registration Only	$625.00			1 + 0
☐	Approval of Registration by DEP	$1250.00			
☐	Water Treatment Wastewater	$625.00			1 + 0
☐	Emergency/Temporary Authorization - Discharge to POTW	$1500.00			1 + 0
☐	Emergency/Temporary Authorization - Discharge to Surface Water	$1500.00			1 + 0
☐	Emergency/Temporary Authorization - Discharge to Groundwater	$1500.00			1 + 0
☐	Other, (please specify):				
	Note: Carry subtotals over to Part III, page 2 of this form. Subtotal ➡				

★★ Contact the specific permit program for this information (Contact numbers are provided in the instructions).

Part IV: General Permit Registrations and Requests for Other Authorizations (continued)

✓	General Permits and Other Authorizations	Initial Fees	No. of Permits Applied For	Total Initial Fee	Original + Required Copies
	AQUIFER PROTECTION PROGRAM				
☐	Registration for Regulated Activities	$625.00			1 + 0
☐	Permit Application to Add a Regulated Activity	$1250.00			1 + 0
☐	Exemption Application from Registration	$1250.00			1 + 0
	INLAND WATER RESOURCES				
☐	Dam Safety Repair and Alteration	$1000.00			1 + 2
☐	Diversion of Water for Consumptive Use: Reauthorization Categories	$1000.00			1 + 2
☐	Diversion of Water for Consumptive Use: Authorization Required	$2500.00			1 + 5
☐	Diversion of Water for Consumptive Use: Filing Only	$1500.00			1 + 4
☐	Habitat Conservation	$1000.00			1 + 2
☐	Lake, Pond and Basin Dredging	$1000.00			1 + 2
☐	Minor Grading	$1000.00			1 + 2
☐	Minor Structures	$1000.00			1 + 2
☐	Utilities and Drainage	$1000.00			1 + 2
☐	Emergency/Temporary Authorization	★★			★★
☐	Other, (please specify):				
	OFFICE OF LONG ISLAND SOUND PROGRAMS				
☐	4/40 Docks	$700.00			1 + 1
☐	Beach Grading	$100.00			1 + 1
☐	Coastal Remedial Activities Required by Order	$700.00			1 + 1
☐	Dock Reconstruction	$300.00			1 + 1
☐	Marina and Mooring Field Reconfiguration	$700.00			1 + 1
☐	Non-harbor Moorings	$100.00			1 + 1
☐	Osprey Platforms and Perch Poles	none			1 + 1
☐	Pump-out Facilities (no fee for Clean Vessel Act grant recipients)	$100.00			1 + 1
☐	Removal of Derelict Structures	$100.00			1 + 1
☐	Residential Flood Hazard Mitigation	$100.00			1 + 1
☐	Swim Floats	$100.00			1 + 1
☐	Emergency/Temporary Authorization	★★			★★
☐	Other, (please specify):				
	Note: Carry subtotals over to Part III, page 2 of this form.	**Subtotal** ➡			

★ See fee schedule on registration/application. ★★ Contact the specific permit program for this information.

Part IV: General Permit Registrations and Requests for Other Authorizations (continued)

✓	General Permits and Other Authorizations	Initial Fees	No. of Permits Applied For	Total Initial Fee	Original + Required Copies
	WASTE MANAGEMENT				
☐	Addition of Grass Clippings at Registered Leaf Composting Facilities	$500.00			1 + 0
☐	Asbestos Disposal Authorization	$300.00			1 + 0
	Certain Recycling Facilities				
☐	Drop-site Recycling Facility	$200.00			1 + 0
☐	Limited Processing Recycling Facility	$500.00			1 + 0
☐	Recyclables Transfer Facility	$500.00			1 + 0
☐	Single Item Recycling Facility	$500.00			1 + 0
	Contaminated Soil and/or Staging Management (Staging/Transfer)				
☐	Registration Only	$250.00			1 + 0
☐	Approval of Registration by DEP	$1500.00			1 + 0
☐	Connecticut Solid Waste Demonstration Project	$1000.00			1 + 0
☐	Disassembling Used Electronics	$400.00			1 + 0
☐	Leaf Composting Facility	none			1 + 1
☐	Municipal Transfer Station	$800.00			1 + 1
☐	One Day Collection of Certain Wastes and Household Hazardous Waste	$1000.00			1 + 0
☐	Special Waste Authorization	$660.00			1 + 0
☐	Storage and Distribution of Two (2) Inch Nominal Tire Chip Aggregate	$500.00			1 + 0
☐	Storage and Processing of Asphalt Roofing Shingle Waste and/or Storage and Distribution of Ground Asphalt Aggregate	★			1 + 0
☐	Storage and Processing of Scrap Tires for Beneficial Use	$1000.00			1 + 0
☐	Emergency/Temporary Authorization	★★			★★
☐	Other, (please specify):				
	REMEDIATION				
☐	In Situ Groundwater Remediation: Enhance Aerobic Biodegradation	★			1 + 2
	Note: Carry subtotals over to Part III, page 2 of this form. Subtotal ➡				

★See fee schedule on registration/application. ★★Contact the specific permit program for this information.

The Department of Energy and Environmental Protection is an affirmative action/equal opportunity employer and service provider. In conformance with the Americans with Disabilities Act, DEEP makes every effort to provide equally effective services for persons with disabilities. Individuals with disabilities who need this information in an alternative format, to allow them to benefit and/or participate in the agency's programs and services, should call 860-424-3035 or e-mail the ADA Coordinator at DEP.aaoffice@ct.gov. Persons who are hearing impaired should call the State of Connecticut relay number 711.

Permit Application for Programs Administered by the Inland Water Resources Division

Please complete this application form in accordance with the instructions (DEP-IWRD-INST-100) in order to ensure the proper handling of your application. Print or type unless otherwise noted. You must submit the *Permit Application Transmittal Form* (DEP-APP-001) and the initial fee along with this form.

DEP USE ONLY

Part I: Application Type

Check the appropriate box identifying the application type.

This application is for (check one):	Please identify any previous or existing permit/authorization/registration number in the space provided.
☒ A *new* application	Existing permit/authorization/registration number:
☐ A *renewal* of an existing permit	
☐ A *modification* of an existing permit	Expiration Date:

Part II: Permit Type and Fee Information

Please note: effective August 21, 2003, the application fees for the programs administered by the Inland Water Resources Division have increased as listed in the following table. The fee for municipalities is 50% of the listed rates.

Type of Permit (check *all* that apply):	Fee to submit with application:
☐ **Inland Wetlands & Watercourses** CGS Sec. 22a-36 et seq.	none
☐ **Dam Construction** *CGS Sec. 22a-403*	none
☐ **401 Water Quality Certificate** *33 U.S.C. 1341*	none
☒ **Flood Management Certification** *CGS Sec. 25-68(b) - (h)*	none
Stream Channel Encroachment *CGS Sec. 22a-342*	
☐ No change in grade and no construction of above-ground structures	$470.00
☐ A change in grade and no construction of above-ground structures	$940.00
☐ A change in grade and above-ground structures or buildings	$4,000.00
Water Diversion: Consumptive Use *CGS Sec. 22a-372(e)*	
☐ Withdrawal > 0.05 and < 0.5 mgd	$2,050.00
☐ Withdrawal ≥ 0.5 and < 2.0 mgd	$4,000.00
☐ Withdrawal ≥ 2.0 mgd	$6,250.00
Water Diversion: Nonconsumptive Use *CGS Sec. 22a-372(e)*	
☐ Watershed < 0.5 sq mi	$2,050.00
☐ Watershed ≥ 0.5 sq mi and < 2.0 sq mi	$4,000.00
☐ Watershed ≥ 2.0 sq mi	$6,250.00

Part III: Applicant Information

1. Fill in the name of the applicant(s) as indicated on the *Permit Application Transmittal Form* (DEP-APP-001):

   Applicant: **Connecticut Department of Transportation**

   Phone: **860-594-2132** ext. Fax: **860-594-3028**

   ☐ Check here if there are co-applicants. If so, label and attach additional sheet(s) with the required information to this sheet.

2. Applicant's interest in property at which the proposed activity is to be located:

   ☒ site owner ☐ option holder ☐ lessee

   ☐ easement holder ☐ operator ☐ other (specify):

3. List primary contact for departmental correspondence and inquiries, if different than the applicant.

   Name: **Thomas J. Maziarz**

   Mailing Address: **2800 Berlin Turnpike, P.O. Box 317546**

   City/Town: **Newington** State: **CT** Zip Code: **06131-7546**

   Business Phone: **860-594-2132** ext. Fax: **860-594-3028**

   Contact Person: **Mark Alexander** Title: **Assistant Director**

4. List attorney or other representative, if applicable:

   Firm Name:

   Mailing Address:

   City/Town: State: Zip Code:

   Business Phone: ext. Fax:

   Attorney:

5. Facility or Property Owner, if different than the applicant:

   Name:

   Mailing Address:

   City/Town: State: Zip Code:

   Business Phone: ext. Fax:

   Contact Person: Title:

   Home address of owner (for Inland Wetlands applications only):

   Mailing Address:

   City/Town: State: Zip Code:

   Home Phone:

Part III: Applicant Information (continued)

6. List any engineer(s) or other consultant(s) employed or retained to assist in preparing the application or in designing or constructing the activity. ☐ Check here if additional sheets are necessary, and label and attach them to this sheet.

Name:

Mailing Address:

City/Town: State: Zip Code:

Business Phone: ext. Fax:

Contact Person: Title:

Service Provided:

Part IV: Site Information

1. **Site Location:**

a. Name of facility, if applicable: **New Haven (Sea Street) Maintenance Facility**

Street Address or Description of Location: **Sea Street, New Haven**

City/Town: **New Haven** State: **CT** Zip Code:

Project No., if applicable: **92-549**

b. Tax Assessor's Reference: Map Block Lot

(Assessor's reference is not required if requester is an agency of the State of Connecticut.)

c. Latitude and Longitude of the approximate "center of the site" in *degrees, minutes, and seconds*:

Latitude: **41-16-60** Longitude: **72-55-60**

Method of determination (check one):

☐ GPS ☒ USGS Map ☐ Other (please specify):

If a USGS Map was used, provide the quadrangle name: **New Haven, CT**

d. Drainage Basin number(s) wherein the proposed activity will take place: **5000-48**

e. Flood Insurance Rate Map Panel Number: **09009C0441H**

Date of the map referenced: **12-17-2010**

f. If applying for a SCEL permit, identify the property wherein the proposed activity will take place by indicating the following:

SCEL Map number(s):

Property Identifier:

Date of the map referenced:

2. COASTAL BOUNDARY: Is the activity which is the subject of this application located within the coastal boundary as delineated on DEP approved coastal boundary maps? ☒ Yes ☐ No

If yes, and this application is for a new permit or for a modification of an existing permit, you must submit a *Coastal Consistency Review Form* (DEP-APP-004) with your application as Attachment P.

Information on the coastal boundary is available at the local town hall or on the “Coastal Boundary Map” available at DEP Maps and Publications (860-424-3555).

Part IV: Site Information (continued)

3. ENDANGERED OR THREATENED SPECIES: Is the project site located within an area identified as a habitat for endangered, threatened or special concern species as identified on the "State and Federal Listed Species and Natural Communities Map"? ☐ Yes ☒ No Date of Map: **July 2012**

If yes, complete and submit a *Connecticut Natural Diversity Data Base* (CT NDDB) *Review Request Form* (DEP-APP-007) to the address specified on the form. **Please note NDDB review generally takes 4 to 6 weeks and may require additional documentation from the applicant. DEP strongly recommends that applicants complete this process before submitting the subject application.**

When submitting this application form, include copies of any correspondence to and from the NDDB, including copies of the completed *CT NDDB Review Request Form*, as Attachment K (Environmental Report) or in Attachment Q if no environmental report is required.

For more information visit the DEP website at www.ct.gov/dep/endangeredspecies (Review/Data Requests) or call the NDDB at 860-424-3011.

4. AQUIFER PROTECTION AREAS: Is the site located within a town required to establish Aquifer Protection Areas, as defined in section 22a-354a through 354bb of the General Statutes (CGS)?

☐ Yes ☒ No

If yes, is the site within an area identified on a Level A or Level B map? ☐ Yes ☐ No

To view the applicable list of towns and maps visit the DEP website at www.ct.gov/dep/aquiferprotection

To speak with someone about the Aquifer Protection Areas, call 860-424-3020.

5. CONSERVATION OR PRESERVATION RESTRICTION: Is the property subject to a conservation or preservation restriction? ☐ Yes ☒ No

If Yes, proof of written notice of this application to the holder of such restriction or a letter from the holder of such restriction verifying that this application is in compliance with the terms of the restriction, must be submitted as Attachment Q.

6. Other Permits: List any previous federal, state or local permits or certificates that have already been issued for the site or for the proposed activity:

Type or Nature of Permit	Permit No. Issuing Authority	Date Issued	Expiration Date	Permittee Name

Part V: Supporting Documents

Please check the attachments submitted as verification that *all* applicable attachments have been submitted with this application 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 applicant's name as indicated on the *Permit Application Transmittal Form*. The specific information required in each attachment is described in the *Instructions for Completing A Permit Application for Inland Water Resources Division Activities* (DEP-IWRD-INST-100).

☒	Attachment A:	Executive Summary
☒	Attachment B:	An 8 1/2" x 11" copy of a United States Geological Survey (USGS) Topographic Quadrangle Map (scale: 1:24,000) with the regulated activity or project site outlined or pinpointed, as appropriate.
☐	Attachment C:	*Documentation Form for: Inland Wetlands and Watercourses Permit, Stream Channel Encroachment Line Permit, and 401 Water Quality Certification* (DEP-IWRD-APP-101)

Part V: Supporting Documents (continued)

☐ Attachment D: *Documentation Form for Water Diversion Permit* (DEP-IWRD-APP-102)

☐ Attachment E: *Documentation Form for a Dam Construction Permit* (DEP-IWRD-APP-103)

☒ Attachment F: *Documentation Form for Flood Management Certification* (DEP-IWRD-APP-104) (State Agencies Only)

☒ Attachment G: Plan Sheets and Drawings

☒ Attachment H: Engineering Documentation

Part 1: *Engineering Report Checklist* (DEP-IWRD-APP-105A) and an Engineering Report

Part 2: *Hydrologic and Hydraulic Consistency Worksheet* (DEP-IWRD-APP-105B)

Section I: Floodplain Management

Section II: Stormwater Management

For state agencies only:

Section III: State Grants and Loans

Section IV: Disposal of State Land

☒ Attachment I: Flood Contingency Plan

☐ Attachment J: Soil Scientist Report (not required for Flood Management Certification)

☐ Attachment K: Environmental Report (not required for Flood Management Certification)

☐ Attachment L: Mitigation Report - wetlands and watercourses, fish and wildlife (not required for Flood Management Certification)

☐ Attachment M: Alternatives Assessment (not required for Flood Management Certification)

☐ Attachment N: *Applicant Compliance Information Form* (DEP-APP-002) (not required for Flood Management Certification or 401 Water Quality Certification Approvals)

☐ Attachment O: *Applicant Background Information Form* (DEP-APP-008) (not required for Flood Management Certification)

☐ Attachment P: *Coastal Consistency Review Form* (DEP-APP-004) (if applicable)

☒ Attachment Q: Other Information: any other information the applicant deems relevant or is required by DEP.

Number of Copies of Application:

Submit one original of all application forms, certifications, reports and supporting documents and the number of photocopies of all such materials as noted on the *Permit Application Transmittal Form*. When applying for more than one permit, you should submit the original and no more than six copies.

Part VI: Application Certification

The applicant *and* **all** individuals responsible for actually preparing the application or supporting documentation must sign this part. An application will be considered insufficient unless **all** required signatures are provided. You must include signatures of any person preparing any report or parts thereof filed in support of this application (i.e., professional engineers, surveyors, soil scientists, biologists, environmental and other consultants, etc.).

"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 the 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 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 application is on complete and accurate forms as prescribed by the commissioner without alteration of the text.

I certify that I will comply with all notice requirements as listed in Section 22a-6g of the General Statutes."

Signature of Applicant	Date
Thomas J. Maziarz	**Bureau Chief, Policy & Planning**
Name of Applicant (print or type)	Title (if applicable)
	9/5/12
Signature of Preparer (if different than above)	Date
Robert C. Messina	**Trans. Supervising Engineer**
Name of Preparer (print or type)	Title (if applicable)

☐ Check here if additional signatures are required.

If so, please reproduce this sheet and attach signed copies to this sheet.

Reminder: After submitting this application to DEP, except in the case of a Flood Management Certification, you must publish a notice of the application immediately and submit a certified copy of this published notice to DEP. See "Notice of Permit Application" section in the instructions (DEP-IWRD-INST-100).

List the name of the newspaper the Notice of Permit Application will be published in:

Note: Please submit the *Permit Application Transmittal Form*, Application Form, Fee, and all Supporting Documents to:

CENTRAL PERMIT PROCESSING UNIT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

Attachment A – Executive Summary

Sea Street Salt Shed
New Haven
State Project No. 92-549

The Project consists of the construction of a Salt Shed at the site of the existing maintenance facility located on Sea Street in New Haven. The new 96' long salt shed will be constructed of structural glued laminated timber arches, laminated tongue and groove wood decking, asphalt shingle roofing, wood siding, and a concrete spread-footing foundation.

The existing salt shed is a temporary fabric-covered structure, which will be disassembled and disposed of by the contractor. The existing shed and sand pile are located within the limits of a new on-ramp proposed under State Project 92-522.

The project will include the demolition of two existing outbuildings. Lead and asbestos have been identified in some of the elements of these structures and will be remediated.

Site work for the salt shed and surrounding operations area consists of excavation and grading work; removal of portions of the existing pavement and other site elements (beam rail, fencing, jersey barriers); installation of catchbasins and a hydrodynamic separator to handle the stormwater in the operations area; construction of drainage swale to connect to the existing drainage outlet; installation of new pavement; fencing; landscaping; and exterior site lighting.

There will be a new double-walled calcium chloride tank installed behind the existing maintenance garage to replace the existing single-walled tank.

Project was discussed at April 2011 PMM, and again at the June 2011 meeting where the site layout was found to be acceptable (see Notes in Attachment Q). The site design balances cuts and fills, and provides for the shed to be above elevation 11.

QUADRANGLE NO.

95

CONTOUR INTERAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

NEW HAVEN, CONN

41072-C8-TF-024
1967
DMA 6466 IV SW- SERIES V816

STATE PROJECT NO.: 92-549

COUNTY: NEW HAVEN

CITY/TOWN: NEW HAVEN

APPLICATION BY:

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

NEW HAVEN SALT SHED
ATTACHMENT B

OFFICE OF ENGINEERING

DATE:

AUGUST 2012

Attachment F: Documentation Form for Flood Management Certification

1. Applicant Name: **Connecticut Department of Transportation**
   (as indicated on the *Permit Application Transmittal Form*)

2. Name of Subject Facility or Project/Project Number:

   Salt Shed at Sea Street Maintenance Garage in New Haven, Project 92-549

3. Name of floodplain and watercourse:

   Long Island Sound

4. This Certification is submitted for the Commissioner's approval pursuant to Section 25-68d of the General Statutes. I hereby certify that based on my reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the proposed activity described in this application is consistent with all applicable standards and criteria established in Sections 25-68d(b) of the General Statutes and Sections 25-68h-1 through 25-68h-3, inclusive, of the Regulations of Connecticut State Agencies.

Signature of the head of the certifying State agency or his/her designated agent	Date
Thomas J. Maziarz	**Bureau Chief, Policy & Plannin**
Name of the head of the certifying State agency or his/her designated agent (print or type)	Title (if applicable)

Attachment G – Plan Sheets

Sea Street Salt Shed
New Haven
State Project No. 92-549

D-001	Site Demolition Plan
C-001	Sedimentation and Erosion Control
C-002	Site Plan
C-003	Drainage Plan
C-004	Grading Plan
C-006	Civil Details
LDS-02	Landscape Design Plan

NOTES:

1. SALT SHALL BE REMOVED FROM SHED BY OTHERS PRIOR TO CONSTRUCTION.

2. EXISTING SALT SHED IS CONSTRUCTED OF CONCRETE BLOCKS WITH A STEEL SUPERSTRUCTURE AND FABRIC ROOF. REMOVE AND DISPOSE OF FABRIC AND STEEL SUPERSTRUCTURE AND CONCRETE BLOCKS.

3. PRE-LOADING AREA CONSISTS OF SAND. REMOVE AND DISPOSE OF SAND.

4. REMOVE BLOCK WALL. BLOCKS SHALL BE RELOCATED TO A STATE FACILITY WITHIN A 40 MILE RADIUS, AS DIRECTED BY THE ENGINEER.

5. INSTALL ANTI-TRACKING PAD AT POINT WHERE TRUCKS PASS FROM BITUMINOUS PAVEMENT TO DISTURBED SOIL.

6. REFER TO D-002 FOR DEMOLITION OF ELECTRICAL ITEMS.

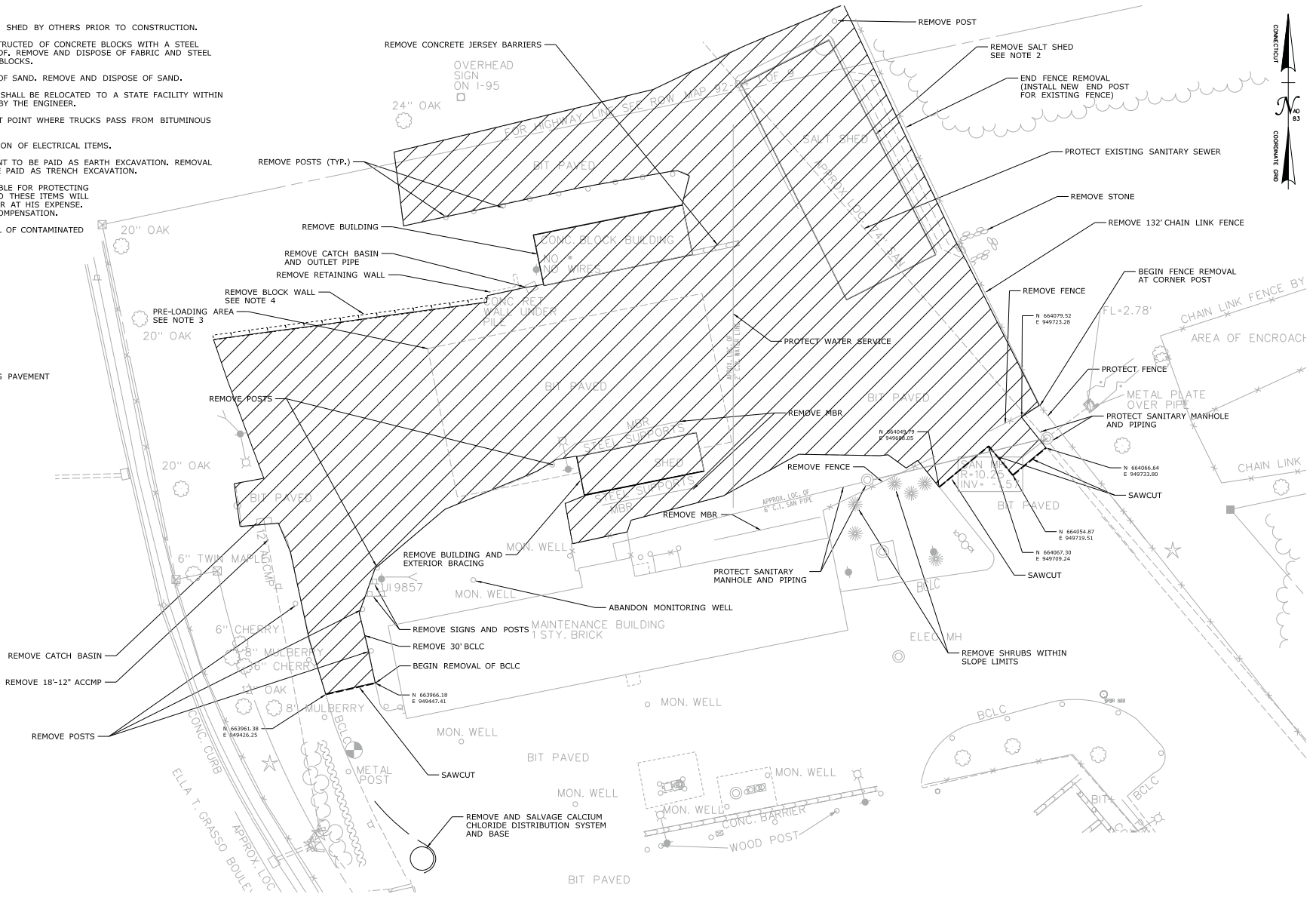
7. REMOVAL OF EXISTING PAVEMENT TO BE PAID AS EARTH EXCAVATION. REMOVAL OF CATCH BASIN AND PIPE TO BE PAID AS TRENCH EXCAVATION.

8. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING ITEMS INDICATED. ANY DAMAGE TO THESE ITEMS WILL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE. THERE WILL BE NO ADDITIONAL COMPENSATION.

9. REFER TO ENV-1 FOR DISPOSAL OF CONTAMINATED MATERIALS.

LEGEND

REMOVE EXISTING PAVEMENT



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Plotted Date: 8/28/2012

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

DESIGNER/DRAFTER: SLM
CHECKED BY: LM
SCALE IN FEET 0 20 40
SCALE 1"=20'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\FD_MSH_DMO_0092_0549_D001.dgn

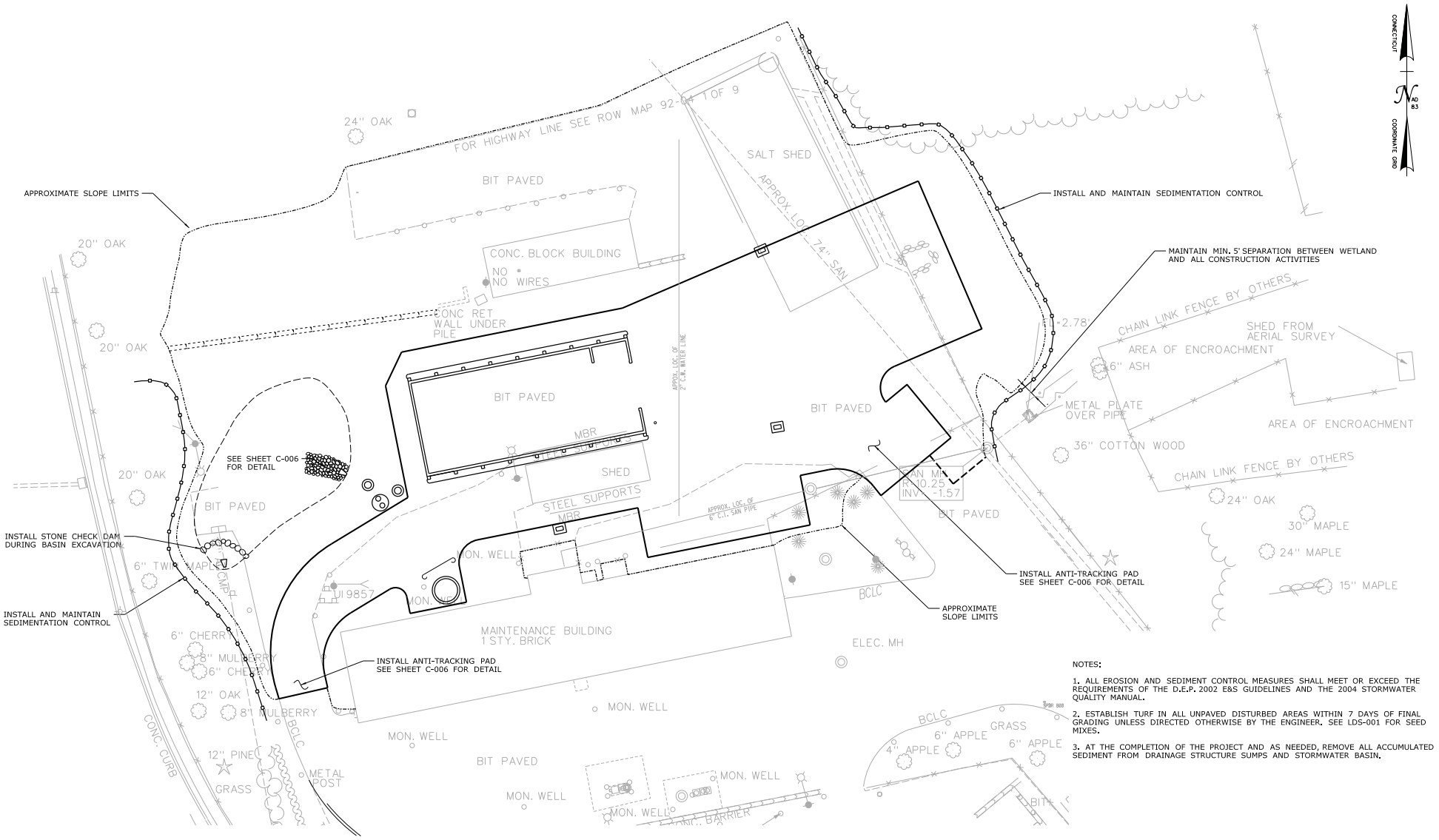
SIGNATURE/BLOCK:
OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

TOWN: NEW HAVEN

DRAWING TITLE: SITE DEMOLITION PLAN

PROJECT NO. 92-549
DRAWING NO. D-001
SHEET NO. 04.02



NOTES:

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL MEET OR EXCEED THE REQUIREMENTS OF THE D.E.P. 2002 E&S GUIDELINES AND THE 2004 STORMWATER QUALITY MANUAL.

2. ESTABLISH TURF IN ALL UNPAVED DISTURBED AREAS WITHIN 7 DAYS OF FINAL GRADING UNLESS DIRECTED OTHERWISE BY THE ENGINEER. SEE LDS-001 FOR SEED MIXES.

3. AT THE COMPLETION OF THE PROJECT AND AS NEEDED, REMOVE ALL ACCUMULATED SEDIMENT FROM DRAINAGE STRUCTURE SUMPS AND STORMWATER BASIN.

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Plotted Date: 8/28/2012

DESIGNER/DRAFTER: SLM
CHECKED BY: LM
SCALE IN FEET 0 20 40
SCALE 1"=20'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\FD_MSH_SED_0092_0549_C001.dgn

SIGNATURE/BLOCK:
OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

TOWN: NEW HAVEN

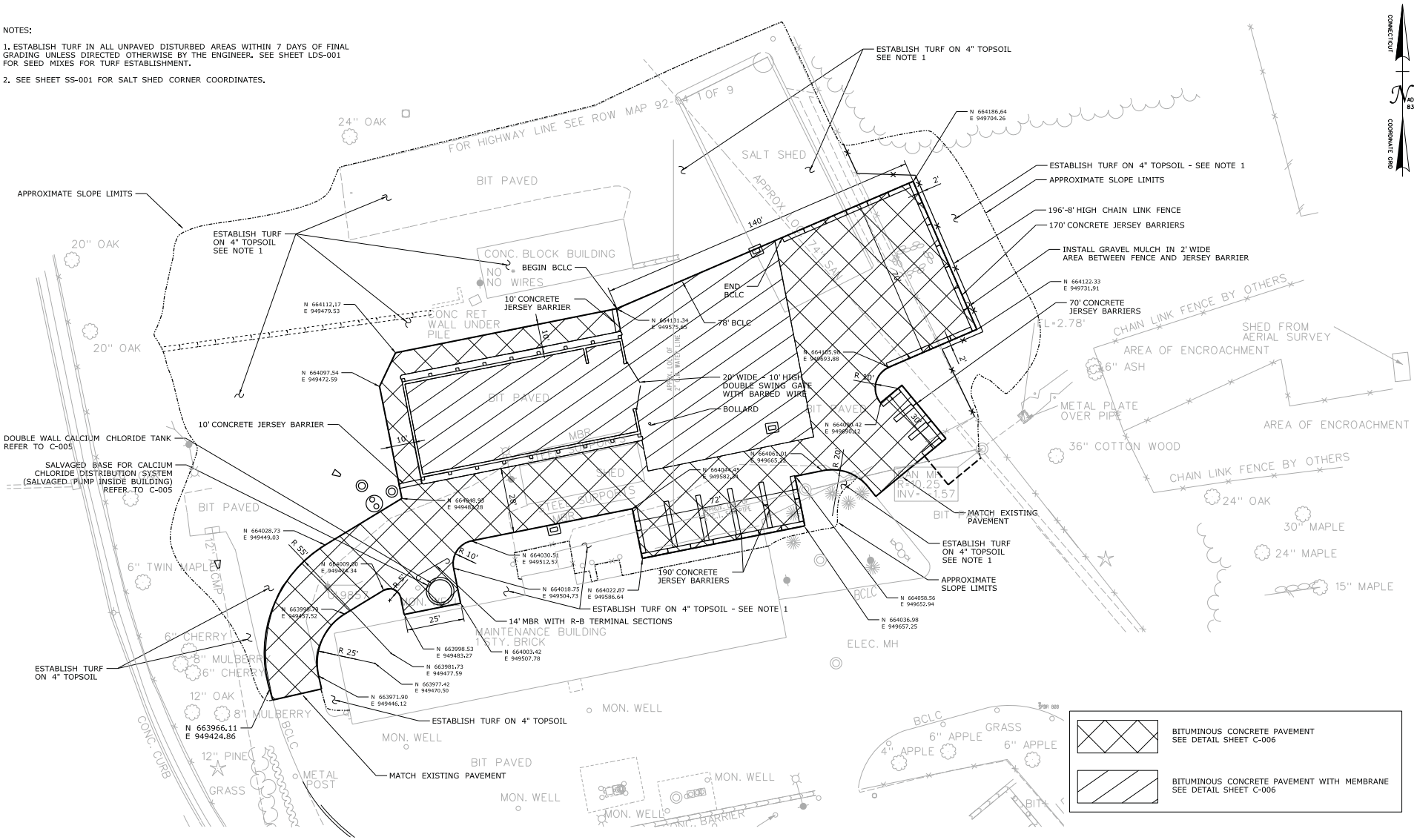
DRAWING TITLE:
SEDIMENTATION AND EROSION CONTROL

PROJECT NO. 92-549
DRAWING NO. C-001
SHEET NO. 05.02

NOTES:

1. ESTABLISH TURF IN ALL UNPAVED DISTURBED AREAS WITHIN 7 DAYS OF FINAL GRADING UNLESS DIRECTED OTHERWISE BY THE ENGINEER. SEE SHEET LDS-001 FOR SEED MIXES FOR TURF ESTABLISHMENT.

2. SEE SHEET SS-001 FOR SALT SHED CORNER COORDINATES.



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Plotted Date: 8/20/2012

DESIGNER/DRAFTER: SLM
CHECKED BY: LM
SCALE IN FEET 0 20 40
SCALE 1"=20'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\FD_MSH_CIV_0092_0549_C002.dgn

SIGNATURE/BLOCK:
OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

TOWN: NEW HAVEN

DRAWING TITLE: SITE PLAN

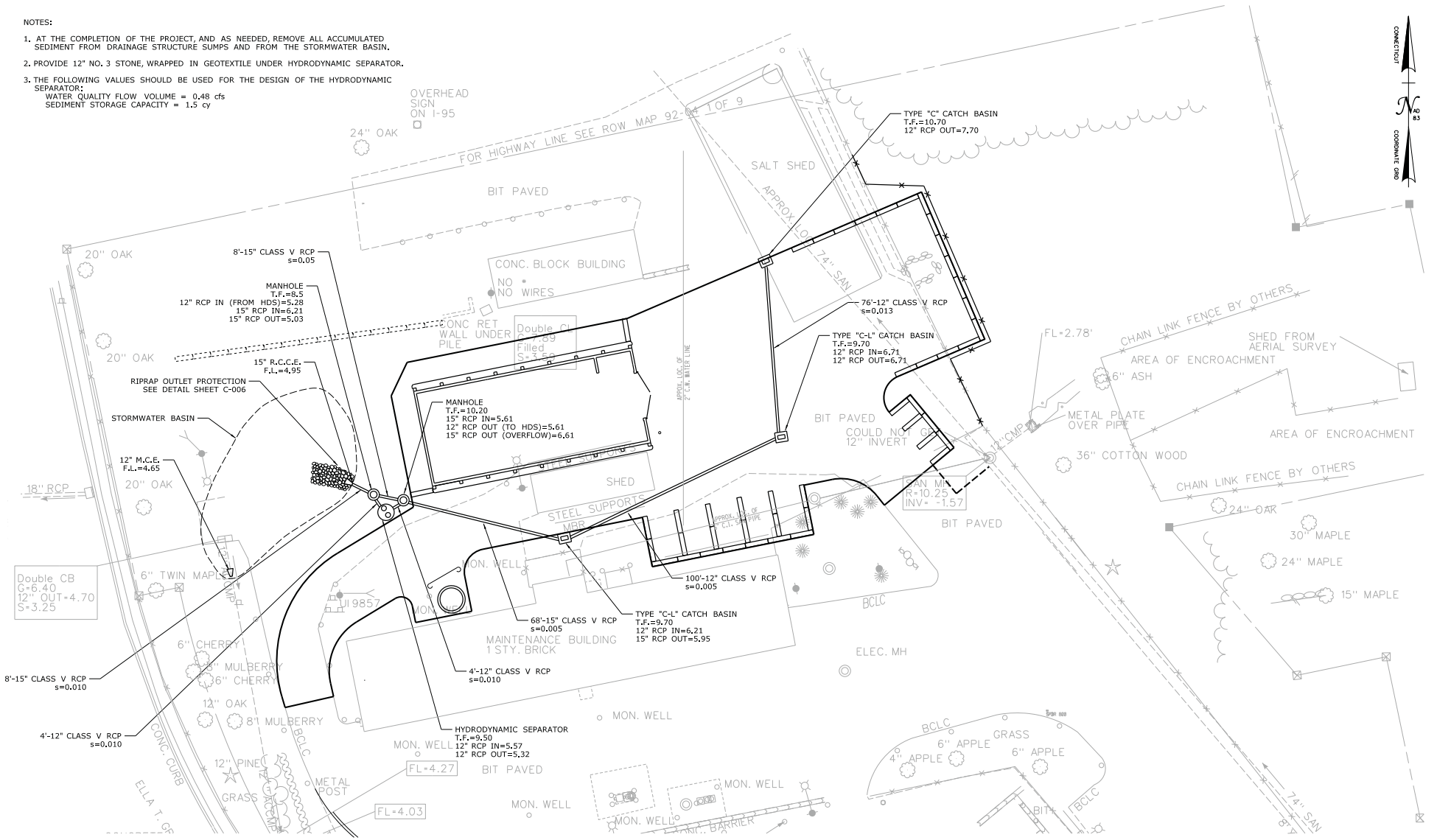
PROJECT NO. 92-549
DRAWING NO. C-002
SHEET NO. 05.03

NOTES:

1. AT THE COMPLETION OF THE PROJECT, AND AS NEEDED, REMOVE ALL ACCUMULATED SEDIMENT FROM DRAINAGE STRUCTURE SUMPS AND FROM THE STORMWATER BASIN.

2. PROVIDE 12" NO. 3 STONE, WRAPPED IN GEOTEXTILE UNDER HYDRODYNAMIC SEPARATOR.

3. THE FOLLOWING VALUES SHOULD BE USED FOR THE DESIGN OF THE HYDRODYNAMIC SEPARATOR:
   WATER QUALITY FLOW VOLUME = 0.48 cfs
   SEDIMENT STORAGE CAPACITY = 1.5 cy



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Plotted Date: 8/28/2012

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

DESIGNER/DRAFTER: SLM
CHECKED BY: LM
SCALE IN FEET 0 20 40
SCALE 1"=20'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\FD_MSH_DRG_0092_0549_C003.dgn

SIGNATURE/BLOCK: OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE: SEA STREET SALT STORAGE FACILITY

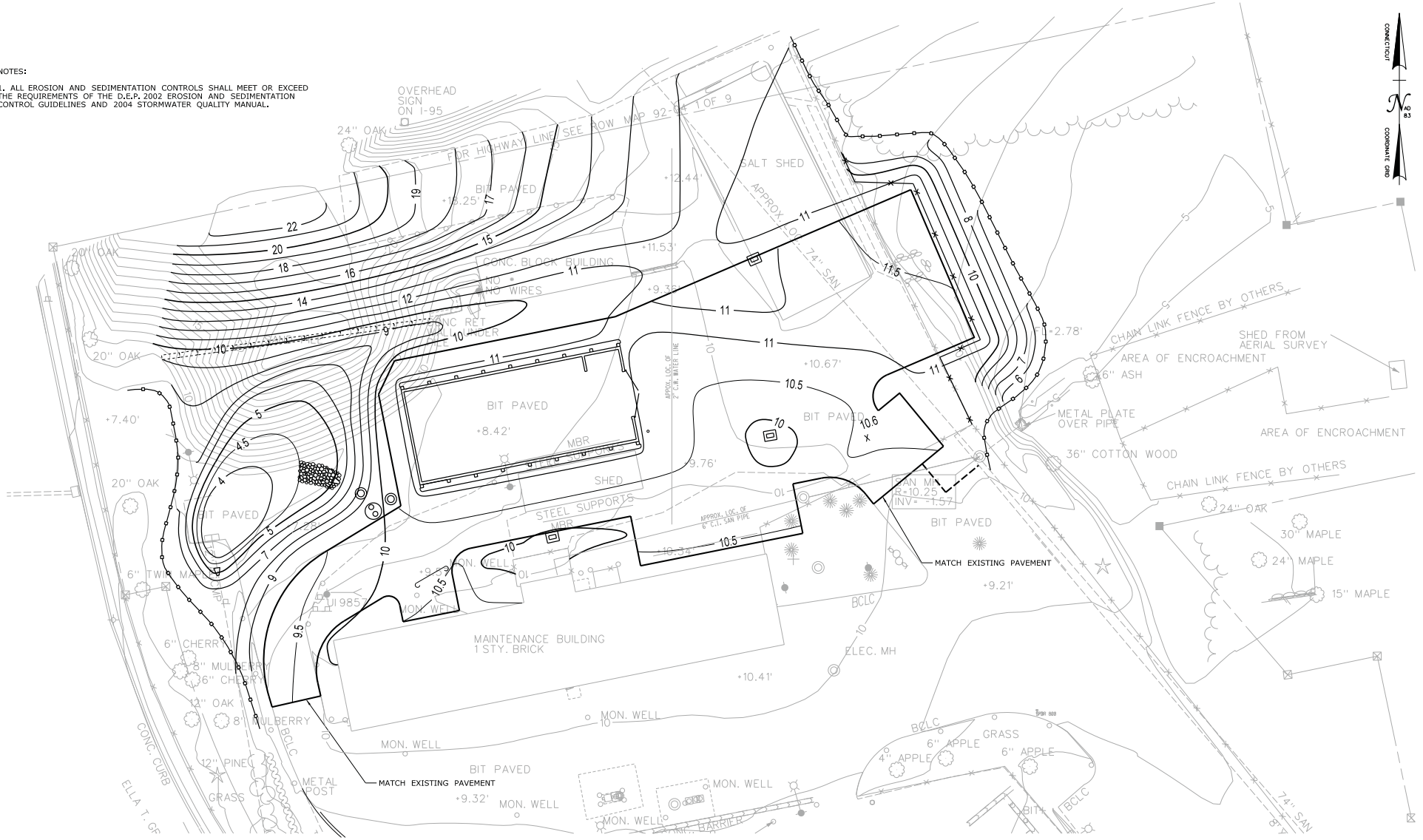
TOWN: NEW HAVEN

DRAWING TITLE: DRAINAGE PLAN

PROJECT NO. 92-549
DRAWING NO. C-003
SHEET NO. 05.04

NOTES:

1. ALL EROSION AND SEDIMENTATION CONTROLS SHALL MEET OR EXCEED THE REQUIREMENTS OF THE D.E.P. 2002 EROSION AND SEDIMENTATION CONTROL GUIDELINES AND 2004 STORMWATER QUALITY MANUAL.



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Plotted Date: 8/28/2012

DESIGNER/DRAFTER: SLM
CHECKED BY: LM
SCALE IN FEET 0 20 40
SCALE 1"=20'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\FD_MSH_GRD_0092_0549_C004.dgn

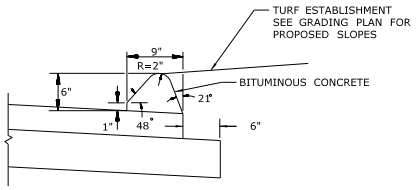
SIGNATURE/BLOCK:
OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

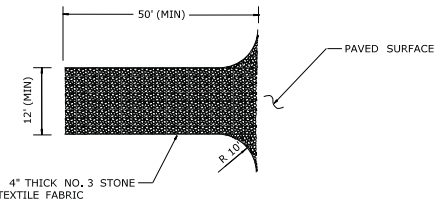
TOWN: **NEW HAVEN**

DRAWING TITLE: **GRADING PLAN**

PROJECT NO. **92-549**
DRAWING NO. **C-004**
SHEET NO. **05.05**



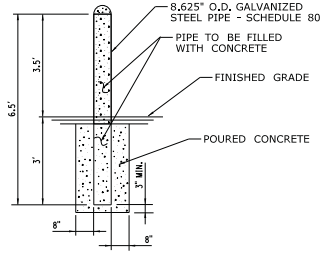
BITUMINOUS CONCRETE CURBING
NOT TO SCALE



NOTES:

1. STONE SHALL BE REPLACED AS NEEDED TO ENSURE SUFFICIENT CAPTURE OF SEDIMENT.
2. ANY SEDIMENT TRACKED OFF-SITE SHALL BE IMMEDIATELY REMOVED BY THE CONTRACTOR.

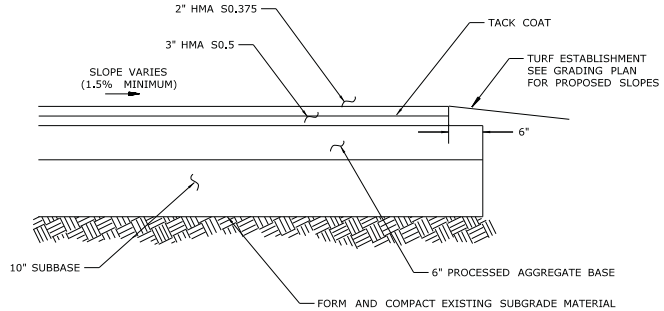
ANTI-TRACKING PAD
NOT TO SCALE



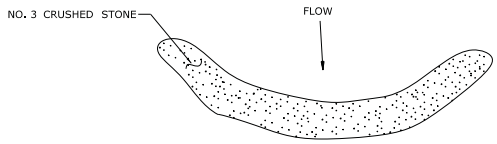
NOTES:

1. BOLLARDS SHALL BE COVERED WITH ¼" YELLOW POLYETHYLENE COVER.
2. TRIM BOLLARD COVER TO FIT.

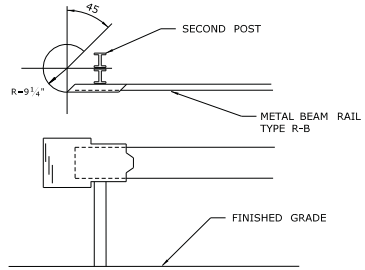
BOLLARD
NOT TO SCALE



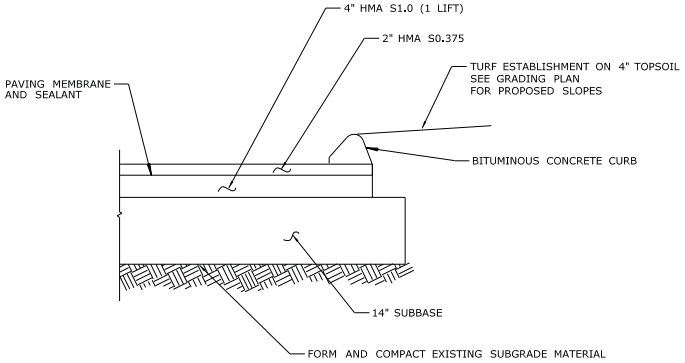
BITUMINOUS CONCRETE PAVEMENT
NOT TO SCALE



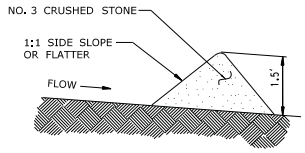
TOP VIEW



R-B TERMINAL SECTION
NOT TO SCALE



BITUMINOUS CONCRETE PAVING - WITH MEMBRANE
NOT TO SCALE

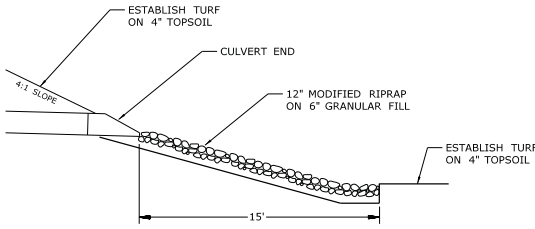


SIDE VIEW

NOTES:

1. STONE CHECK DAM SHALL EXTEND THE FULL WIDTH OF THE BASIN, PLUS 18 INCHES KEYED INTO THE BANKS ON EACH SIDE.
2. THE HEIGHT OF THE CENTER OF THE CHECK DAM SHALL BE 6 INCHES LOWER THAN THE HEIGHT OF THE OUTER EDGES.

STONE CHECK DAM
NOT TO SCALE



NOTE:
1. AT DISCHARGE POINT, PROVIDE 12" MODIFIED RIPRAP ON 6" GRANULAR FILL. RIPRAP SHALL EXTEND 3' ON EITHER SIDE OF THE CULVERT END AND 15' BEYOND THE CULVERT END.

RIPRAP OUTLET PROTECTION
NOT TO SCALE

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THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 8/20/2012

DESIGNER/DRAFTER: SLM
CHECKED BY: LM
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\FD_MSH_DET_0092_549_C006.dgn

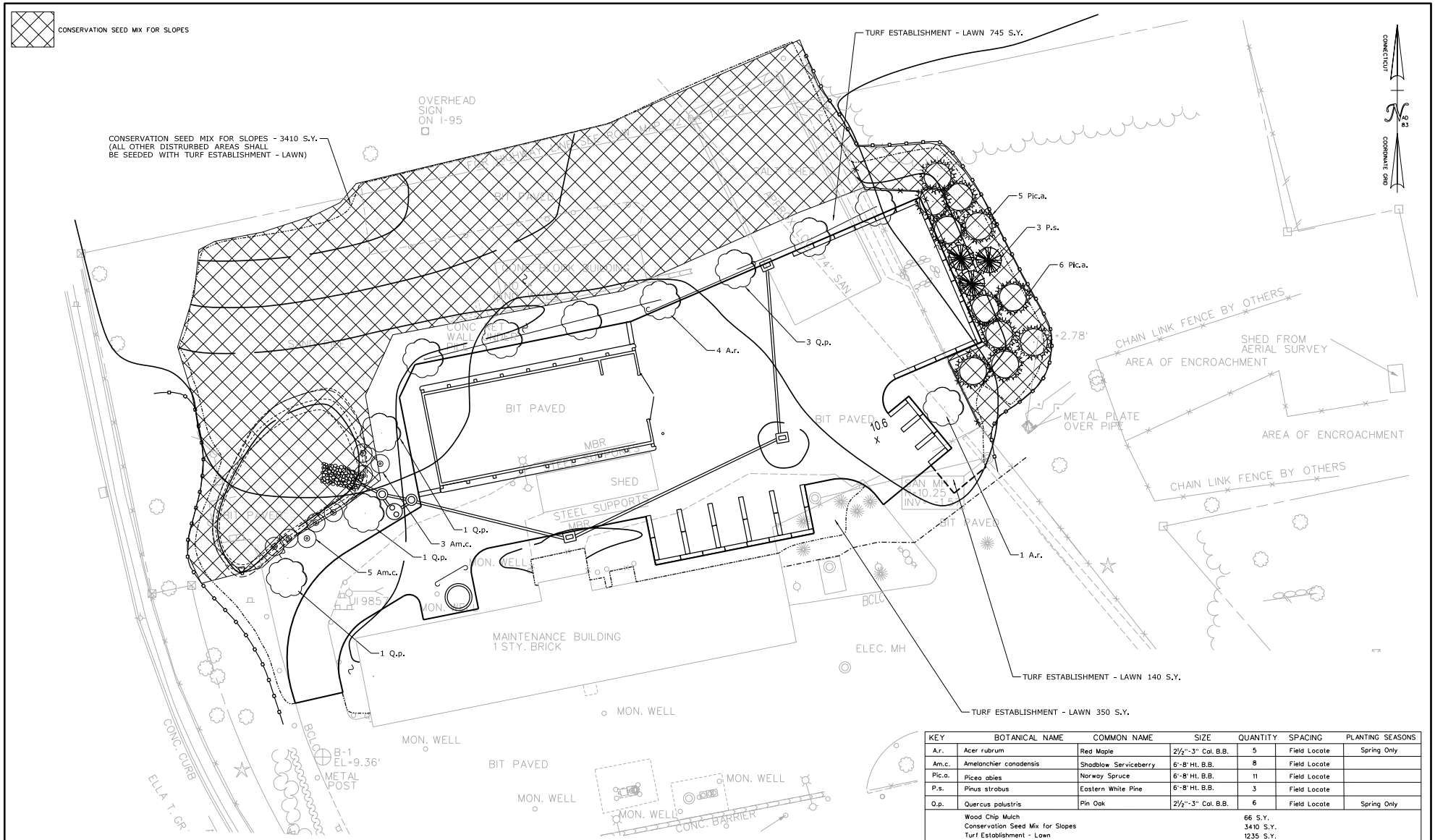
SIGNATURE/BLOCK:
OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

TOWN: NEW HAVEN

DRAWING TITLE: CIVIL DETAILS

PROJECT NO. 92-549
DRAWING NO. C-006
SHEET NO. 05.07



KEY	BOTANICAL NAME	COMMON NAME	SIZE	QUANTITY	SPACING	PLANTING SEASONS
A.r.	Acer rubrum	Red Maple	2½"-3" Cal. B.B.	5	Field Locate	Spring Only
Am.c.	Amelanchier canadensis	Shadblow Serviceberry	6'-8' Ht. B.B.	8	Field Locate	
Pic.a.	Picea abies	Norway Spruce	6'-8' Ht. B.B.	11	Field Locate	
P.s.	Pinus strobus	Eastern White Pine	6'-8' Ht. B.B.	3	Field Locate	
Q.p.	Quercus palustris	Pin Oak	2½"-3" Cal. B.B.	6	Field Locate	Spring Only
	Wood Chip Mulch			66 S.Y.		
	Conservation Seed Mix for Slopes			3410 S.Y.		
	Turf Establishment - Lawn			1235 S.Y.		

REV.	DATE	REVISION DESCRIPTION	SHEET NO.
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Plotted Date: 8/15/2012

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

DESIGNER/DRAFTER: **M. Rylander**
CHECKED BY: **D. Barnes**
SCALE IN FEET 0 20 40
SCALE 1"=20'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW-MSH-0092-0549-LDS-02.dgn

SIGNATURE/BLOCK: **OFFICE OF ENGINEERING**
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

TOWN: **NEW HAVEN**

DRAWING TITLE: **LANDSCAPE DESIGN SHEET**

PROJECT NO. **92-549**
DRAWING NO. **LDS-02**
SHEET NO. **06.02**

Attachment G – Plan Sheets

Sea Street Salt Shed
New Haven
State Project No. 92-549

D-001	Site Demolition Plan
C-001	Sedimentation and Erosion Control
C-002	Site Plan
C-003	Drainage Plan
C-004	Grading Plan
C-006	Civil Details
LDS-02	Landscape Design Plan

Attachment H: Engineering Documentation

Part 1: Engineering Report Checklist

The following is a checklist of requirements that need to be completed, included and submitted as part of the Engineering Report. Please complete this checklist by identifying where each requirement listed is addressed in the Engineering Report (report title and page numbers). If an item is not applicable, place "NA" in the box. Attach the completed checklist as the cover sheet to engineering reports, as applicable, which fully describe the design of the proposed facilities or other actions and the hydraulic and hydrologic effects thereof. The application instructions (DEP-IWRD-INST-100) should be consulted for a complete description of each item listed. This checklist is required to be signed and sealed by a professional engineer licensed in the State of Connecticut.

Stormwater Management

Location of Item	Item Description
	Description of the design storm frequency intensity, volume and duration
Attachment Q	Watershed maps, existing and proposed
	Computations for Tc
Attachment Q	Imperviousness calculations
	NRCS runoff curve numbers, volumetric runoff coefficients
	Computations used to determine peak runoff rates, and velocities for each watershed area (24-hour storm): • Stream Channel Protection: 2-year frequency (“over-control” of 2-year storm) • Conveyance Protection: 10-year frequency • Peak Runoff Attenuation: 2-year, 10-year, and 100-year frequency • Emergency Outlet Sizing: safely pass the 100-year frequency or larger storm
	Hydrograph routing calculations
Attachment Q	Description, schematics, and calculations for drainage and stormwater management systems, bridges and culverts
	Infiltration rates
	Documentation of sources
	Computer disk containing input and output data and the associated program for all computer models used in the analyses
	Hard copy of input and output data including input/output tables
Attachment Q	Detention basin analysis including timing and duration of expected outflow, stream stability analysis and hydrograph summation

Flood Plain Assessment

Location of Item	Item Description
	Description or simulation of existing and proposed conditions upstream and downstream of the proposed activity
	(For SCEL applications only) A determination of the effect of the proposed activity on flooding and flood hazards together with an equivalent encroachment on the opposite bank for the flood event establishing the encroachment lines
	For any bridge or culvert placement or replacement with a drainage area of 100 acres or more, plan sheets showing the existing and proposed inundation area for the 2, 10, 25, 50, and 100 year discharges, carried to convergence
	A description and analysis of the floodplain modifications required to restore any flood conveyance and flood storage capacity
	Demonstration that backwater from the proposed activity will not impact an existing dam, dike, or similar structure
	Backup data and complete hydraulic analysis for proposed modifications to the floodplain including location plan and plot for sections, profile sheet, summary sheet

Dams, Dikes, Diversion Channels, Similar Structures

Location of Item	Item Description
	Primary and emergency spillway and outlet structure erosion protection
	Dam breach analysis
	Geotechnical evaluation
	Construction Specifications for foundation preparation, embankment material, outlet structure, and construction inspection

Soil Erosion and Sediment Control Plan

Location of Item	Item Description
Attachment Q	Narrative
Attachment G	Drawings
	Details
	Calculations for Engineered Measures

Professional Certification

For any Engineering Report submitted as part of the IWRD permit application, the following certification must be signed and sealed by a professional engineer licensed to practice in Connecticut and submitted with the Engineering Report Checklist and Report.

"I certify that in my professional judgement, each requirement listed in the Engineering Report Checklist has been addressed in the Engineering Report submitted as part of the IWRD permit application as Attachment H, Part 1 and that the information is true, accurate and complete to the best of my knowledge and belief.

This certification is based on my review of the Engineering Report.

I understand that a false statement made in the submitted information may, pursuant to Section 22a-6 of the General Statutes, be punishable as a criminal offense under Section 53a-157b of the General Statutes, and may also be punishable under Section 22a-438 of the General Statutes."

Signature of Applicant	Date
Thomas J Maziarz Name of Applicant (print or type)	**Bureau Chief, Policy & Plannin** Title (if applicable)
 Signature of Professional Engineer	9/5/12 Date
Robert C. Messina Name of Professional Engineer (print or type)	P.E. Number (if applicable)

Affix P.E. Stamp Here
(if applicable)

Attachment H: Engineering Documentation

Part 2: Hydrologic and Hydraulic Consistency Worksheet

Inland Water Resources Division Permit Activities

This worksheet has four sections; only complete the section(s) applicable to the proposed project. Where a question requires a "Yes" or "No" answer, select the appropriate response and explain your response, if required, in the space provided.

Section I: **Floodplain Management** *(if the proposed project involves a structure, obstruction, encroachment or work in a watercourse, floodplain, or coastal high hazard area)*

Section II: **Stormwater Management** *(if the proposed project involves stormwater drainage or stormwater runoff*)

Sections III: **State Grants and Loans** and **Section IV: Disposal of State Land** *(only if the applicant is a state agency seeking flood management certification approval for state grants and loans or disposal of state land)*

Contents:

Definitions of terms used in these worksheets are found in Section 25-68b of the Connecticut General Statutes and Section 25-68h-1 of the Regulations of Connecticut State Agencies and in the National Flood Insurance Program Regulations (44 CFR, Chapter 1, Subchapter B, Part 59.1).

Section I: Floodplain Management

Section I: Floodplain Management

Name of Applicant: **Connecticut Department of Transportation**

Name of Proposed Project: **Sea Street Salt Shed in New Haven**

1. General Criteria

a. *Critical Activity* - Does the proposed project involve the treatment, storage and disposal of hazardous waste or the siting of hospitals, housing for the elderly, schools or residences, in the 0.2 per cent [500 year] floodplain? ☐ Yes ☒ No

If yes, the base flood for the critical activity shall have a recurrence interval equal to the 500 year flood event; if no, the base flood for the activity shall have a recurrence interval equal to the 100 year flood event.

b. *Nonintensive Floodplain Uses* - Will the proposed project promote development in floodplains or will utilities servicing the project be located so as to enable floodplain development?

☐ Yes ☒ No

Explain:

c. *National Flood Insurance Program* (NFIP) - Will the proposed project be located within an area of special flood hazard designated by the Federal Emergency Management Agency (FEMA)?

☐ Yes ☒ No If yes, list the FEMA flood zone(s):

Does the proposed project meet the NFIP minimum standards established in 44 CFR, Chapter 1, Subchapter B, Part 60.3, floodplain management criteria for flood-prone areas?

☒ Yes ☐ No

d. *Municipal Regulations* - Has the municipality in which the proposed project is to be located adopted floodplain regulations containing requirements that are more restrictive than the NFIP floodplain management criteria for flood-prone areas? ☐ Yes ☒ No

If yes, describe the more restrictive requirements:

Does the proposed project comply with the more restrictive standards of the municipality?

☐ Yes ☐ No

Section I: Floodplain Management (continued)

2. Flooding and Flood Hazards

a. *Flooding* - Will the proposed project pose any hazard to human life, health or property in the event of a base flood? ☐ Yes ☒ No

If yes, explain:

b. *Flood Velocities* - Will the proposed project cause an increase in flow velocity or depth during the base flood discharge? ☐ Yes ☒ No

If yes, the increase in velocity is: fps
and/or the increase in depth is: ft.

Will such increase in velocity or depth cause channel erosion or pose any hazard to human life, health or property? ☐ Yes ☐ No

Explain:

c. *Flood Storage* - Will the proposed project affect the flood storage capacity or flood control value of the floodplain? ☐ Yes ☒ No

If yes, describe the effects:

d. *Degrading or Aggrading Stream Beds* - Is the streambed currently degrading or aggrading?

☐ Degrading ☐ Aggrading ☒ Neither

Has the project design addressed degrading or aggrading streambed conditions?

☐ Yes ☐ No

e. *Ice Jams* - Is the watercourse prone to ice jams or floods due to ice? ☐ Yes ☒ No

Has the project design considered ice jams or floods due to ice? ☐ Yes ☐ No

Section I: Floodplain Management (continued)

f. *Storage of Materials & Equipment* - Will the construction or use of the proposed project involve the storage of materials below the 500 year flood elevation that are buoyant, hazardous, flammable, explosive, soluble, expansive or radioactive, or the storage of any other materials which could be injurious to human, animal or plant life in the event of a flood?

☐ Yes ☒ No

If yes, describe the materials and how such materials will be protected from flood damage, secured or removed from the floodplain to prevent pollution and hazards to life and property.

Storage of materials that could be injurious to human health or the environment in the event of flooding is prohibited below the elevation of the 500 year flood. Other material or equipment may be stored below the 500 year flood elevation provided that such material or equipment is not subject to major damage by floods, and provided that such material or equipment is firmly anchored, restrained or enclosed to prevent it from floating away or that such material or equipment can be removed prior to flooding.

g. *Floodwater Loads* - Will structures, facilities and stored materials be anchored or otherwise designed to prevent floatation, collapse, or lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy? ☐ Yes ☒ No

3. Standards for Structures in Floodplains or Coastal High Hazard Areas

Does the proposed project involve a new or substantially improved structure or facility located within a floodplain or coastal high hazard area? ☒ Yes ☐ No

If yes, complete this subsection; if no, skip to subsection 4 **(*Topography Changes within Floodplain)***.

a. *Structures in Coastal High Hazard Areas* - Will the structure or facility be located within an NFIP coastal high hazard area? ☐ Yes ☒ No

If no, skip to paragraph 3(b); if yes:

1. Will the structure or facility be located landward of the reach of mean high tide?

   ☐ Yes ☐ No

2. Will a new structure or facility be located on an undeveloped coastal barrier beach designated by FEMA? ☐ Yes ☐ No

3. If the structure or facility is/will be located within a coastal high hazard area, the structure or facility must be elevated on pilings or columns so that the bottom of the lowest horizontal structural member of the lowest floor (excluding the pilings or columns) is elevated to at least one foot above the base flood level and the pile or column foundation and structure attached thereto must be anchored to resist floatation, collapse and lateral movement due to the effects of wind, velocity waters, hurricane wave wash, and base flood water loads acting simultaneously on all building components.

   Does the proposed structure or facility meet these standards? ☐ Yes ☐ No

   The base flood elevation is: ft. (Datum:)

   The elevation of the lowest horizontal structural member is: ft. (Datum:)

Section I: Floodplain Management (continued)

4. Will the space below the lowest floor be either free of obstruction or constructed with non-supporting breakaway walls? ☐ Yes ☐ No

5. Will fill be used for structural support of any buildings within coastal high hazard areas?

   ☐ Yes ☐ No

b. *Structures in Floodplain Areas* - Are the structures residential or nonresidential?

☐ Residential ☒ Nonresidential If *nonresidential*, skip to paragraph 3(d) below.

c. *Residential Structures* - If the structure or facility is for human habitation will the lowest floor of such structure or facility, including its basement, be elevated one foot above the level of the 500 year flood?

☐ Yes ☐ No

The 500 year flood elevation is: ft. (Datum:)

The elevation of the lowest floor, including basement, is: ft. (Datum:)

d. *Non-residential Structures* - If the structure or facility is not intended for residential uses, will the lowest floor of such structure or facility, including its basement, be elevated to or above the 100 year flood height or be floodproofed to that height, or in the case of a critical activity, the 500 year flood height?

☒ Yes ☐ No

If yes, the structure will be: ☒ Elevated ☐ Floodproofed

The base flood elevation is: **10.0** ft. (Datum: **1988**)

The elevation of the lowest floor, including basement, is: **11.0** ft. (Datum: **1988**)

The structure is floodproofed to: ft. (Datum:)

Note: for insurance purposes nonresidential structures must be floodproofed to at least one foot above the base flood elevation. DEP strongly encourages that the height of floodproofing incorporate one foot of freeboard.

e. *Utilities* - Will service facilities such as electrical, heating, ventilation, plumbing, and air conditioning equipment be constructed at or above the elevation of the base flood or floodproofed with a passive system? ☒ Yes ☐ No

f. *Water Supply Systems* - Does the proposed project include a new or replacement water supply system?
☐ Yes ☒ No

If yes, is the water supply system designed to prevent floodwaters from entering and contaminating the system during the base flood? ☐ Yes ☐ No

g. *Sanitary Sewage Systems* - Does the proposed project include a new or replacement sanitary sewage or collection system? ☐ Yes ☒ No

If yes, is the sanitary sewage system designed to minimize or eliminate the infiltration of flood waters into the systems and discharges from the systems into flood waters during the base flood?

☐ Yes ☐ No

h. *Foundation Drains* - Are foundation drains of buildings designed to prevent backflow from the 100 year frequency flood into the building?

☐ Yes ☐ No ☒ No foundation drains

Section I: Floodplain Management (continued)

4. Activity within Floodplain

Does the proposed project involve activity in a floodplain including but not limited to filling, dumping, construction, excavating, or grading?

☒ Yes ☐ No If no, skip to subsection 5 ***(Alterations of Watercourses)***.

If yes, does the proposed project include encroachments, including fill, new construction, substantial improvements, or other development within a NFIP adopted regulatory floodway?

☐ Yes ☒ No If yes, skip to paragraph 4(b) below.

a. *No Regulatory Floodway* - The NFIP requires that until a regulatory floodway is designated, that no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point. (If no regulatory floodway has been adopted, project impacts may be evaluated by considering an equivalent conveyance loss on the opposite side of the river from the proposed project.)

Is the proposed project consistent with this requirement? ☒ Yes ☐ No

b. Floodway Encroachments - Will the proposed encroachment into the floodway result in any increase in flood levels during either the 100 year or 10 year discharges?

100 year: ☐ Yes; the increase is: (in 1/100ths of a foot) ☒ No

If yes, has the applicant received approval of such increase in accordance with 44 CFR, Chapter 1, Subchapter B, Part 65.12? ☐ Yes ☐ No

10 year: ☐ Yes; the increase is: (in 1/100ths of a foot) ☐ No

c. *Coastal Areas* - Flood hazard potential in coastal areas shall be evaluated considering surface profiles of the combined occurrence of tides, storm surges, and peak runoff. The starting water surface elevation for the base flood in watersheds with time of concentrations of over 6 hours shall be the 10 year frequency tidal surge level.

If the proposed project is in a coastal area, have the hydraulic analyses incorporated these criteria?

☐ Yes ☒ No ☐ Not in Coastal Area

5. Alterations of Watercourses

Does the proposed project include the construction or alteration to a natural perennial watercourse or man-made channel?

☐ Yes ☒ No If no, skip to subsection 6 ***(Culverts and Bridges)***; if yes, complete the following subsection:

a. *Topography Change* - Is the watercourse or channel located within a regulatory floodway or Zone A1-30 or AE as designated by the NFIP? ☐ Yes ☐ No

b. *Hydraulic Capacity* - Does the channel have a minimum flow capacity of a flood equal to at least the 25 year frequency flood? ☐ Yes ☐ No

The channel capacity is designed for the: year flood.

Does the channel have an inner channel with a capacity of a 2 year frequency flood? ☐ Yes ☐ No

Section I: Floodplain Management (continued)

c. *Aquatic Habitat* - Channel alterations should be designed to create aquatic habitats suitable for fisheries, including suitable habitat for maintaining fish populations and to enable fish passage, and to maintain or improve water quality, aesthetics, and recreation.

Has the applicant had any pre-application meetings or correspondence with DEP Fisheries?

☐ Yes ☐ No

Check each of the following criteria that have been incorporated into the project design:

☐ 1. artificial channel linings have been avoided;

☐ 2. the channel will encourage ecological productivity and diversity;

☐ 3. the channel and its banks will be compatible with their surroundings;

☐ 4. the channel will vary in its width, depth, invert elevations, and side slopes to provide diverse aquatic habitat;

☐ 5. straightening existing channels and thereby decreasing their length has been avoided;

☐ 6. the channel will not create barriers to upstream and downstream fish passage;

☐ 7. the channel will contain pools and riffles and a low flow channel to concentrate seasonal low water flows;

☐ 8. the channel will contain flow deflectors, boulders and low check dams to enhance aquatic habitat;

☐ 9. stream bank vegetation will be preserved where feasible and disturbed stream bank areas will be replanted with suitable vegetation;

☐ 10. clean natural stream bed materials of a suitable size will be incorporated in the new channel; and

☐ 11. construction of the proposed project will be scheduled to minimize conflicts with spawning, stocking, and recreational fishing seasons.

Describe how the above aquatic habitat design criteria have been incorporated into the project design:

Section I: Floodplain Management (continued)

6. Culverts and Bridges

Does the proposed project involve the repair or new construction of a culvert or bridge?

☐ Yes ☒ No If no, go to subsection 7 ***(Temporary Hydraulic Facilities)***.

If yes, complete this subsection:

a. *Fish Passage* - Does the culvert design allow for the passage of fish? ☐ Yes ☐ No

If yes, describe the specific design provisions for fish passage:

b. *Depressed Structural Floors* - Is the rigid structural floor of the culvert or bridge depressed below the normal stream bed to allow a natural stream bed to form over the floor?

☐ Yes ☐ No ☐ No rigid structural floor

c. *Multiple Openings* - The use of a single large culvert or bridge opening is preferred over the use of multiple small openings. Has the design minimized the use of multiple small openings?

☐ Yes ☐ No

If no, explain:

d. *Sag Vertical Curves* - Does the design utilize solid parapet walls in the sag part of a vertical curve?

☐ Yes ☐ No ☐ Not located in a sag vertical curve

e. *Debris Blockage* - Is the culvert or bridge prone to blockage by debris? ☐ Yes ☐ No

If yes, has the project design incorporated measures to minimize the potential for debris blockage?

☐ Yes ☐ No

f. *Topography Change* - Is the culvert or bridge located within a regulatory floodway or Zone A1-30 or AE as designated by the NFIP? ☐ Yes ☐ No

Section I: Floodplain Management (continued)

g. *State Highways* - Does the watercourse pass under a state roadway?

☐ Yes ☐ No If no, skip to paragraph 6(g)(2).

If yes, culverts and bridges for state highways shall be designed in accordance with the Connecticut Department of Transportation (DOT) Drainage Manual and all applicants should refer to it for specific design criteria. In general, however, the Drainage Manual requires the following:

(Place a check mark for all applicable criteria utilized)

☐ *Minor Structures* - Minor structures have a drainage area of less than one square mile in which there is no established watercourse. They shall be designed to pass the 25 year frequency discharge.

☐ *Small Structures* - Small structures have a drainage area of less than one square mile in which there is an established watercourse. *They* shall be designed to pass the 50 year frequency discharge.

☐ *Intermediate Structures* - Intermediate structures have a drainage area greater than one square mile and less than 10 square miles. They *shall* be designed to pass the 100 year frequency discharge with reasonable underclearance.

☐ *Large Structures* - Large structures have a drainage area greater than 10 square miles and less than 1000 square miles. They shall be designed to pass the 100 year frequency discharge with an underclearance not less than two feet.

☐ *Monumental Structures* - Monumental structures *have* a drainage area greater than 1000 square miles. They shall be designed to meet the requirements of the Connecticut Department of Environmental Protection, U.S. Army Corps of Engineers, and the U.S. Coast Guard.

☐ *Tidal Structures* - Tidal structures are subject to tidal action and shall be classified as minor, small, intermediate, etc. depending on their drainage area. These structures shall be designed in accordance with the previously listed *classifications*. However if the highway is subject to frequent tidal flooding, the design storm may be made consistent with the frequency of flooding by tidal action. The proposed culvert or bridge is classified as:

☐ Tidal, minor

☐ Tidal, small

☐ Tidal, intermediate

☐ Tidal, large

☐ Tidal, monumental

1. Has the structure been designed in accordance with the criteria established in the DOT Drainage Manual? ☐ Yes ☐ No

   If no, describe the lower design standards and the reasons for not complying with the DOT Drainage Manual:

Section I: Floodplain Management (continued)

2. Will the proposed culvert or bridge increase upstream water surface elevations in the event of a base flood above that which would have been obtained in the natural channel if the highway embankment were not constructed? ☐ Yes ☐ No

   If yes, is the increase in elevation more than one foot? Describe:

3. Will the proposed culvert or bridge be designed so that flooding during the design discharge does not endanger the roadway or cause damage to upstream developed property? (NOTE: The design discharge for culverts and bridges on state highways should be that which was determined by FEMA. If the applicant judges that the FEMA discharge is inappropriate, the project should be analyzed for both the applicant's computed flow and the FEMA discharge. The project, however, must still meet the standards of the NFIP.) ☐ Yes ☐ No

   Explain:

h. *Local Roads & Driveways* - Local roads (not state highways) and driveways may be designed for flood frequencies and underclearances less stringent than those specified in the DOT Drainage Manual when (check all that have been incorporated into the project design):

   ☐ 1. the road is at or close to the floodplain grade

   ☐ 2. water surface elevations are not increased by more than one foot nor cause damage to upstream properties

   ☐ 3. provisions are made to barricade the road when overtopped

   ☐ 4. the road or driveway is posted as being subject to flooding

   ☐ 5. the road or driveway has low traffic volume

   ☐ 6. alternate routes are available

   The culvert or bridge has been designed to pass the: year frequency discharge with an underclearance of: feet.

   Utilizing the DOT Drainage Manual classifications listed under paragraph 6(g) above, the culvert or bridge is classified as a: structure.

Section I: Floodplain Management (continued)

h. If the culvert or bridge is designed to standards lower than which is stipulated in the DOT Drainage Manual, list such standards and the reasons for the lower design standards:

i. *Downstream Peak Flows* - Will the proposed culvert or bridge increase downstream peak flows by decreasing existing headwater depths during flooding events? ☐ Yes ☐ No

If yes, describe the selected design criteria and the impacts to downstream properties:

7. Temporary Hydraulic Facilities

Temporary hydraulic facilities include all channels, culverts or bridges which are required for haul roads, channel relocations, culvert installations, bridge construction, temporary roads, or detours. They are to be designed with the same care which is used for the primary facility.

If the proposed activity involves a temporary hydraulic facility(s), has such facility been designed in accordance with Chapter 6, Appendix F, "Temporary Hydraulic Facilities," of the DOT Drainage Manual?

☐ Yes ☐ No ☒ No temporary hydraulic facilities

If yes, the design flood frequency is the: year flood.

Describe the temporary facilities:

Section II: Stormwater Management

Name of Applicant: **Connecticut Department of Transportation**

Name of Proposed Project: **Sea Street Salt Shed in New Haven**

1. *Stormwater Runoff*

The proposed project will (check all that apply):

- ☐ Increase the area of impervious surfaces
- ☐ Increase runoff coefficients
- ☐ Alter existing drainage patterns
- ☐ Alter time of concentrations
- ☐ Change the timing of runoff in relation to adjacent watersheds

Will the proposed project impact downstream areas by increasing peak flow rates, the timing of runoff, or the volume of runoff? ☐ Yes ☒ No

If yes, describe the downstream impacts for the 2, 10 and 100 year frequency discharges:

The pre and post development peak flow rates at the downstream design point are as follows:

Return Frequency (Year)	Peak Discharges (CFS)	
	Pre-Development	Post-Development
2		
10		
100		

The above peak discharges were computed utilizing the: hour duration storm. This duration storm was selected because:

Section II: Stormwater Management (continued)

Describe the location of the design point and why this location was chosen:

2. *Stormwater Detention Facilities*

Does the proposed project include the construction of any stormwater detention facilities?

☒ Yes ☐ No If no, skip to subsection 3 ***(Storm Drainage Systems)***.

If yes, has the DEP determined whether a dam construction permit is required? ☐ Yes ☐ No

The pre and post development peak flow rates at the downstream design point are as follows:

Return Frequency (Year)	Peak Discharges (CFS)		
	Pre-Development	Post-Development (without detention)	Post-Development (with detention)
2			
10	**2.8**	**2.2**	**2.0**
100	**4.0**	**3.2**	**3.1**

The above peak discharges were computed utilizing the: **.66** hour duration storm. This duration storm was selected because:

This represents the worst-case flows for post-construction conditions. Shorter durations, which better represent the peak for the pre-construction conditions, were also checked.

While the peak flow times of this system were offset by the detention time in the basin, the quantities of flow were decreased from their pre-construction conditions. The flows are small enough to have no effect on the larger system, which accepts flow from the surrounding roadways.

The basin was included in the design as a benefit to the quality of stormwater as it leaves the site.

Describe the location of the design point and why this location was chosen:

The design point is the first common point where all pre-construction flows and post-construction flows enter the existing system. See figures in Attachment Q for location.

Section II: Stormwater Management (continued)

If the proposed project increases peak flow rates for the 2, 10 or 100 year frequency discharges, describe the impacts to downstream areas:

Will the detention facility aggravate erosion along the downstream channel? ☐ Yes ☒ No

In certain situations, detention of stormwater aggravates downstream flooding. This occurs when the discharge from a subwatershed is delayed by a detention facility so that it adds to the peak discharge from another subwatershed. Adding the hydrographs of the two subwatersheds results in a higher peak discharge over that which would occur if detention were not present.

Is the location of the detention facility within the watershed suitable for detention? ☒ Yes ☐ No

Explain:

The basin allows for treatment of approximately 1/3 of the WQV for the site while reducing the maximum flows into the existing drainage system. The basin will have no negative impacts on the watershed.

3. *Storm Drainage Systems*

Does the proposed project include the construction of subsurface storm drainage systems?

☒ Yes ☐ No If no, you have completed Section II of the worksheets.

If yes, complete this subsection:

a. *DOT Standards* - Is the proposed storm drainage system designed in accordance with the Connecticut Department of Transportation's (DOT) Drainage Manual? ☒ Yes ☐ No

If no, describe the lower design standards and the reasons for not complying with the Drainage Manual:

b. *Design Storm* - Is the storm drainage system designed for a ten year frequency storm without closing the use of the facility? ☒ Yes ☐ No

c. *Future Development* - Has the design of the system considered future development of adjacent properties? ☐ Yes ☒ No

Section II: Stormwater Management (continued)

d. *Outlet Protection* - Have the outlets from the system been designed to minimize the potential for downstream erosion? ☒ Yes ☐ No

e. *Overland Flow* - Has the use of curbing been minimized to encourage overland dispersed flow through stable vegetated areas? ☒ Yes ☐ No

f. *Vegetated Filter Strips* - Has the design incorporated the use of vegetated filter strips or grass swales to improve the quality of water outletting from the storm drainage system? ☒ Yes ☐ No

g. *Stormwater Treatment* - Describe features of the stormwater collection system intended to improve the quality of stormwater runoff prior to its discharge to surface waters.

The existing site stormwater system consisted of a short series of catchbasins which collected stormwater on all of the paved areas and discharged directly into the existing system. The new system will add a hydrodynamic separator to act as pre-treatment and a storm basin which will encourage infiltration and allow for a further reduction in sediment leaving the site. In addition, the impervious area of the site has been reduced by 0.43 acres and replaced with grassed and landscaped slopes to further encourage infiltration.

h. *E & S Control Plan* - Has the design and installation of the storm drainage system been coordinated with the soil erosion and sediment control plan prepared in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control? ☒ Yes ☐ No

Explain:

Before construction begins, silt fence or haybales will be installed at the limits of all disturbed area and around existing catchbasins within the project limits. Anti-tracking pads will be installed where construction traffic enters/exits the site.

During construction, the above controls will be maintained. When the basin is cobnstructed, the outlet pipe will be protected by a stone check dam. Disturbed slopes will be stabilized with seeding or an erosion control matting. Riprap will be placed at the outlet of the new storm system. Construction debris will be regularly removed from the site and dust control measures, including sweeping and spraying, will be used as needed.

At the end of the project, the temporary sedimentation controls will be removed as the site is stabilized and all structures in the new storm system will be cleaned of sediment.

Attachment I – Flood Contingency Plan

Sea Street Salt Shed
New Haven
State Project No. 92-549

Construction Operation Plan

During construction, the Contractor is bound by the conditions in Section 1.10 of Form 816, which addresses the need for the Contractor to maintain a stable work area and to coordinate with the National Oceanic and Atmospheric Administration (N.O.A.A.) weather service for information pertaining to storms.

In the event of flooding, storage of materials that could be injurious to human health or the environment will be located outside of the 100-year flood zone. Other material or equipment may be stored below the 500 year flood elevation such that the material or equipment is not subject to major damage by floods, and that such material or equipment will be firmly anchored, restrained or enclosed to prevent it from floating away or that such material or equipment can be removed prior to flooding.

Prior to construction, the Contractor will submit to the Engineer for approval, a written flood contingency plan. The plan will include the following:

- A description of the means by which the Contractor will remove from the floodprone areas, all material, equipment and personnel prior to a predicted major storm.
- Provisions for notifying workers engaged in work on the site of an impending storm.
- Provisions for securing work in progress prior to a major storm.

The contract is expected to begin in the spring of 2013 and take six months to construct. At the pre-construction meeting, typically held two weeks prior to construction, appropriate field personnel will be assigned to coordinate activities during construction. The inspection personnel will be assigned through DOT Office of Construction, District 3, New Haven (203-389-3020).

Additionally, DOT Office of Environmental Planning (860-594-2920) will assign personnel to review the Contractor's erosion and sediment control plans. The Department can invoke the "24 hour rule" as prescribed in Form 816, Section 1.10 in order to force the Contractor to correct any deficiencies found on the project affecting environmental issues. The Office of Environmental Planning will oversee the Contractor for the life of the contract as necessary to ensure compliance with all environmental requirements.

Post-Construction Operation Plan

The Department will maintain responsibility for the integrity of the facility after completion of the project. On-site maintenance staff (203-789-7842) will be responsible for maintaining the site post-construction. Typically, if there are any environmental issues to be addressed, the Office of Environmental Planning should be contacted in order to coordinate any remedial action involving regulated activities.

Attachment Q – Other Information

Sea Street Salt Shed
New Haven
State Project No. 92-549

- FEMA Firmette
- Pre-Construction Conditions
- Post-Construction Conditions
- Basin Drainage Area
- Drainage Calculations
  - Pipe Flow Chart – 10 year storm
  - Basin Routing Calculations – 10 year storm
  - Water Quality Volume Calculations
- Erosion and Sedimentation Control Narrative
- PMM Notes

MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0441H

FIRM

FLOOD INSURANCE RATE MAP

NEW HAVEN COUNTY, CONNECTICUT

(ALL JURISDICTIONS)

PANEL 441 OF 635

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

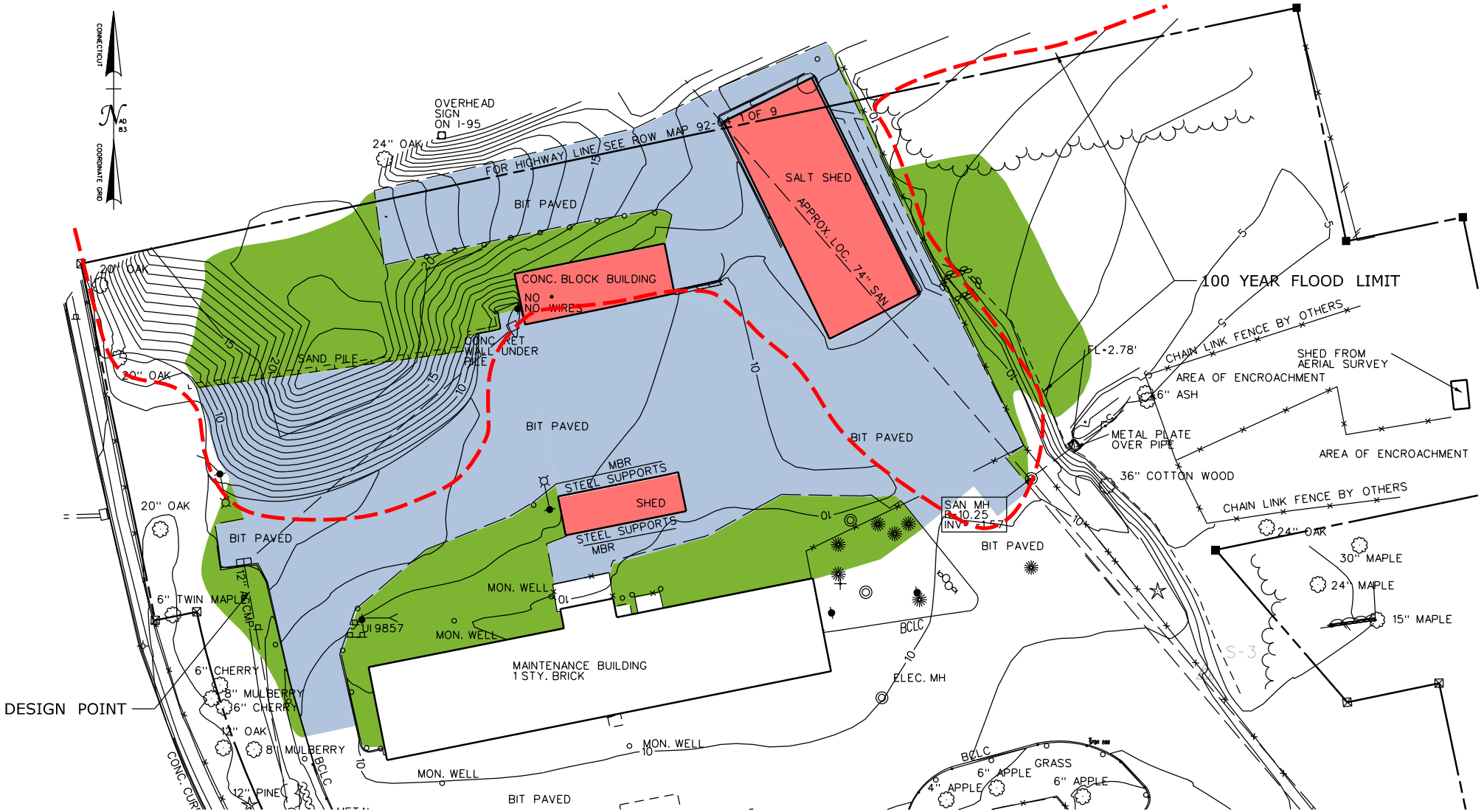
COMMUNITY	NUMBER	PANEL	SUFFIX
NEW HAVEN, CITY OF	090084	0441	H
WEST HAVEN, CITY OF	090092	0441	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
09009C0441H

EFFECTIVE DATE
DECEMBER 17, 2010

Federal Emergency Management Agency



ROOF - 0.15 AC

PAVED - 0.90 AC

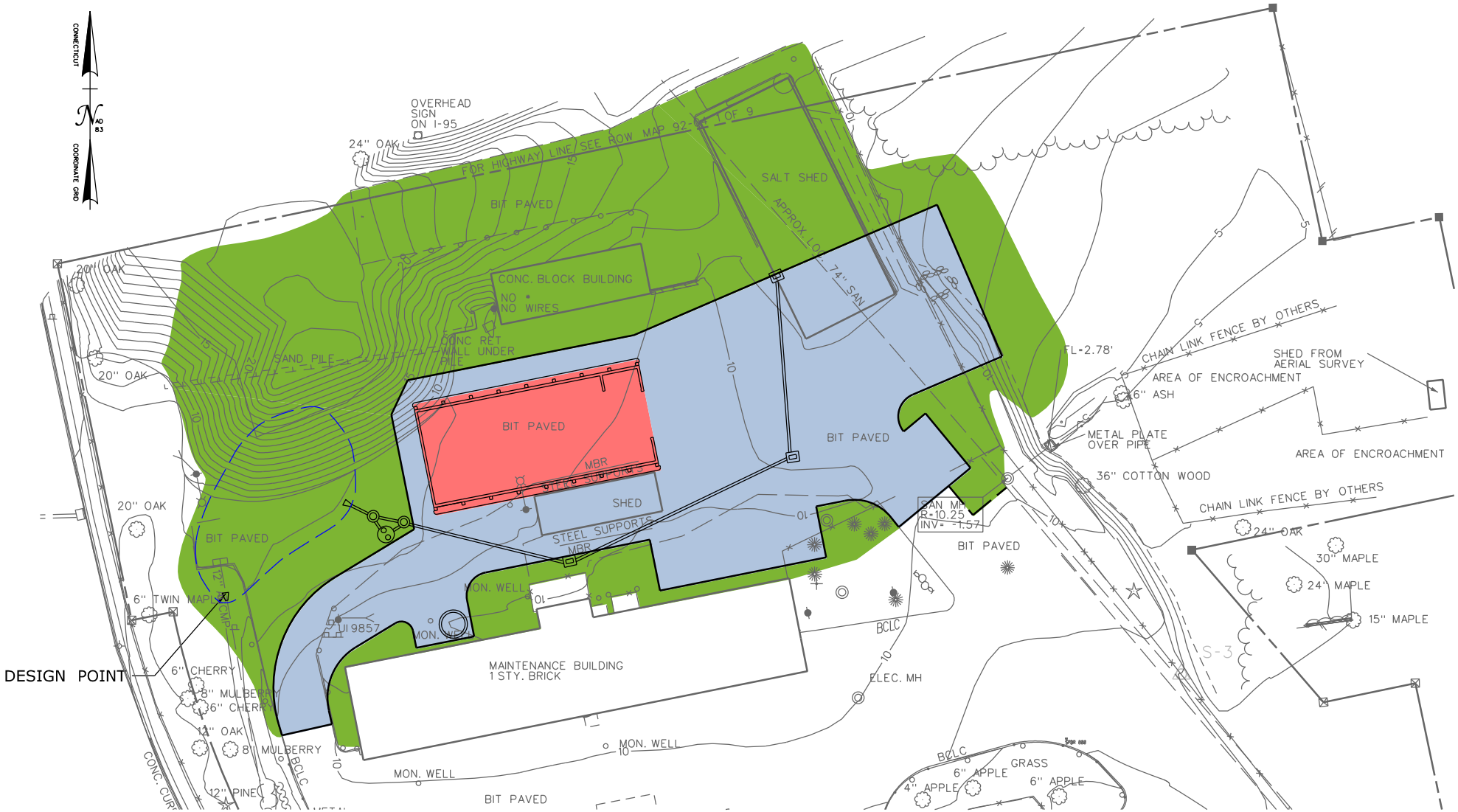
UNPAVED - 0.51 AC

ESTIMATED RUNOFF COEFFICIENT $= \frac{(1.0)(0.15)+(0.9)(0.90)+(0.3)(0.51)}{(0.15+0.90+0.51)} = 0.71$

SEA STREET SALT SHED
NEW HAVEN

PRE-CONSTRUCTION CONDITIONS

1"=60'



ROOF - 0.11 AC

PAVED - 0.51 AC

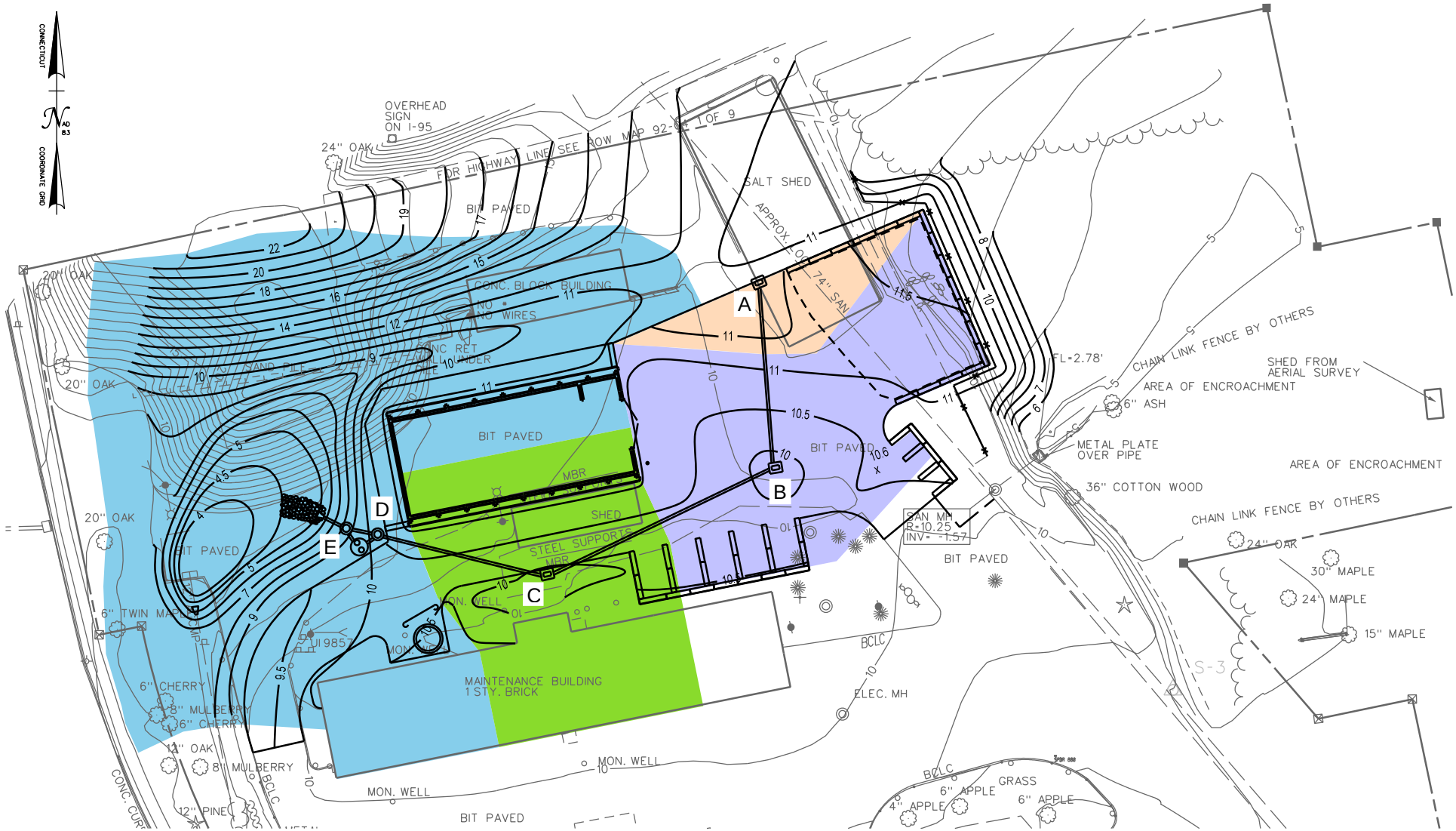
UNPAVED - 0.94 AC

ESTIMATED RUNOFF COEFFICIENT $= \frac{(1.0)(0.11)+(0.9)(0.51)+(0.3)(0.94)}{(0.11+0.51+0.94)} = 0.55$

SEA STREET SALT SHED
NEW HAVEN

POST-CONSTRUCTION CONDITIONS

1"=60'



AREA #1 - 0.06 AC PAVEMENT
AI=(0.9)(0.06)=0.05

AREA #2 - 0.26 AC PAVEMENT
AI=(0.9)(0.26)=0.23

AREA #3 - 0.13 AC ROOF, 0.07 AC PAVEMENT, 0.05 AC GRASS/GRAVEL
AI=(1.0)(0.13)+(0.9)(0.07)+(0.2)(0.05)=0.20

AREA #4 - 0.11 AC ROOF, 0.11 AC PAVEMENT, 0.64 AC GRASS/GRAVEL
AI=(1.0)(0.11)+(0.9)(0.11)+(0.3)(0.64)=0.40

TOTAL IMPERVIOUS AREA = 0.74 AC

SEA STREET SALT SHED
NEW HAVEN

BASIN DRAINAGE AREA

1"=60'

NEW HAVEN SALT SHED **STATE PROJECT 92-549**

Storm Drainage Piping Calculations - Pavement area only

Line	Time to	Time in	Accum.	Contrib.	Surface	Imperv.	AI to	Sum of AI	Rainfall	Q in	Pipe	Length of	Slope	"n"	Average	Maximum
Segment	Inlet	Pipe	Time	Area		Coeff.	C.B.	in System	Intensity	System	Size	Pipe			Velocity	Capacity
	min	*min*	*min*	*acre*					*in/hr*	*cfs*	*in*	*ft*	*ft/ft*		*ft/sec*	*cfs*
A-B	5	0.55	5.00	0.06	pavement	0.9	0.05	0.05	6	**0.32**	12	76	0.013	0.013	2.309	4.37
B-C	5	0.48	5.55	0.26	pavement	0.9	0.23	0.29	5.9	**1.70**	12	100	0.005	0.013	3.46	2.71
C-D	5	0.29	6.03	0.13	roof	1	0.19	0.48	5.8	**2.79**	15	68	0.005	0.013	3.92	4.91
				0.07	pavement	0.9										
D-E	-	0.02	6.32	-	-	-	-	0.48	5.7	**2.74**	15	8	0.05	0.013	7.46	15.54
E-Basin	-	0.03	6.34	-	-	-	-	0.48	5.7	**2.74**	15	8	0.01	0.013	4.89	6.95
			6.37													

NEW HAVEN SALT SHED **STATE PROJECT 92-549**

Basin Routing Calculations

Inlet pipe: 15" RCP inv. at 4.95, s=0.010 ft/ft

Outlet pipe: 12" accmp inv. @ elev. 4.65, S= .0032 ft/ft for 124'

Total AI in (pavement + grass): 0.88

Basin Volumes

	elevation	area in sf at elev.	cf per 1/2 ft depth	Total Vol.-cf
0	4	841	0	0
0.5	4.5	1265	527	527
1	5	2791	1014	1541
1.5	5.5	3086	1469	3010
2	6	3318	1601	4611
2.5	6.5	3584	1726	6336
3	7	3851	1859	8195

10 year storm

WQV = 2657

31 = % of WQV retained below the outlet

	T(min)= **10**		R(in/hr)= 4.8		AI= 0.88		Q(cfs)= 4.224				velocity
60 sec. intervals	1	2	3	4	5	6	7	8	9	10	(ft/sec)
in (cf)	253	253	253	253	253	253	253	253	253	253	**1.528**
out (cf)	0.0	0.0	0.0	0.0	0.4	3.9	12.1	21.6	33.0	41.5	**flow (cfs)**
storage in basin (cf)	253	507	760	1014	1267	1516	1758	1990	2210	2422	**0.826**
storage head (ft) basin	0.24	0.48	0.62	0.74	0.86	0.99	1.07	1.15	1.23	1.30	**basin**
storage head (ft) in pipe	0.00	0.00	0.00	0.09	0.21	0.34	0.42	0.50	0.58	0.65	**depth**
flow depth in pipe (in)	0.00	0.00	0.00	1.08	2.58	4.05	5.09	6.03	6.93	7.80	**(ft)**
adjusted slope											**1.30**

	T(min)= **30**		R(in/hr)= 2.8		AI= 0.88		Q(cfs)= 2.464				velocity
180 sec. intervals	1	2	3	4	5	6	7	8	9	10	(ft/sec)
in (cf)	444	444	444	444	444	444	444	444	444	444	**1.407**
out (cf)	0.0	0.0	0.0	16.3	64.7	115.9	153.2	182.8	202.8	211.2	**flow (cfs)**
storage in basin (cf)	444	887	1331	1758	2137	2464	2755	3015	3256	3488	**1.105**
storage head (ft) basin	0.42	0.68	0.90	1.07	1.20	1.31	1.41	1.50	1.58	1.65	**basin**
storage head (ft) in pipe	0.00	0.00	0.25	0.42	0.55	0.66	0.76	0.85	0.93	1.00	**depth**
flow depth in pipe (in)	0.00	0.00	2.95	5.09	6.63	7.97	9.16	10.22	11.12	11.99	**(ft)**
adjusted slope											**1.65**

	T(min)= **40**		R(in/hr)= 2.5		AI= 0.88		Q(cfs)= 2.2				velocity
240 sec. intervals	1	2	3	4	5	6	7	8	9	10	(ft/sec)
in (cf)	528	528	528	528	528	528	528	528	528	528	**2.589**
out (cf)	0.0	0.0	2.9	59.0	141.8	200.7	245.2	272.8	281.8	327.5	**flow (cfs)**
storage in basin (cf)	528	1056	1584	2053	2439	2767	3049	3304	3551	3751	**2.033**
storage head (ft) basin	0.50	0.76	1.01	1.17	1.31	1.42	1.51	1.59	1.67	1.73	**basin**
storage head (ft) in pipe	0.00	0.11	0.36	0.52	0.66	0.77	0.86	0.94	1.02	1.08	**depth**
flow depth in pipe (in)	0.00	1.33	4.38	6.29	7.87	9.21	10.35	11.30	12.23	12.98	**(ft)**
adjusted slope									0.0050	0.0111	**1.73**

	T(min)= **50**		R(in/hr)= 2.1		AI= 0.88		Q(cfs)= 1.848				velocity
300 sec. intervals	1	2	3	4	5	6	7	8	9	10	(ft/sec)
in (cf)	554	554	554	554	554	554	554	554	554	554	**2.239**
out (cf)	0.0	0.0	6.1	88.1	191.8	260.3	309.5	339.4	351.8	343.2	**flow (cfs)**
storage in basin (cf)	554	1109	1663	2129	2492	2786	3031	3246	3449	3660	**1.758**
storage head (ft) basin	0.53	0.79	1.04	1.20	1.32	1.42	1.51	1.57	1.64	1.70	**basin**
storage head (ft) in pipe	0.00	0.14	0.39	0.55	0.67	0.77	0.86	0.92	0.99	1.05	**depth**
flow depth in pipe (in)	0.00	1.64	4.70	6.60	8.08	9.29	10.28	11.08	11.84	12.64	**(ft)**
adjusted slope										0.0083	**1.70**

NEW HAVEN SALT SHED **STATE PROJECT 92-549**

Water Quality Volume Calculations for Storm Basin

The basin receives flow from a total of 1.43 acres, of which 0.74 acres is impervious. This area includes the entire project area and most of the roof of the existing maintenance garage. The required storage for the "first flush" is as follows:

WQV = (1”)(0.05+0.009I)(A) / 12

WQV = Water Quality Volume
I = Percent Impervious Cover (%)
A = Area (acre)

WQV = (1”)[0.05+0.009 x ((0.74/1.43) x 100%)] x 1.43/12

WQV = 0.061 acre-ft x 43560sf/acre= 2657 cf

As designed, the basin will have a total storage volume of 831 cf below the invert of the outlet pipe. This equals a 31% retention of the WQV.

A sediment forebay is not included in the basin, due to it's small size and the fact that 100% of the stormwater will go through a hydrodynamic separator or will flow a considerable distance over grass before entering the basin.

Erosion and Sedimentation Control

CT DOT will have construction inspection personnel assigned to the project in order to oversee the Contractor's operations to insure compliance with the provisions of the Standard Specifications. Further CT DOT oversight is provided by the District 3 Environmental Coordinator and the Office of Environmental Planning.

The following timelines will be followed for the proposed construction activities:

- If construction activities are complete or have been temporarily halted for more than seven (7) days, stabilization activities will be implemented within three (3) days.
- When final grades are completed in any part of the site, stabilization activities will be implemented within 3 days.
- Disturbed areas that do not establish a vegetative cover within 30 days of seeding shall have erosion control blankets installed. Prior to the erosion control blanket installation, the soil would be prepared with the application of lime, fertilizer, and seed.
- Areas that will be disturbed past the planting season will be covered with a long-term, non-vegetative stabilization method that will provide protection through the winter.
- Stabilization practices will be implemented as quickly as possible in accordance with the Guidelines.
- The Contractor shall stabilize disturbed areas with temporary or permanent measures as quickly as possible after the land is disturbed. Driveway roadbed shall be stabilized immediately upon completion of rough grading with compacted road aggregate. Requirements for soil stabilization are detailed in Form 816 article 1.10.03, 7/32 Best Management Practices.

Temporary Stabilization Practices:

- Erosion Control Matting: Matting shall be used to stabilize the topsoil on disturbed slopes where a stable, vegetated cover is not established within 30 days, or on temporary slopes steeper than 2:1.
- Silt Fence: Silt fence shall be placed at the toe of all disturbed slopes.
- Anti-Tracking Pads: Construction entrances (gravel anti-tracking pads) shall be constructed at truck access points to off –road route.
- Dust Control: Routine sweeping and application of dust suppression agents, including water and calcium chloride, over exposed subbase shall be completed for dust control.

Stabilization practices shall be implemented no more than three days after completion, as final grades are reached, or if work has been suspended for more than seven days.

Temporary seeding shall be spread over any disturbed areas which will remain inactive for at least 30 days. Areas to remain disturbed through winter shall be protected with non-vegetative stabilization measures. The Contractor must provide an Erosion and Sedimentation Control plan for each winter season during construction operations.

The Contractor may use other controls in the project as necessary if they conform to the 2002

Connecticut Erosion and Sedimentation Guidelines and are approved by the Engineer. The contractor will be required to provide the necessary details for any erosion controls not specifically called for on the project plans.

Permanent Stabilization Practices:

All new embankments disturbed by construction and unpaved areas that are graded or disturbed by construction will receive topsoil and turf establishment or landscape plantings. The Contractor may use other permanent stabilization practices approved by the Engineer and conforming to Connecticut's Erosion and Sedimentation Control Guidelines (2002).

Temporary and Permanent Structural Practices:

- Storm Basin: A stormwater basin shall be constructed as shown on plans and will function as WQV storage and to encourage infiltration.
- Riprap Outlet Protection: Permanent riprap outlet protection shall be installed at all storm drain outlets
- Stone Check Dam: A temporary stone check dam shall be constructed in the storm basin as shown on the plans to reduce the potential for sediment transport during construction.

Maintenance:

All construction activities and related activities shall conform to the requirements of Section 1.10 "Environmental Compliance" of ConnDOT's Standard Specifications, Form 816. In general, all construction activities shall proceed in such a manner so as not to pollute any wetlands, watercourses, water body, and conduit carrying stormwater. The Contractor shall limit, in so far as possible, the surface area of earthen materials exposed by construction activity and immediately provide temporary and permanent pollution control to prevent soil erosion and contamination on the site. Water pollution control provisions and best management practices per Article 1.10.03 of the Standard Specifications shall be administered during construction.

Inspection Guidelines:

During construction, all areas disturbed by the construction activity that have not been stabilized, structural control measures, and locations where vehicles enter or exit the site shall be inspected at least once every seven calendar days. These areas shall also be inspected within 24 hours following any storm in which 0.1 inches or greater of rain occurs.

Qualified personnel provided by the DOT District 3 Office shall conduct inspections.

Items to be inspected: the following items shall be inspected as described below:

Item	Procedure

Silt Fence	Silt fence shall be inspected to ensure that the fence line is intact with no breaks or tears. The fence shall be firmly anchored to the ground. Areas where the fence is excessively sagging or where support posts are broken or uprooted shall be noted. Depth of sediment behind the fence shall be noted.
Catch Basin Protection	Protective measures shall be inspected to insure that sediment is not entering the catch basins. Catch basin sumps shall be monitored for sediment deposition. Hay bales shall be inspected to insure they have not clogged.
Vehicle Entrances / Exits	Locations where vehicles enter or exit the site shall be inspected for evidence of off-site tracking.
General	Construction areas and the perimeter of the site shall be inspected for any evidence of debris that may blow or wash off site or that has blown or washed off site. Construction areas shall be inspected for any spills or unsafe storage of materials that could pollute off site waters.

Post-construction Guidelines:

After the project is complete, the Department will perform the following maintenance and restorative measures:

- Litter/debris will be removed from the site regularly.
- Mowing and maintenance of the turf areas and vegetated areas will occur as needed.
- Drainage structure sumps will be inspected regularly and sediment will be removed when sumps are more than half full.
- Riprap outlet protection will be inspected and repaired annually or as needed.
- Stone check dams will be inspected and repaired annually or as needed. Sediment will be removed when it reaches half the height of the check dam.
- The stormwater basin will be inspected and repaired annually or as needed. Sediment will be removed when it interferes with the detention capacity of the basin. Outlets will be checked for excessive scour and repaired as needed.

92-549 Sea Street Salt Shed, New Haven

4/21/11 - The Sea Street Salt Shed Facility has been redesigned as the site will be impacted by construction of the West River Bridge. Site improvements include bringing the facility up to standards, including an improved storage building for salt. The facility was designed to stay out of the 100 year floodplain, however, when new mapping for the county was released, the elevation and mapping boundaries changed quite significantly, putting the facility "back into" the 100 year floodplain. The site is crucial for roadway operations and must remain in this location. The DOT asked for guidance on permissibility in regard to Flood Management Certification. No wetland impacts are involved with this project.

Agency comments: DEP IWRD asked the designer to attempt to raise the shed which will store the salt up and out of the floodplain and then re-present the plan for a permit need determination.

May Update - Updated plans have been developed and sent electronically to DEP for an initial review.

6/16/11 – An updated site layout was presented by Facilities Design as a follow up. The site layout balances cuts and fills and provides for the shed itself to be above elevation 11.

Agency comments: The site layout is acceptable. A Flood Management Certification application needs to be submitted to DEP however formal hydraulic calculations are not deemed necessary, just a report on the volumes.

7/21/11 - A FMC will be prepared and submitted by the Department. This item will be dropped from the agenda.

Connecticut Department of
Energy & Environmental Protection
Bureau of Water Protection & Land Reuse
Office of Long Island Sound Programs

Coastal Consistency Review Form

DEEP USE ONLY
Application No.:
Analyst Assigned:
Date Received (OLISP):

Please complete this form in accordance with the instructions (DEP-INST-004). Print or type unless otherwise noted.

Part I: Project Information

1. Applicant Name: Connecticut Department of Transportation

Mailing Address: **2800 Berlin Turnpike., P.O. Box 317546**

City/Town: **Newington** State: **CT** Zip Code: **06131-7546**

Business Phone: **860-594-2132** ext.: Fax: **860-594-3028**

Contact Person: **Mr. Mark Alexander** Phone: **860-594-2931** ext.

E-mail: **mark.w.alexander@ct.gov**

2. Preparer Name: Robert C. Messina

Mailing Address: **2800 Berlin Turnpike., P.O. Box 317546**

City/Town: **Newington** State: **CT** Zip Code: **06131-7546**

Business Phone: **860-594-3305** ext.: Fax: **860-594-3375**

Contact Person: Phone: ext.

E-mail: **robert.messina@ct.gov**

3. Street Address or Description of Location of the Project Site:

New Haven Maintenance Garage, Sea Street

City or Town: **New Haven**

4. Brief Project Description:

This project consists of the demolition of an existing fabric salt shed and two storage sheds, construction of a new salt shed and associated drainage, paving and electrical work, and an upgrade and relocation of the calcium chloride tank.

5. Is the project located within the coastal boundary as defined in CGS Section 22a-94(b)?

☒ Yes ☐ No

If you answered **Yes** to this question, complete the entire form.

If you answered **No** to this question, and your project is located in a coastal area, skip Parts II through V and complete Parts VI, VII and VIII.

Part II: Identification of Applicable Coastal Use and Activity Policies and Standards

Identify all statutory goals and policies in or referenced by Section 22a-92 of the Coastal Management Act applicable to the proposed activities by checking the applicable boxes in the following table.

- ☒ General Development* - CGS Sections 22a-92(a)(1), 22a-92(a)(2), 22a-92(a)(9), 22a-92(a)(9)
- ☐ Water-Dependent Uses - CGS Sections 22a-92(a)(3), 22a-92(b)(1)(A)
- ☐ Ports and Harbors - CGS Section 22a-92(b)(1)(C)
- ☐ Coastal Structures and Filling - CGS Section 22a-92(b)(1)(D)
- ☐ Dredging and Navigation - CGS Sections 22a-92(c)(1)(C), 22a-92(c)(1)(D)
- ☐ Boating - CGS Section 22a-92(b)(1)(G)
- ☐ Fisheries - CGS Section 22a-92(c)(1)(I)
- ☐ Coastal Recreation And Access - CGS Sections 22a-92(a)(6), 22a-92(C)(1)(j), 22a-92(c)(1)(K)
- ☐ Sewer and Water Lines - CGS Section 22a-92(b)(1)(B)
- ☐ Fuel, Chemicals And Hazardous Materials - CGS Sections 22a-92(b)(1)(C), 22a-92(b)(1)(E), 22a-92(c)(1)(A)
- ☒ Transportation - CGS Sections 22a-92(b)(10)(F), 22a-92(c)(1)(F), 22a-92(c)(1)(G), 22a-92(c)(1)(H)
- ☐ Solid Waste - CGS Section 22a-92(a)(2)
- ☐ Dams, Dikes and Reservoirs - CGS Section 22a-92(a)(2)
- ☐ Cultural Resources - CGS Section 22a-92(b)(1)(J)
- ☐ Open Space and Agricultural Lands - CGS Section 22a-92(a)(2)

* applicable to all proposed activities

Part III: Consistency With Applicable Statutory Coastal Use and Activity Goals and Policies

Explain how the proposed activity is consistent with the applicable coastal activities goals and policies identified in Part II and describe any mitigation necessary to offset adverse impacts.

1. General Development: The proposed activity will upgrade an existing facility. The quality of stormwater leaving the site will be improved. This will be accomplished by reducing the impervious area by 0.43 acres and improving the stormwater system through the installation of a hydrodynamic separator and construction of a stormwater basin. There will also be an upgrade to the calcium chloride dispensing system by replacing the existing single-walled tank with a double-walled tank.

2. Transportation: The proposed activity will be an improvement to the existing highway maintenance facility.

Part IV: Identification of Applicable Coastal Resources and Coastal Resource Policies

Identify the coastal resources and associated statutory policies that apply to your project by checking the applicable boxes in the following table.

Coastal Resources	on-site	adjacent to work site	off-site but potentially affected by the project
General Resources* - CGS Sections 22a-93(7), 22a-92(a)(2)	X	X	X
Beaches & Dunes - CGS Sections 22a-93(7)(C), 22a-92-(b)(2)(C), 22a-92(c)(1)(K)	☐	☐	☐
Bluffs & Escarpments - CGS Sections 22a-93(7)(A), 22a-92(b)(2)(A)	☐	☐	☐
Coastal Hazard Area - CGS Sections 22a-93(7)(H), 22a-92(a)(2), 22a-92(b)(2)(F), 22a-92(b)(2)(J), 22a-92(c)(2)(B), 22a-92(a)(5)	☒	☐	☐
Coastal Waters & Estuarine Embayments - CGS Sections 22a-93(5), 22a-93(7)(K), 22a-93(7)(L), 22a-93(7)(G), 22a-92(a)(2), 22a-92(c)(2)(A)	☐	☐	☐
Developed Shorefront - CGS Sections 22a-93(7)(I), 22a-92(b)(2)(G)	☐	☐	☐
Freshwater Wetlands and Watercourses - CGS Sections 22a-93(7)(F), 22a-92(a)(2)	☐	☐	☐
Intertidal Flats - CGS Sections 22a-93(7)(D), 22a-92(b)(2)(D), 22a-92(c)(1)(K)	☐	☐	☐
Islands - CGS Sections 22a-93(7)(J), 22a-92(b)(2)(H)	☐	☐	☐
Rocky Shorefront - CGS Sections 22a-93(7)(B), 22a-92(b)(2)(B)	☐	☐	☐
Shellfish Concentration Areas - CGS Sections 22a-93(7)(N), 22a-92(c)(1)(I)	☐	☐	☐
Shorelands - CGS Sections 22a-93(7)(M), 22a-92(b)(2)(I)	☐	☐	☐
Tidal Wetlands - CGS Sections 22a-93(7)(E), 22a-92(a)(2), 22a-92(b)(2)(E), 22a-92(c)(1)(B)	☐	☐	☐

* applicable to all proposed activities

Part V: Consistency with Applicable Statutory Coastal Resource Goals and Policies

Explain how the proposed activity is consistent with the applicable statutory coastal resource goals and policies identified in Part IV and describe any mitigation necessary to offset adverse impacts.

General Resources; As an upgrade to an existing facility, this project does not alter or restrict access to any coastal resources. This project has no significant impact to any Coastal Resources.

Off-site Coastal Resources will be protected from damage during construction by careful erosion and sedimentation control established at the beginning of the project and maintained until all disturbed areas within the project limits have been properly stabilized.

Part VI: Identification of Potential Adverse Impacts

Identify the adverse impact categories that apply to the proposed activity. Check the applicable box if the proposed activity has the potential to generate any adverse impacts defined in the Coastal Management Act and referred to in the following table. If the category is applicable to the proposed activity, you may describe in Part VII project design features which may eliminate or minimize the potential for identified adverse impacts.

Potential Resource Impacts	Applicable	Not Applicable
Characteristics & Functions of Resources - CGS Section 22a-93(15)(H)	☐	☒
Coastal Flooding - CGS Section 22a-93(15)(E)	☐	☒
Coastal Waters Circulation Patterns - CGS Section 22a-93(15)(B)	☐	☒
Drainage Patterns - CGS Section 22a-93(15)(D)	☐	☒
Patterns of Shoreline Erosion and Accretion - CGS Section 22a-93(15)(C)	☐	☒
Visual Quality - CGS Section 22a-93(15)(F)	☐	☒
Water Quality - CGS Section 22a-93(15)(A)	☐	☒
Wildlife, Finfish, Shellfish Habitat - CGS Section 22a-93(15)(G)	☐	☒

Potential Impacts on Water Dependent Uses	Applicable	Not Applicable
Locating a non-water-dependent use on a site suited to or planned for a water-dependent use - CGS Section 22a-93(17)	☐	☒
Replacing an existing water-dependent use with a non-water-dependent use - CGS Section 22a-93(17)	☐	☒
Siting a non-water-dependent use which reduces or eliminates public access to marine or tidal waters - CGS Section 22a-93(17)	☐	☒

Part VII: Consistency with Statutory Adverse Impact Policies

Explain how all potential adverse impacts identified, as applicable, in Part VI have been avoided, eliminated or minimized.

No adverse impacts have been identified.

Existing flood storage volumes will be maintained.

The proposed salt storage shed will be constructed one foot above the 100 yr. flood elevation.

Any construction impacts will be avoided or mitigated through the use of appropriate E&S controls throughout the construction of the project.

When complete, the new storm drainage system, including the hydrodynamic separator and storm basin, will improve the quality of stormwater leaving the site.

Part VIII: Remaining Adverse Impacts

Identify any adverse impacts which remain after incorporating all measures to eliminate or minimize such adverse impacts, and explain why no feasible and prudent alternatives exist that would further avoid or reduce such impacts.

There are no remaining adverse impacts.

SCALE 1:24 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

QUADRANGLE NO.

95

NEW HAVEN, CONN

41072-C8-TF-024
1967
DMA 6466 IV SW- SERIES V816

STATE PROJECT NO.: 92-549

COUNTY: NEW HAVEN

CITY/TOWN: NEW HAVEN

APPLICATION BY:

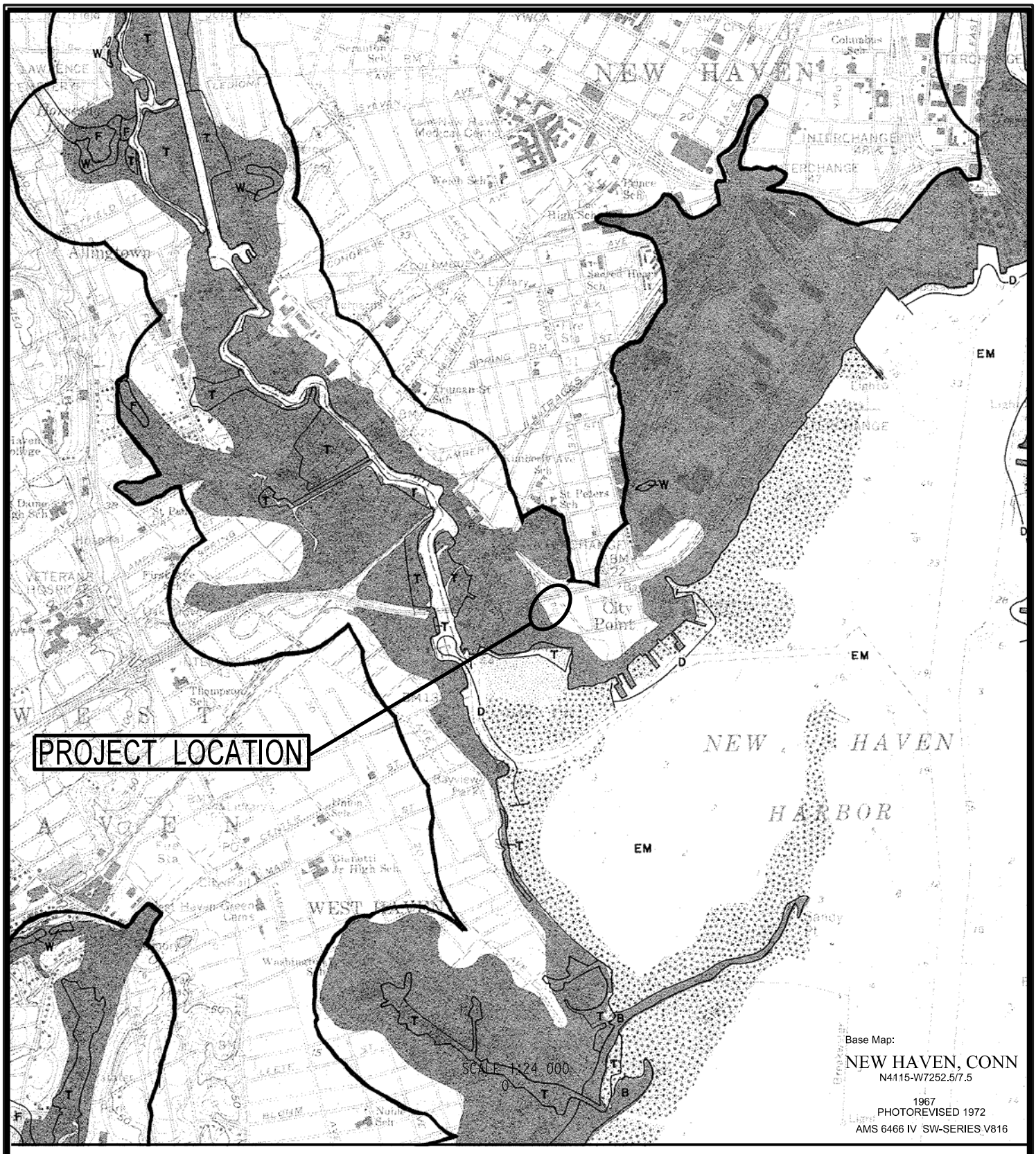
STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

NEW HAVEN SALT SHED

OFFICE OF ENGINEERING

DATE:

AUGUST 2012



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SCALE 1:24,000

STATE PROJECT NO.: 92-549 COUNTY: NEW HAVEN CITY/TOWN: NEW HAVEN	APPLICATION BY: STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION SEA STREET SALT SHED COASTAL RESOURCES	OFFICE OF ENGINEERING	DATE: AUGUST 2012

Attachment A – Project Description

Sea Street Salt Shed
New Haven
State Project No. 92-549

The Project consists of the construction of a Salt Shed at the site of the existing maintenance facility located on Sea Street in New Haven. The new 96' long salt shed will be constructed of structural glued laminated timber arches, laminated tongue and groove wood decking, asphalt shingle roofing, wood siding, and a concrete spread-footing foundation.

The existing salt shed is a temporary fabric-covered structure, which will be disassembled and disposed of by the contractor. The project will also include the demolition of two existing outbuildings. Lead and asbestos have been identified in some of the elements of these structures and will be remediated.

Site work for the salt shed and surrounding operations area consists of excavation and grading work; removal of portions of the existing pavement and other site elements (beam rail, fencing, jersey barriers); installation of catchbasins and a hydrodynamic separator to handle the stormwater in the operations area; construction of drainage swale to connect to the existing drainage outlet; installation of new pavement; fencing; landscaping; and exterior site lighting.

There will be a new double-walled calcium chloride tank installed behind the existing maintenance garage to replace the existing single-walled tank.

The existing shed and sand pile are located within the limits of a new on-ramp proposed under State Project 92-522. The purpose of this project is to provide a new salt storage shed outside the limits of the proposed highway ramp and to upgrade the existing calcium chloride storage tank from single-walled to double-walled.

The project will reduce the amount of impervious area by 0.43 acre.

A small stormwater basin will be constructed to treat stormwater runoff. The majority of the site's drainage will be treated through the basin, in addition to a majority of the roof drainage from the existing maintenance facility. The first 0.31" of runoff from these areas will be retained below the basin's outlet pipe. In addition, all stormwater runoff in the operation area of the salt shed will be collected in drainage structures and routed through a hydrodynamic separator prior to discharging into the storm basin.

Sediment and erosion control measures will be installed and maintained throughout construction until all disturbed areas have been stabilized. After construction is complete, all sediment will be removed from catch basin sumps, the hydrodynamic separator and the storm basin.

Attachment B – Drainage System

Sea Street Salt Shed
New Haven
State Project No. 92-549

Existing Conditions

The existing drainage in the project area consists of a small system of two catch basins, shown in Figure 2. This system discharges into a small wetland pocket to the west of the maintenance garage, then enters the adjacent roadway drainage system. This system eventually discharges into the Long Island Sound, see Figure 1 for discharge point.

Post-Construction Conditions

Figure 3 represents the proposed drainage for the site. All of the paved areas within the salt/sand operations area will be collected in catchbasins and pre-treated in the hydrodynamic separator before entering the basin. This is an improvement over the existing site where some of the area in front of the salt shed flows off the pavement and eventually into an adjacent wetland (see Figure 2). The remaining stormwater will sheetflow to the storm basin, a majority of which is over grassed slopes (see Figure 5). Water entering the basin will eventually infiltrate or leave the basin through an existing 12" corrugated pipe, where it enters the existing system.

Design Overview

The drainage computations were performed using standard DOT methodologies. The stormwater basin was maximized to the extent possible and will accommodate 31% of the Water Quality Volume calculated for the site (in accordance with the 2004 Stormwater Quality Manual). Routing calculations for the basinwee performed for the ten year storm and also checked to ensure that the 100 year storm would not cause flooding to the site or the adjacent roadways. The pipe system was designed for the ten year storm event using the Rational Method.

The area contributing to the basin is 1.43 acres. The majority of the roof drainage from the existing maintenance facility, the roof drainage from the new salt shed, and all of the paved salt shed operations area will be routed through the basin before entering the existing system. Prior to discharge into the basin, stormwater from all paved areas in the project area will be directed through a hydrodynamic separator as pre-treatment.

During the ten year storm, stormwater in the basin will reach a depth of 1.73' (elev. 5.73), with a maximum flow in the outlet pipe of approximately 2.0 cfs.

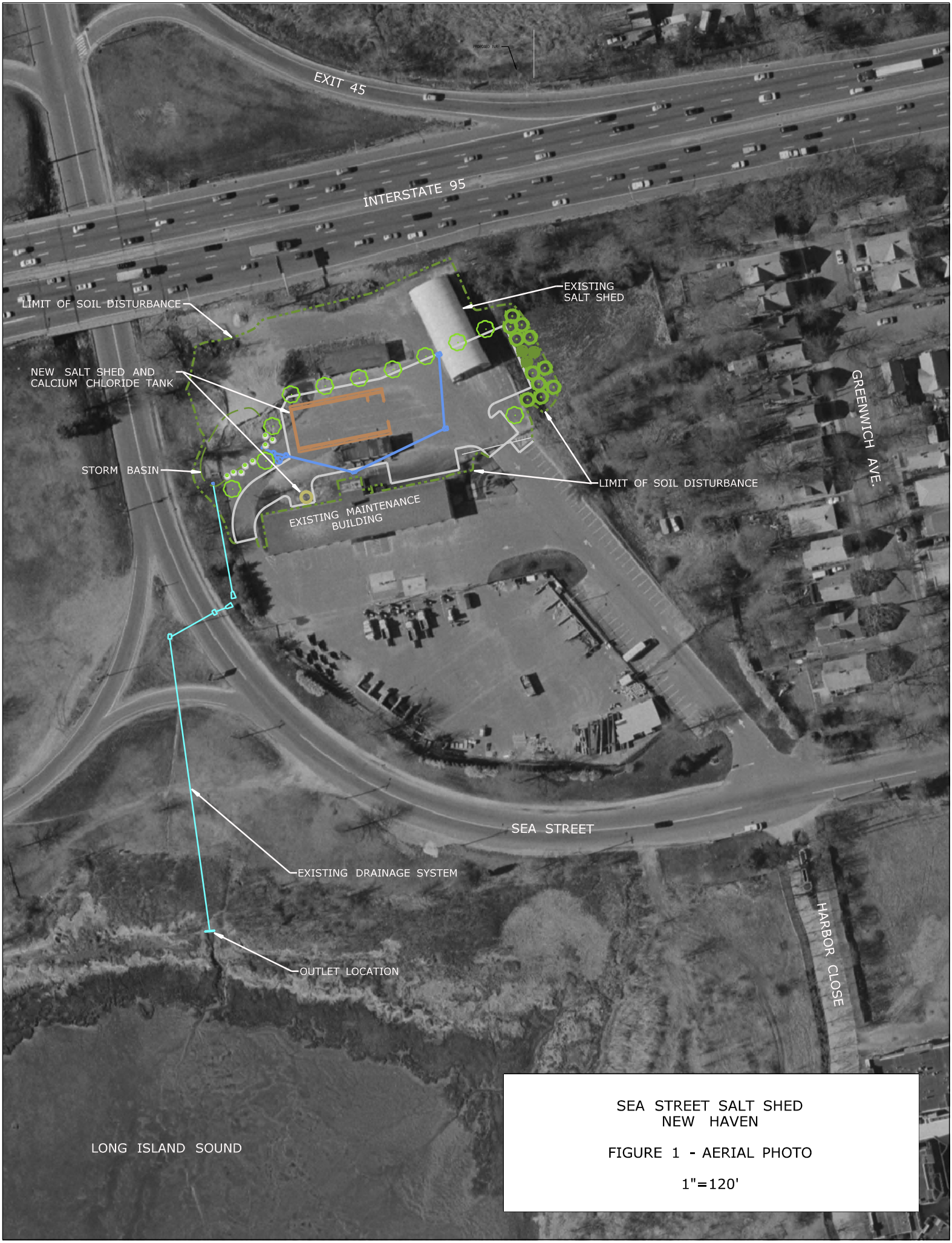
During the 100 year storm, stormwater in the basin will reach a depth of 1.91' (elev. 5.91), with a maximum flow in the outlet pipe of approximately 3.3 cfs.

The overall project will improve the quality of stormwater entering the existing roadway drainage system by:

- Reducing the impervious area of the site by 0.43 acres (see Figures 4 and 5)
- Routing stormwater from the salt/sand operations area through a hydrodynamic separator prior to discharging into the storm basin
- Routing all roof drainage through the stormwater basin, and
- Retaining the first .3" of stormwater below the outlet pipe of the storm basin

Drainage calculations and Figures are included on the following sheets.

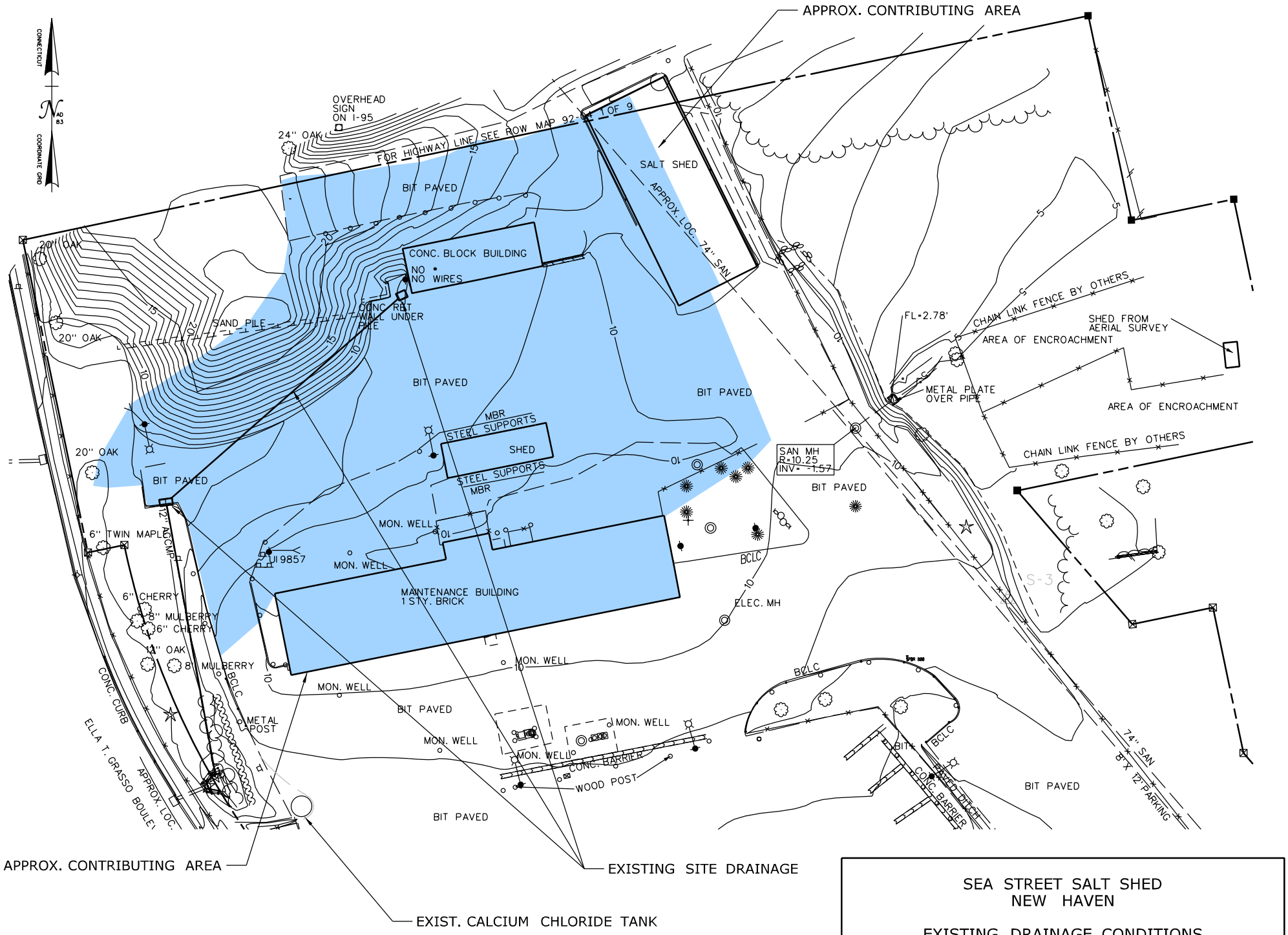
List of Figures and Calculations



SEA STREET SALT SHED
NEW HAVEN

FIGURE 1 - AERIAL PHOTO

1"=120'

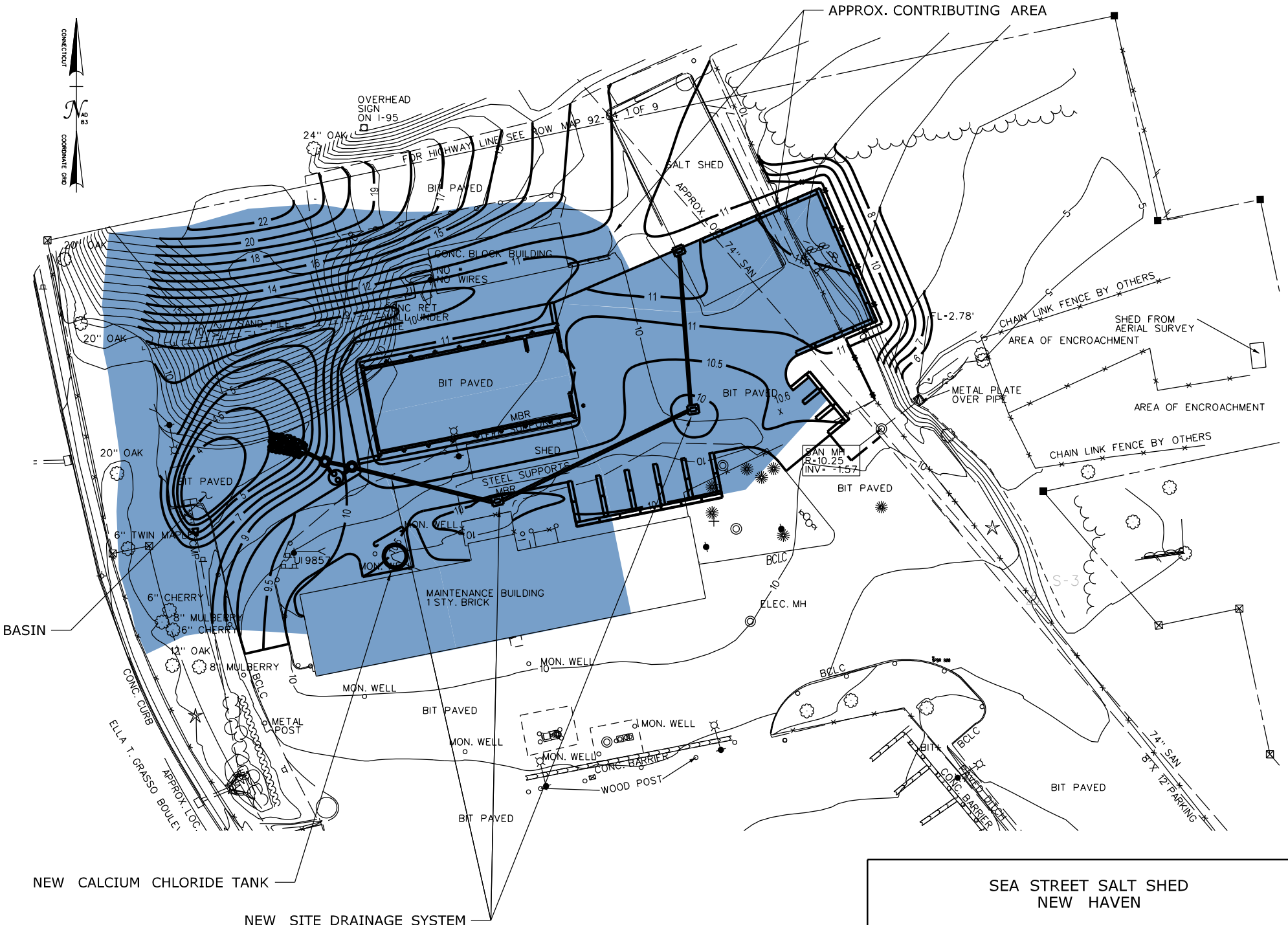


SEA STREET SALT SHED
NEW HAVEN

EXISTING DRAINAGE CONDITIONS

1"=60'

FIGURE 2



SEA STREET SALT SHED
NEW HAVEN

POST-CONSTRUCTION DRAINAGE CONDITIONS

1"=60'

FIGURE 3

ROOF - 0.15 AC

PAVED - 0.90 AC

UNPAVED - 0.51 AC

(LIMITS OF DISTURBED AREA SHOWN)

SEA STREET SALT SHED
NEW HAVEN

PRE-CONSTRUCTION IMPERVIOUS AREA

1"=60'

FIGURE 4

ROOF - 0.11 AC

PAVED - 0.51 AC

UNPAVED - 0.94 AC

(LIMITS OF DISTURBED AREA SHOWN)

SEA STREET SALT SHED
NEW HAVEN

POST-CONSTRUCTION IMPERVIOUS AREA

1"=60'

FIGURE 5

NEW HAVEN SALT SHED **STATE PROJECT 92-549**

Water Quality Volume Calculations for Storm Basin

The basin receives flow from a total of 1.43 acres, of which 0.74 acres is impervious. This area includes the entire project area and most of the roof of the existing maintenance garage. The required storage for the "first flush" is as follows:

WQV = (1”)(0.05+0.009I)(A) / 12

WQV = Water Quality Volume
I = Percent Impervious Cover (%)
A = Area (acre)

WQV = (1”)[0.05+0.009 x ((0.74/1.43) x 100%)] x 1.43/12

WQV = 0.061 acre-ft x 43560sf/acre= 2657 cf

As designed, the basin will have a total storage volume of 831 cf below the invert of the outlet pipe. This equals a 31% retention of the WQV.

A sediment forebay is not included in the basin, due to it's small size and the fact that 100% of the stormwater will go through a hydrodynamic separator or will flow a considerable distance over grass before entering the basin.

NEW HAVEN SALT SHED **STATE PROJECT 92-549**

Storm Drainage Piping Calculations - Pavement area only

Line	Time to	Time in	Accum.	Contrib.	Surface	Imperv.	AI to	Sum of AI	Rainfall	Q in	Pipe	Length of	Slope	"n"	Average	Maximum
Segment	Inlet	Pipe	Time	Area		Coeff.	C.B.	in System	Intensity	System	Size	Pipe			Velocity	Capacity
	min	*min*	*min*	*acre*					*in/hr*	*cfs*	*in*	*ft*	*ft/ft*		*ft/sec*	*cfs*
A-B	5	0.55	5.00	0.06	pavement	0.9	0.05	0.05	6	**0.32**	12	76	0.013	0.013	2.309	4.37
B-C	5	0.48	5.55	0.26	pavement	0.9	0.23	0.29	5.9	**1.70**	12	100	0.005	0.013	3.46	2.71
C-D	5	0.29	6.03	0.13	roof	1	0.19	0.48	5.8	**2.79**	15	68	0.005	0.013	3.92	4.91
				0.07	pavement	0.9										
D-E	-	0.02	6.32	-	-	-	-	0.48	5.7	**2.74**	15	8	0.05	0.013	7.46	15.54
E-Basin	-	0.03	6.34	-	-	-	-	0.48	5.7	**2.74**	15	8	0.01	0.013	4.89	6.95
			6.37													

NEW HAVEN SALT SHED **STATE PROJECT 92-549**

Basin Routing Calculations

Inlet pipe: 12" RCP inv. at 5.52, s=0.010 ft/ft

Outlet pipe: 12" RCP inv. @ elev. 5.27, S= .005 ft/ft for 8'

Total AI in (pavement + grass): 0.85

Basin Volumes

	elevation	area in sf at elev.	cf per 1/4 ft depth	Total Vol.- cf
0	4.5	2251	0	0
0.25	4.75	2552	600	600
0.5	5	2828	673	1273
0.75	5.25	3086	739	2012
1	5.5	3332	802	2814
1.25	5.75	3584	865	3679
1.5	6	3851	929	4608

10 year storm

WQV = 2712

76.56 = % of WQV below the outlet

	T(min)= **10**		R(in/hr)= 4.8		AI= 0.85		Q(cfs)= 4.08				velocity
60 sec. intervals	1	2	3	4	5	6	7	8	9	10	(ft/sec)
in (cf)	245	245	245	245	245	245	245	245	245	245	**0.724**
out (cf)	0	0	0	0	0	0	0	0	0	0	**flow (cfs)**
storage in basin (cf)	245	490	734	979	1224	1469	1714	1958	2203	2448	**0.046**
storage head (ft) basin	0.10	0.20	0.30	0.39	0.48	0.57	0.65	0.73	0.81	0.89	**basin**
storage head (ft) in pipe	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.12	**depth**
flow depth in pipe (in)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	1.39	**(ft)**
adjusted slope											**0.89**

	T(min)= **30**		R(in/hr)= 2.8		AI= 0.85		Q(cfs)= 2.38				velocity
180 sec. intervals	1	2	3	4	5	6	7	8	9	10	(ft/sec)
in (cf)	428	428	428	428	428	428	428	428	428	428	**3.308**
out (cf)	0	0	0	0	0	0	11	52	120	203	**flow (cfs)**
storage in basin (cf)	428	857	1285	1714	2142	2570	2987	3364	3672	3898	**1.429**
storage head (ft) basin	0.18	0.35	0.50	0.65	0.79	0.92	1.05	1.16	1.25	1.31	**basin**
storage head (ft) in pipe	0.00	0.00	0.00	0.00	0.02	0.15	0.28	0.39	0.48	0.54	**depth**
flow depth in pipe (in)	0.00	0.00	0.00	0.00	0.25	1.85	3.36	4.67	5.74	6.47	**(ft)**
adjusted slope											**1.31**

	T(min)= **40**		R(in/hr)= 2.5		AI= 0.85		Q(cfs)= 2.125				velocity
240 sec. intervals	1	2	3	4	5	6	7	8	9	10	(ft/sec)
in (cf)	510	510	510	510	510	510	510	510	510	510	**3.442**
out (cf)	0	0	0	0	0	14	81	195	313	368	**flow (cfs)**
storage in basin (cf)	510	1020	1530	2040	2550	3046	3475	3790	3988	4129	**1.696**
storage head (ft) basin	0.21	0.41	0.59	0.76	0.92	1.07	1.19	1.28	1.33	1.37	**basin**
storage head (ft) in pipe	0.00	0.00	0.00	0.00	0.15	0.30	0.42	0.51	0.56	0.60	**depth**
flow depth in pipe (in)	0.00	0.00	0.00	0.00	1.77	3.57	5.05	6.12	6.76	7.21	**(ft)**
adjusted slope											**1.37**

	T(min)= **45**		R(in/hr)= 2.3		AI= 0.85		Q(cfs)= 1.955				velocity
270 sec. intervals	1	2	3	4	5	6	7	8	9	10	(ft/sec)
in (cf)	528	528	528	528	528	528	528	528	528	528	**3.430**
out (cf)	0	0	0	0	0	24	114	253	364	416	**flow (cfs)**
storage in basin (cf)	528	1056	1584	2111	2639	3143	3557	3832	3995	4107	**1.671**
storage head (ft) basin	0.22	0.42	0.61	0.78	0.95	1.10	1.21	1.29	1.34	1.37	**basin**
storage head (ft) in pipe	0.00	0.00	0.00	0.01	0.18	0.33	0.44	0.52	0.57	0.60	**depth**
flow depth in pipe (in)	0.00	0.00	0.00	0.13	2.11	3.90	5.34	6.25	6.78	7.14	**(ft)**
adjusted slope											**1.37**

	T(min)= **50**		R(in/hr)= 2.1		AI= 0.85		Q(cfs)= 1.785				velocity
300 sec. intervals	1	2	3	4	5	6	7	8	9	10	(ft/sec)
in (cf)	536	536	536	536	536	536	536	536	536	536	**3.398**
out (cf)	0	0	0	0	0	3	147	300	406	451	**flow (cfs)**
storage in basin (cf)	536	1071	1607	2142	2677	3210	3599	3834	3964	4048	**1.602**
storage head (ft) basin	0.22	0.42	0.61	0.79	0.96	1.11	1.23	1.29	1.33	1.35	**basin**
storage head (ft) in pipe	0.00	0.00	0.00	0.02	0.19	0.34	0.46	0.52	0.56	0.58	**depth**
flow depth in pipe (in)	0.00	0.00	0.00	0.25	2.25	4.13	5.48	6.26	6.68	6.95	**(ft)**
adjusted slope											**1.35**

Attachment C – Plans and Photos

Sea Street Salt Shed
New Haven
State Project No. 92-549

D-001 – Site Demolition Plan
C-001 – Sedimentation and Erosion Control
C-002 – Site Plan
C-003 – Drainage Plan
C-004 – Grading Plan
C-006 – Civil Details
LDS-02 – Landscape Design Sheet

Site Photos

NOTES:

1. SALT SHALL BE REMOVED FROM SHED BY OTHERS PRIOR TO CONSTRUCTION.

2. EXISTING SALT SHED IS CONSTRUCTED OF CONCRETE BLOCKS WITH A STEEL SUPERSTRUCTURE AND FABRIC ROOF. REMOVE AND DISPOSE OF FABRIC AND STEEL SUPERSTRUCTURE AND CONCRETE BLOCKS.

3. PRE-LOADING AREA CONSISTS OF SAND. REMOVE AND DISPOSE OF SAND.

4. REMOVE BLOCK WALL. BLOCKS SHALL BE RELOCATED TO A STATE FACILITY WITHIN A 40 MILE RADIUS, AS DIRECTED BY THE ENGINEER.

5. INSTALL ANTI-TRACKING PAD AT POINT WHERE TRUCKS PASS FROM BITUMINOUS PAVEMENT TO DISTURBED SOIL.

6. REFER TO D-002 FOR DEMOLITION OF ELECTRICAL ITEMS.

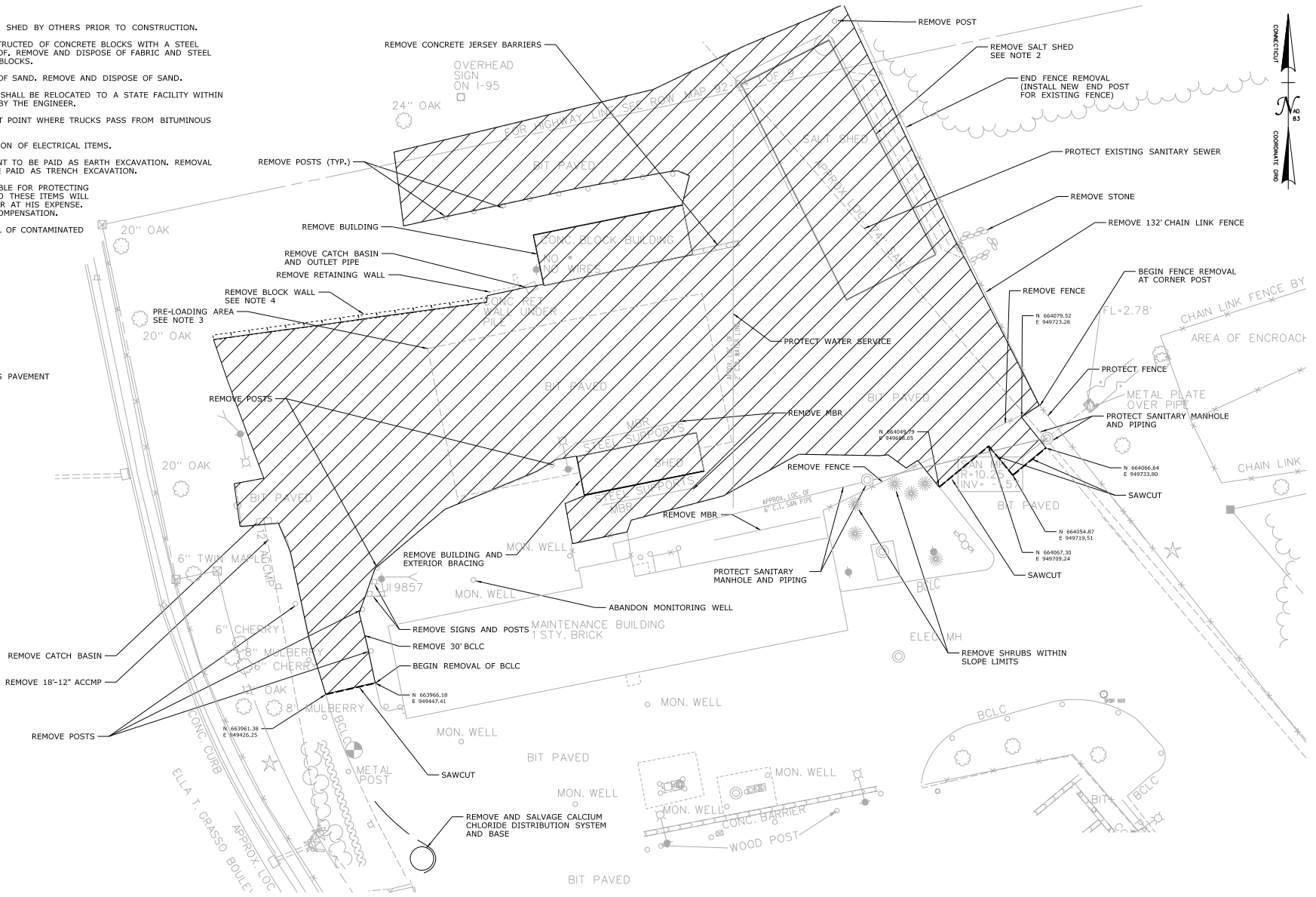
7. REMOVAL OF EXISTING PAVEMENT TO BE PAID AS EARTH EXCAVATION. REMOVAL OF CATCH BASIN AND PIPE TO BE PAID AS TRENCH EXCAVATION.

8. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING ITEMS INDICATED. ANY DAMAGE TO THESE ITEMS WILL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE. THERE WILL BE NO ADDITIONAL COMPENSATION.

9. REFER TO ENV-1 FOR DISPOSAL OF CONTAMINATED MATERIALS.

LEGEND

REMOVE EXISTING PAVEMENT



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Plotted Date: 8/28/2012

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

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CHECKED BY: LM
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STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

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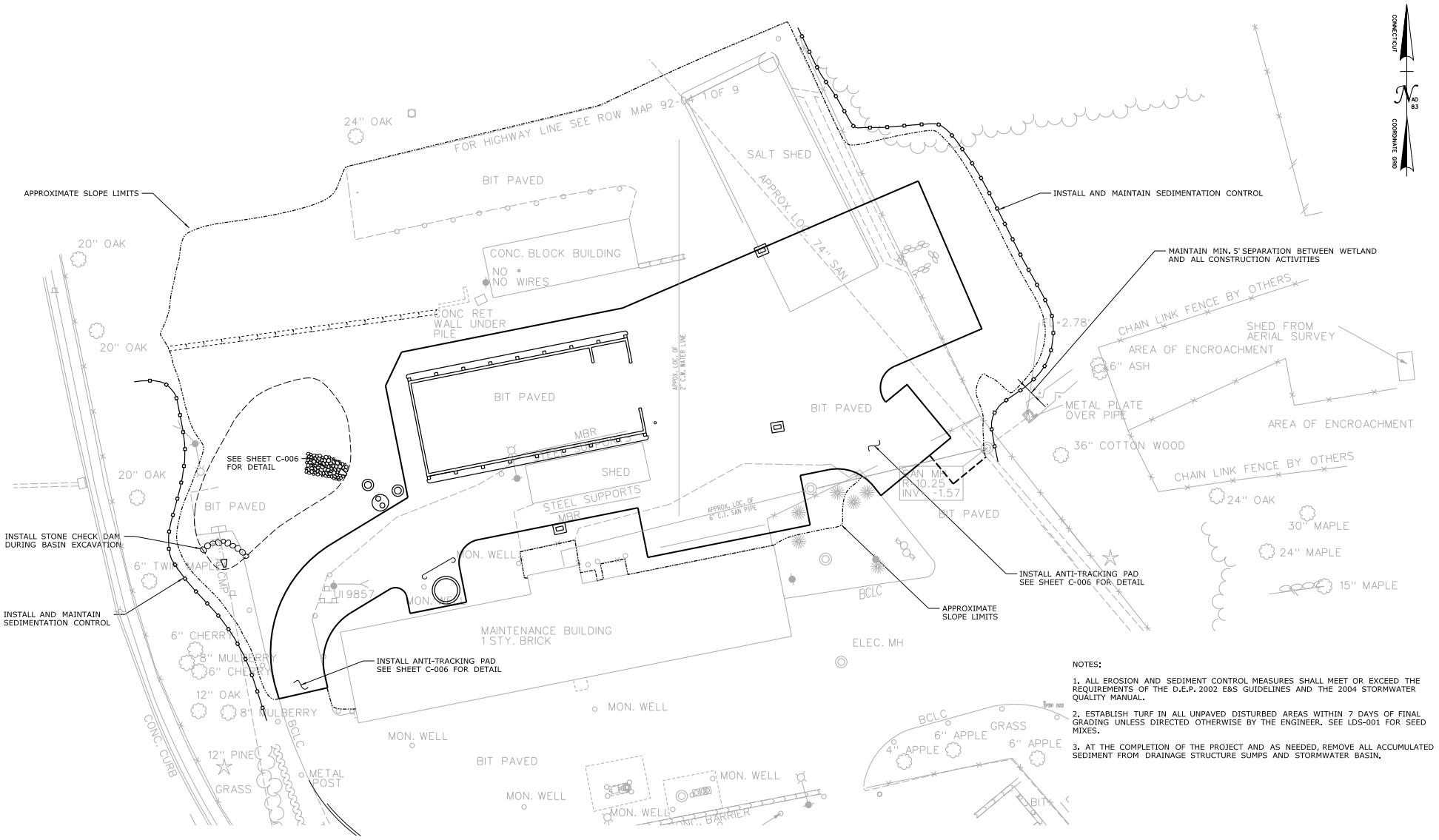
SIGNATURE/BLOCK:
OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

TOWN: NEW HAVEN

DRAWING TITLE: SITE DEMOLITION PLAN

PROJECT NO. 92-549
DRAWING NO. D-001
SHEET NO. 04.02



NOTES:

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL MEET OR EXCEED THE REQUIREMENTS OF THE D.E.P. 2002 E&S GUIDELINES AND THE 2004 STORMWATER QUALITY MANUAL.

2. ESTABLISH TURF IN ALL UNPAVED DISTURBED AREAS WITHIN 7 DAYS OF FINAL GRADING UNLESS DIRECTED OTHERWISE BY THE ENGINEER. SEE LDS-001 FOR SEED MIXES.

3. AT THE COMPLETION OF THE PROJECT AND AS NEEDED, REMOVE ALL ACCUMULATED SEDIMENT FROM DRAINAGE STRUCTURE SUMPS AND STORMWATER BASIN.

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Plotted Date: 8/28/2012

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STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

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OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

TOWN: NEW HAVEN

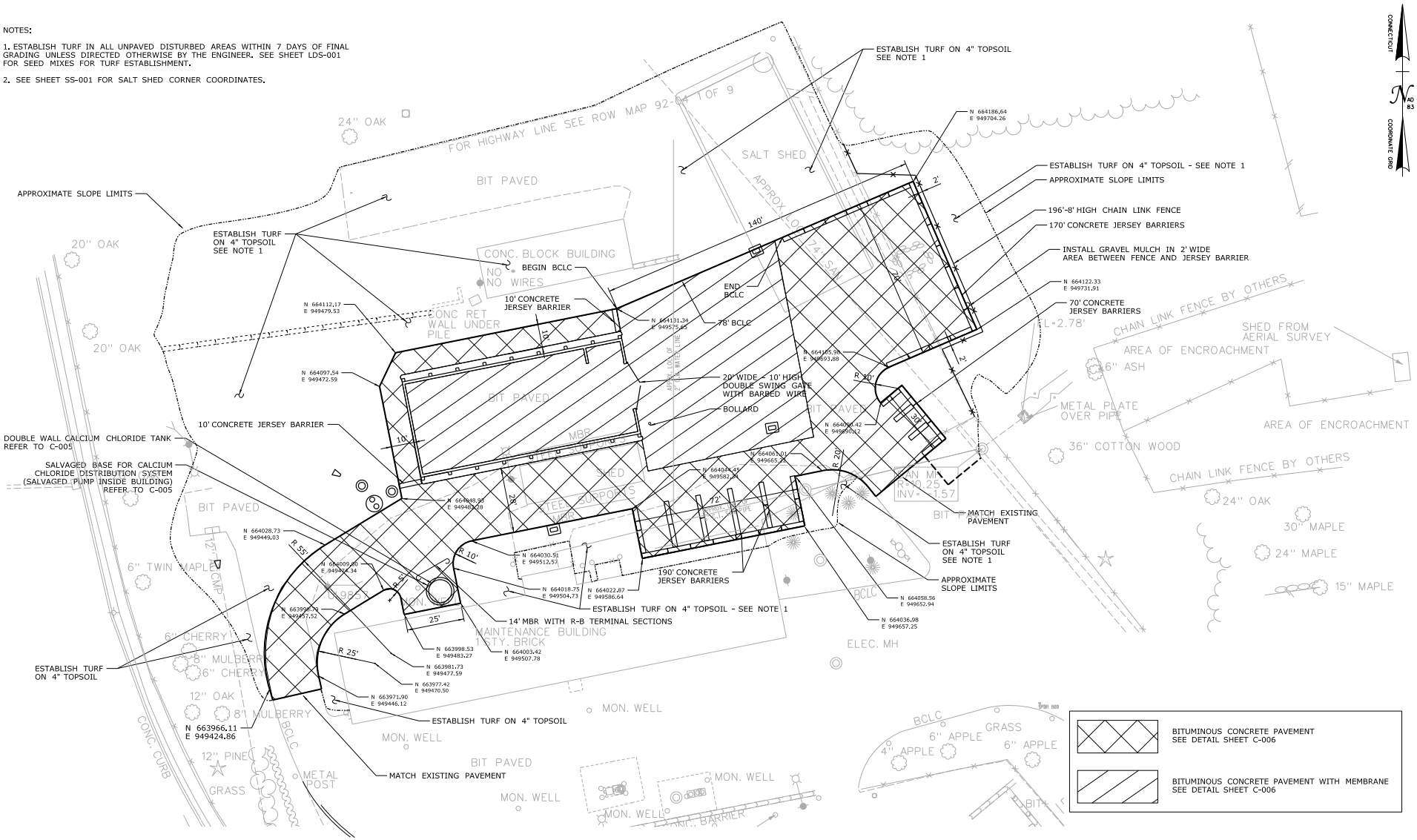
DRAWING TITLE:
SEDIMENTATION AND EROSION CONTROL

PROJECT NO. 92-549
DRAWING NO. C-001
SHEET NO. 05.02

NOTES:

1. ESTABLISH TURF IN ALL UNPAVED DISTURBED AREAS WITHIN 7 DAYS OF FINAL GRADING UNLESS DIRECTED OTHERWISE BY THE ENGINEER. SEE SHEET LDS-001 FOR SEED MIXES FOR TURF ESTABLISHMENT.

2. SEE SHEET SS-001 FOR SALT SHED CORNER COORDINATES.



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Plotted Date: 8/20/2012

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STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

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OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

TOWN: NEW HAVEN

DRAWING TITLE: SITE PLAN

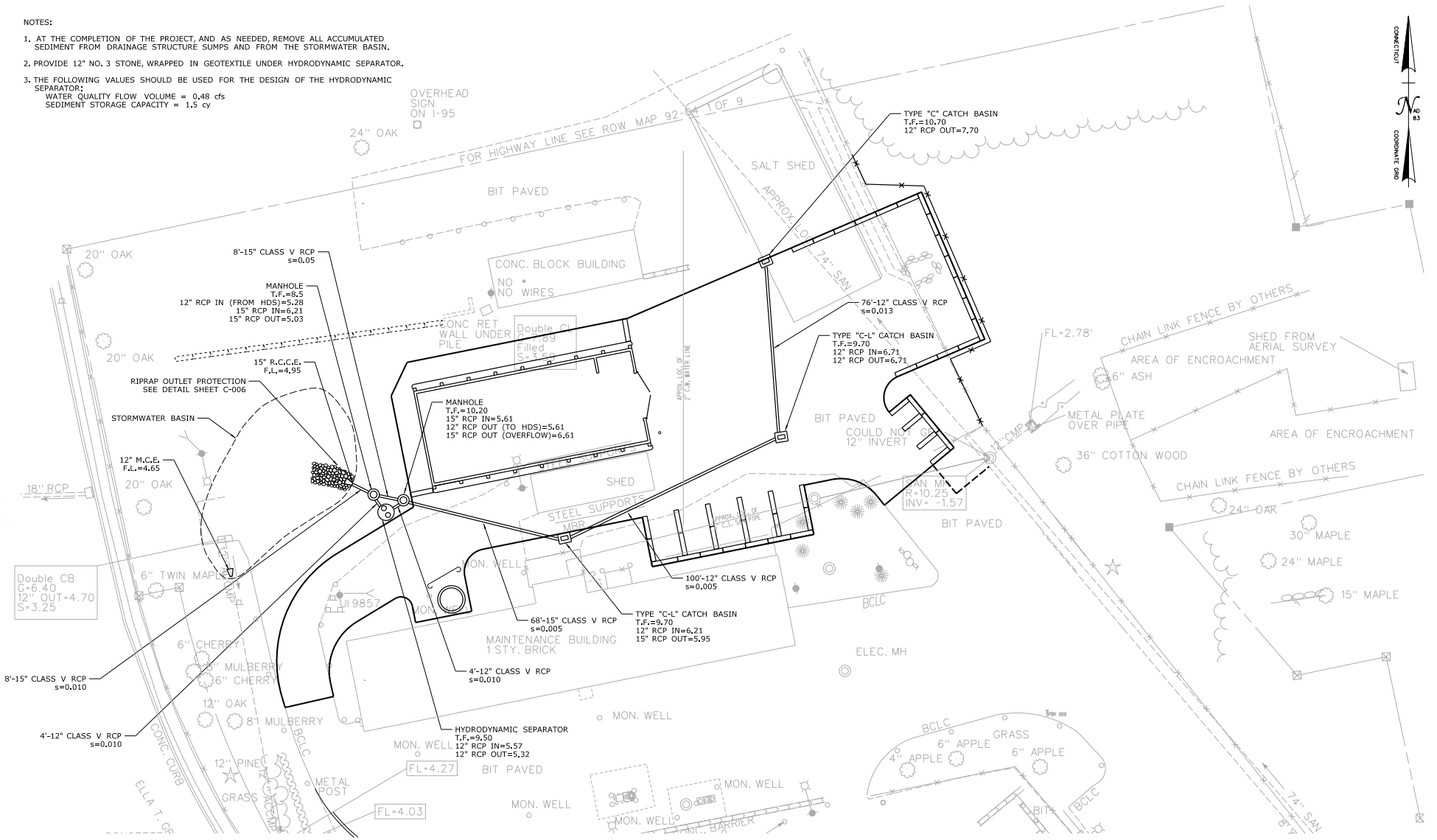
PROJECT NO. 92-549
DRAWING NO. C-002
SHEET NO. 05.03

NOTES:

1. AT THE COMPLETION OF THE PROJECT, AND AS NEEDED, REMOVE ALL ACCUMULATED SEDIMENT FROM DRAINAGE STRUCTURE SUMPS AND FROM THE STORMWATER BASIN.

2. PROVIDE 12" NO. 3 STONE, WRAPPED IN GEOTEXTILE UNDER HYDRODYNAMIC SEPARATOR.

3. THE FOLLOWING VALUES SHOULD BE USED FOR THE DESIGN OF THE HYDRODYNAMIC SEPARATOR:
   WATER QUALITY FLOW VOLUME = 0.48 cfs
   SEDIMENT STORAGE CAPACITY = 1.5 cy



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STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

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SIGNATURE/BLOCK: OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE: SEA STREET SALT STORAGE FACILITY

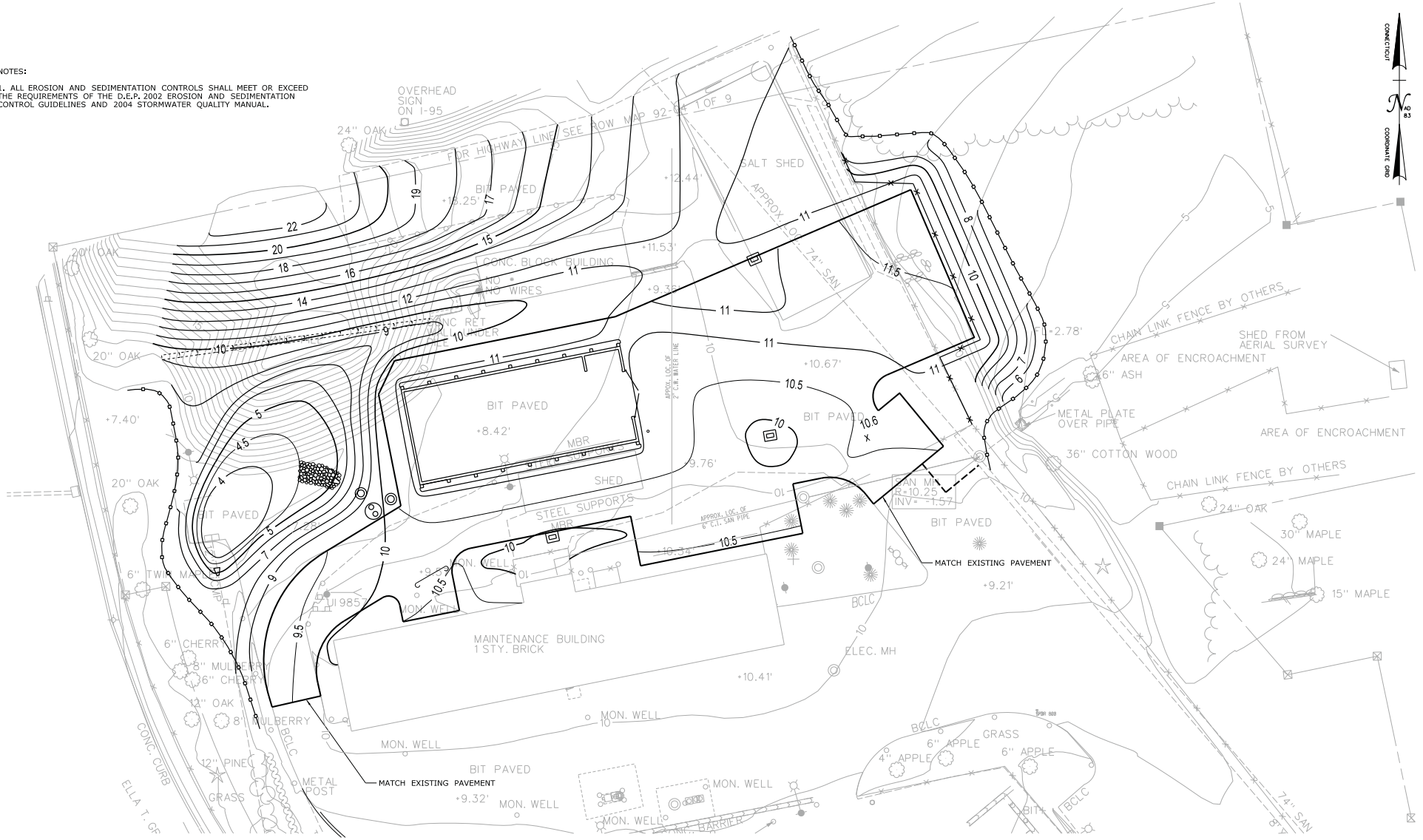
TOWN: NEW HAVEN

DRAWING TITLE: DRAINAGE PLAN

PROJECT NO. 92-549
DRAWING NO. C-003
SHEET NO. 05.04

NOTES:

1. ALL EROSION AND SEDIMENTATION CONTROLS SHALL MEET OR EXCEED THE REQUIREMENTS OF THE D.E.P. 2002 EROSION AND SEDIMENTATION CONTROL GUIDELINES AND 2004 STORMWATER QUALITY MANUAL.



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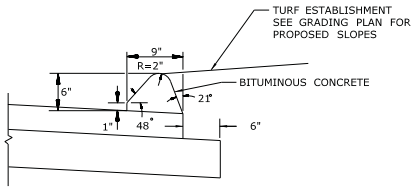
PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

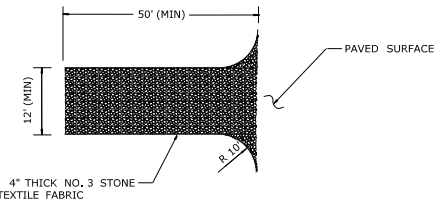
TOWN: **NEW HAVEN**

DRAWING TITLE: **GRADING PLAN**

PROJECT NO. **92-549**
DRAWING NO. **C-004**
SHEET NO. **05.05**



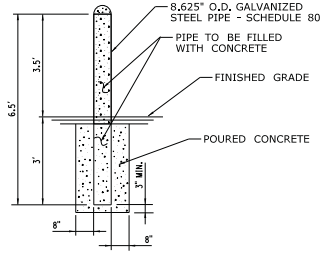
BITUMINOUS CONCRETE CURBING
NOT TO SCALE



NOTES:

1. STONE SHALL BE REPLACED AS NEEDED TO ENSURE SUFFICIENT CAPTURE OF SEDIMENT.
2. ANY SEDIMENT TRACKED OFF-SITE SHALL BE IMMEDIATELY REMOVED BY THE CONTRACTOR.

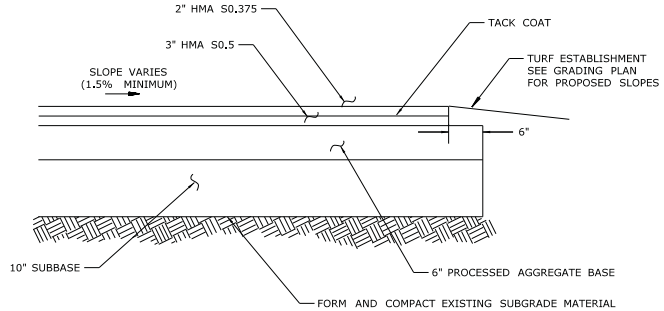
ANTI-TRACKING PAD
NOT TO SCALE



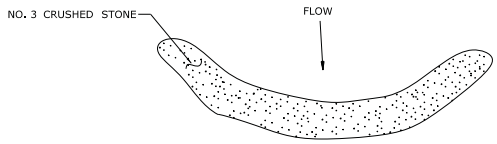
NOTES:

1. BOLLARDS SHALL BE COVERED WITH ¼" YELLOW POLYETHYLENE COVER.
2. TRIM BOLLARD COVER TO FIT.

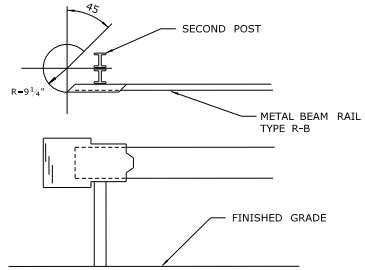
BOLLARD
NOT TO SCALE



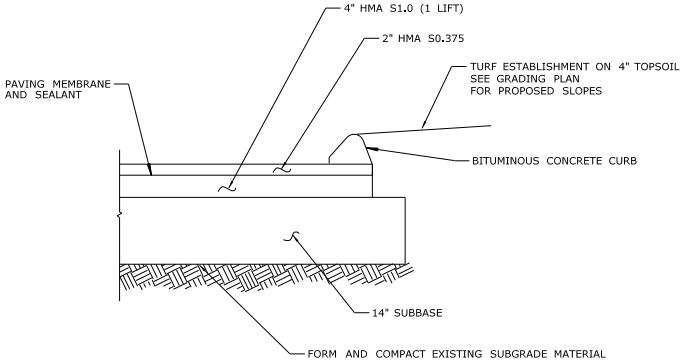
BITUMINOUS CONCRETE PAVEMENT
NOT TO SCALE



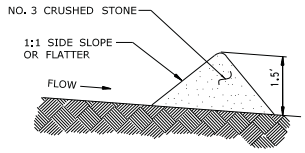
TOP VIEW



R-B TERMINAL SECTION
NOT TO SCALE



BITUMINOUS CONCRETE PAVING - WITH MEMBRANE
NOT TO SCALE

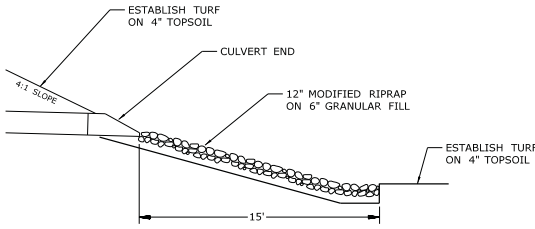


SIDE VIEW

NOTES:

1. STONE CHECK DAM SHALL EXTEND THE FULL WIDTH OF THE BASIN, PLUS 18 INCHES KEYED INTO THE BANKS ON EACH SIDE.
2. THE HEIGHT OF THE CENTER OF THE CHECK DAM SHALL BE 6 INCHES LOWER THAN THE HEIGHT OF THE OUTER EDGES.

STONE CHECK DAM
NOT TO SCALE



NOTE:
1. AT DISCHARGE POINT, PROVIDE 12" MODIFIED RIPRAP ON 6" GRANULAR FILL. RIPRAP SHALL EXTEND 3' ON EITHER SIDE OF THE CULVERT END AND 15' BEYOND THE CULVERT END.

RIPRAP OUTLET PROTECTION
NOT TO SCALE

REV.	DATE	REVISION DESCRIPTION	SHEET NO.
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 8/20/2012

DESIGNER/DRAFTER: SLM
CHECKED BY: LM
SCALE AS NOTED

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\FD_MSH_DET_0092_549_C006.dgn

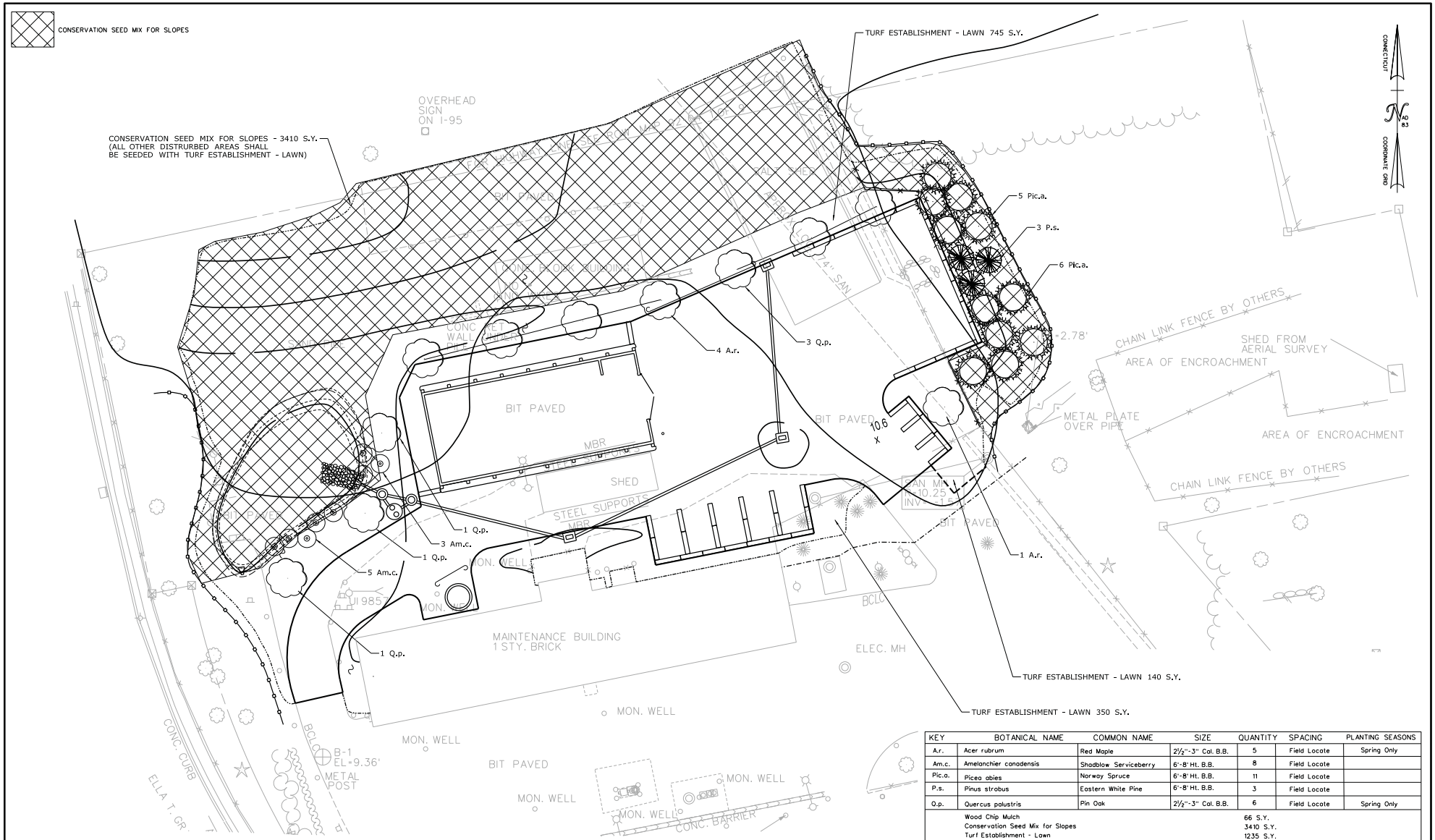
SIGNATURE/BLOCK:
OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

TOWN: NEW HAVEN

DRAWING TITLE: CIVIL DETAILS

PROJECT NO. 92-549
DRAWING NO. C-006
SHEET NO. 05.07



KEY	BOTANICAL NAME	COMMON NAME	SIZE	QUANTITY	SPACING	PLANTING SEASONS
A.r.	Acer rubrum	Red Maple	2½"-3" Cal. B.B.	5	Field Locate	Spring Only
Am.c.	Amelanchier canadensis	Shadblow Serviceberry	6'-8' Ht. B.B.	8	Field Locate	
Pic.a.	Picea abies	Norway Spruce	6'-8' Ht. B.B.	11	Field Locate	
P.s.	Pinus strobus	Eastern White Pine	6'-8' Ht. B.B.	3	Field Locate	
Q.p.	Quercus palustris	Pin Oak	2½"-3" Cal. B.B.	6	Field Locate	Spring Only
	Wood Chip Mulch			66 S.Y.		
	Conservation Seed Mix for Slopes			3410 S.Y.		
	Turf Establishment - Lawn			1235 S.Y.		

REV.	DATE	REVISION DESCRIPTION	SHEET NO.
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Plotted Date: 8/15/2012

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

DESIGNER/DRAFTER: **M. Rylander**
CHECKED BY: **D. Barnes**
SCALE IN FEET 0 20 40
SCALE 1"=20'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW-MSH-0092-0549-LDS-02.dgn

SIGNATURE/BLOCK: **OFFICE OF ENGINEERING**
APPROVED BY: DATE:

PROJECT TITLE:
SEA STREET
SALT STORAGE FACILITY

TOWN: **NEW HAVEN**

DRAWING TITLE: **LANDSCAPE DESIGN SHEET**

PROJECT NO. **92-549**
DRAWING NO. **LDS-02**
SHEET NO. **06.02**

Existing storage shed to be demolished

Back of existing maintenance garage

Existing storage shed to be demolished

Existing fabric salt storage shed

Existing wetland pocket where 12" discharge pipe from new basin outlets

State of Connecticut

Department of Transportation

SUPPLEMENTAL SPECIFICATIONS

TO

THE STANDARD SPECIFICATIONS

FOR

ROADS, BRIDGES AND INCIDENTAL CONSTRUCTION

FORM 816

2004

JULY 2012

July 2012

DIVISION I
GENERAL REQUIREMENTS AND COVENANTS

DIVISION II
CONSTRUCTION DETAILS

SECTION		SPECIFICATION NUMBER
2.02	Roadway Excavation, Formation of Embankment and Disposal of Surplus Material	202
2.05	Trench Excavation	205
3.04	Processed Aggregate Base	304
4.01	Concrete Pavement	401
5.14	Prestressed Concrete Members	514
6.01	Concrete for Structures	601
6.03	Structural Steel	603
6.12	Concrete Cylinder Curing Box	612
6.51	Culverts	651
7.02	Piles	702
8.22	Temporary Precast Concrete Barrier Curb	822
9.10	Metal Beam Rail	910
9.18	Three-Cable Guide Railing (I-Beam Post) and Anchorages	918
9.22	Bituminous Concrete Sidewalk Bituminous Concrete Driveway	922
9.44	Topsoil	944
9.49	Furnishing, Planting and Mulching Trees, Shrubs, Vines and Ground Cover Plants	949
9.75	Mobilization	975
10.01	Trenching and Backfilling	1001
10.10	Concrete Handhole	1010
11.13	Control Cable	1113
12.10	Epoxy Resin Pavement Markings, Symbols and Legends	1210

DIVISION III
MATERIALS SECTION

July 2012

STANDARD SPECIFICATIONS
FOR
ROADS, BRIDGES AND INCIDENTAL CONSTRUCTION
FORM 816

ERRATA

PG.	ARTICLE OR SUBARTICLE	LINE NO.	CORRECTION
iv	Table of Contents	11	Change “Guild” to “Guide”
4	1.01.01	8	After the end of the definition for “Plans,” insert as a subset, “A. Standard Sheets – Standardized plans containing details approved by the Department and the FHWA, for construction of a given type on any project, included in contracts on an as-needed basis.”
6	1.01.02	41	Change “Aluminum Association” to “Aluminum Association, Inc. (The)”
6	1.01.02	42	Delete “AAA – Aluminum Alloy Association”
7	1.01.02	1	Insert “AABC – Associated Air Balance Council”
7	1.01.02	1	Insert “AAMA – American Architectural Manufacturers Association”
7	1.01.02	12	Insert “ABMA – American Bearing Manufacturers Association”
7	1.01.02	12	Insert “ACGIH – American Council of Government Industrial Hygienists”
7	1.01.02	12	Change “American Concrete Institute” to “ACI International (American Concrete Institute)”
7	1.01.02	14	Insert “ADAAG – Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities”
7	1.01.02	16	Change “Associated General Contractors of America” to “Associated General Contractors of America (The)”
7	1.01.02	19	Insert “AI – Asphalt Institute”
7	1.01.02	19	Change “American Institute of Architects” to “American Institute of Architects (The)”
7	1.01.02	20	Delete “AIEE – American Institute of Electrical Engineers “
7	1.01.02	24	Delete “ALI – Associated Laboratories, Inc.”
7	1.01.02	26	Change “American Lumber Standard Committee” to “American Lumber Standards Committee, Incorporated”
7	1.01.02	27	Change “Air Movement and Control Association” to “Air Movement and Control Association International, Inc.”
7	1.01.02	31	Delete “AOEC – Area of Environmental Concern”
7	1.01.02	33	Change “The Engineered Wood Association” to “APA-The Engineered Wood Association”
7	1.01.02	37	Change “Air Conditioning” to “Air-Conditioning”
8	1.01.02	7	Change “Air Conditioning” to “Air-Conditioning”
8	1.01.02	8	Change “American Society of Mechanical Engineers” to “ASME International (The American Society of Mechanical Engineers International)”
8	1.01.02	18	Delete “ATA – American Transit Association”
8	1.01.02	20	Delete “AWG – American Wire Gauge”
8	1.01.02	22	Change “Wood-Preservers” to “Wood-Preservers’ “
8	1.01.02	33	Delete “AZI – American Zinc Institute”
8	1.01.02	35	Change “Building Officials and Code Administrators International” to “BOCA International, Inc.”

PG.	ARTICLE OR SUBARTICLE	LINE NO.	CORRECTION
8	1.01.02	38	Change “Library” to “Laboratory”
9	1.01.02	2	Change “CONNDOT” to “ConnDOT”
9	1.01.02	6	Delete “CPI – Clay Pipe Institute”
9	1.01.02	9	Delete “CS – Commercial Standard”
9	1.01.02	10	Change “Construction Specifications Institute” to “Construction Specifications Institute (The)”
9	1.01.02	12	Change “Tower” to ”Technology”
9	1.01.02	17	Delete “DFPA – Douglas Fir Plywood Association”
9	1.01.02	19	Change “Department of Defense” to “Department of Defense Military Specifications and Standards”
9	1.01.02	21	Change “Association” to “Alliance”
9	1.01.02	23	Delete “U.S. Department of Transportation”
9	1.01.02	28	Delete “U.S. Department of Transportation”
9	1.01.02	30	Insert “FMG – FM Global”
9	1.01.02	31	Delete “U.S. Department of Transportation”
10	1.01.02	2	Delete “HASP – Health and Safety Plan”
10	1.01.02	3	Delete “HMA – Hot Mix Asphalt or Bituminous Concrete”
10	1.01.02	4	Delete “HPMA – Hardwood Plywood Manufacturers Association”
10	1.01.02	5	Insert “HPVA – Hardwood Plywood & Veneer Association”
10	1.01.02	9	Insert “ICC – International Code Council”
10	1.01.02	9	Change “Insulated Cable Engineers Association” to “Insulated Cable Engineers Association, Inc.”
10	1.01.02	10	Change “Institute of Electrical and Electronics Engineers” to “Institute of Electrical and Electronics Engineers, Inc. (The)”
10	1.01.02	21	Change “Military Standardization Documents, U.S. Department of Defense” to “(MILSPEC) Military Specification and Standards”
10	1.01.02	24	Delete “MS – Military Specifications”
10	1.01.02	26	Change “Manufacturers Standardization Society of the Valve and Fittings Industry Inc.” to “Manufacturers Standardization Society of The Valve and Fittings the Valve Industry Inc.”
10	1.01.02	29	Change “National Association of Architectural Metal Manufacturers (The)” to “National Association of Architectural Metal Manufacturers”
10	1.01.02	31	Insert “NADCA – National Air Duct Cleaners Association”
10	1.01.02	34	Delete “NBS – National Bureau of Standards”
10	1.01.02	35	Delete “NC – National Course”
11	1.01.02	3	Delete “NCPRC – National Clay Pipe Research Corporation”
11	1.01.02	10	Change “International Electrical Testing Association” to “InterNational Testing Association”
11	1.01.02	12	Delete “NFS – NFS International”
11	1.01.02	13	Insert “NHLA – National Hardwood Lumber Association”
11	1.01.02	18	Insert “NLGA – National Lumber Grades Authority”
11	1.01.02	18	Delete “NLMA – National Lumber Manufacturers Association”
11	1.01.02	21	Insert “NSF – NSF International”
11	1.01.02	21	Change “National Terrazzo and Mosaic Association (The)” to “National Terrazzo and Mosaic Association, Inc.”
11	1.01.02	26	Delete “PCC – Portland Cement Concrete”
11	1.01.02	28	Delete “PLP – Plastic Laminate Producers”
11	1.01.02	29	Delete “PS – Product Standard of NBS, U.S. Department of Commerce”
11	1.01.02	32	Delete “RLMI – Reflector and Lamp Manufacturers’ Institute”

PG.	ARTICLE OR SUBARTICLE	LINE NO.	CORRECTION
11	1.01.02	35	Delete “SAWP – Society of American Wood Preservers”
11	1.01.02	36	Insert “SDI – Steel Deck Institute”
11	1.01.02	36	Insert “S.D.I. – Steel Door Institute”
11	1.01.02	37	Insert “SJI – Steel Joist Institute”
11	1.01.02	37	Insert “SMACNA – Sheet Metal and Air Conditioning Contractors’ National Association”
11	1.01.02	37	Change “Southern Pine Inspection Bureau” to “Southern Pine Inspection Bureau (The)”
12	1.01.02	9	Change “Tile Council of America“ to “Tile Council of America, Inc.”
12	1.01.02	10	Insert “TIA – Telecommunications Industry Association”
12	1.01.02	10	Insert “TPI – Truss Plate Institute, Inc.”
12	1.01.02	10	Delete “UBC – Uniform Building Code”
12	1.01.02	11	Change “Underwriters Laboratories, Inc.” to “Underwriters Laboratories Inc.”
12	1.01.02	12	Delete “UMTA – Urban Mass Transportation Administration, U.S. Department of Transportation”
12	1.01.02	14	Delete “UPC – Uniform Plumbing Code”
12	1.01.02	15	Insert “USGBC – U.S. Green Building Council”
12	1.01.02	16	Delete “USS – United States Standard”
12	1.01.02	17	Delete “VOC – Volatile Synthetic Organic Chemicals”
12	1.01.02	19	Delete “WCLA – West Coast Lumberman’s Association”
12	1.01.02	20	Insert “WCSC – Window Covering Safety Council”
12	1.01.02	20	Delete “WSA – Temporary Waste Stockpile Area”
12	1.01.03	31	Insert “AOEC – Area of Environmental Concern”
12	1.01.03	31	Insert “AWG – American Wire Gauge”
13	1.01.03	16	Insert “HASP – Health and Safety Plan”
13	1.01.03	29	Insert “PCC – Portland Cement Concrete”
14	1.01.03	25	Insert “VOC – Volatile Organic Compound”
14	1.01.03	26	Insert “WSA – Temporary Waste Stockpile Area”
22	1.03.07	23	Change “**$1,000,000**” to “**$2,000,000**”
32	1.05.01	38	Change “Connecticut General Statutes” to “CGS”
45	1.05.15	29	Change “Department of Public Utility Control” to “DPUC”
105	1.20	29	Change “Workmen and Equipment” to “Personnel and Equipment”
105	1.20	31	Delete “Completion of Construction Work and”
107	1.20-1.02.13	15	Change “Americans with Disabilities Act Accessibility Guidelines” to “ADAAG”
108	1.20-1.04.01	26	Change “othewise” to “otherwise”
119	1.20-1.05.25	4	Change “Certificate of Compliance” to “C.O.C.”
122	1.20-1.06.08	3	Change “Certificate of Compliance” to “C.O.C.”
131	1.20-1.08.05	34	Change “Workmen and Equipment” to “Personnel and Equipment”
132	1.20-1.08.11	12	Change “Certificate of Compliance” to “C.O.C.”
133	1.20-1.08.13	7	Delete “Completion of Construction Work and”
133	1.20-1.08.13	9	Change “Certificate of Compliance” to “C.O.C.”
133	1.20-1.08.11	15	Change “Certificate of Compliance” to “C.O.C.”
133	1.20-1.08.11	20	Change “Certificate of Compliance” to “C.O.C.”
143	2.02.01	28	Insert “, swales” after “channels”
245	4.06.04	11	Change “**Over weight (mass) Adjustments -**” and replace with indented “Over weight (mass) Adjustments -” as a subsection of “**1. Bituminous Concrete Class ( )**”.

PG.	ARTICLE OR SUBARTICLE	LINE NO.	CORRECTION
259	5.03.03	24	Change “Such requirements of Article 5.02.03 as are pertinent shall apply equally to this construction.” To “All such plans prepared by the Contractor shall be considered working drawings and shall be submitted with engineering calculations to the Engineer for review in accordance with the requirements of Article 1.05.02."
270	5.08.02	4	Change “M.06.02-12” to “M.06.02-4 Welded Stud Shear Connectors”
271	5.09.02	39	Change “M.06.02-12” to “M.06.02-4 Welded Stud Shear Connectors”
284	5.14.03-12	12	Change “Article M.06.02-13” to “Subarticle 6.03.03 (a) Shop Fabrication Notice”
351	6.03.03	8	Change “MS MIL-C-11796B” to “MIL-C-11796B”
434	9.04.02	14	Change “Subarticle M.06.02-1” to “Article 6.03.02”
434	9.04.02	15	Change “M.06.02-9(d) for metal bridge rail (cast post—aluminum).” to “Malleable castings shall conform to the requirements of the specifications for malleable iron castings, ASTM A 47, Grade No. 32510 (22010). Ductile iron castings shall conform to the Specifications for Ductile Iron Castings, ASTM A 536, Grade 60-40-18 (414-276-18) unless otherwise specified. In addition to the specified test coupons, test specimens from parts integral with the castings, such as risers, shall be tested for castings having a weight (mass) of more than 1000 pounds (455 kilograms) to determine that the required quality is obtained in the castings in the finished condition.”
452	9.14.02	2	Change “Subarticle M.06.02-8” to “ASTM A 53, Type E or S, Grade A, Schedule 40 Black Finish.”
452	9.14.02	4	Change “Subarticle M.06.02-9(d) except that the grade shall be 32510” to “the specifications for malleable iron castings, ASTM A 47, Grade No. 32510 (22010). Ductile iron castings shall conform to the Specifications for Ductile Iron Castings, ASTM A 536, Grade 60-40-18 (414-276-18) unless otherwise specified. In addition to the specified test coupons, test specimens from parts integral with the castings, such as risers, shall be tested for castings having a weight (mass) of more than 1000 pounds (455 kilograms) to determine that the required quality is obtained in the castings in the finished condition.”
496	9.70.01	37	Change “CDOT” to “ConnDOT”
569	11.14.05	19	Change “Span Wire” to “Span Wire (Type)”
577	12.01.03	7	Change “6.03.03-19” to “6.03.03-4 (f) High Strength Bolted Connections”
577	12.01.03	23	Change “Article 6.03.03-15” to “Subarticle 6.03.03-4(c) Bearings”
577	12.01.03	27	Change “Article 6.03.03-19 (c)(3)” to “Subarticle 6.03.03-4 (f) High Strength Bolted Connections Turn-of-Nut Installation Method”
604	18.00.02	7	Change “National Cooperative Highway Research Program (NCHRP)” to “NCHRP”
623	M.03.01	9	Change “Cement and Concrete Reference Laboratory” to “CCRL”
623	M.03.01	13	Change “Cement and Concrete Reference Laboratory” to “CCRL”
626	M.03.01	2	Change “Cement and Concrete Reference Laboratory” to “CCRL”

PG.	ARTICLE OR SUBARTICLE	LINE NO.	CORRECTION
626	M.03.01	3	Change “NBS” to “NIST”
632	M.03.01	18	Change “Cement and Concrete Reference Laboratory” to “CCRL”
638	M.04.02	37	Change “Asphalt Institute’s” to “AI’s”
711	M.10.02-1	17	Change “Subarticle M.06.02-1(b)” to “Article M.06.02”
720	M.10.08-3	2	Change “Subarticle M.06.02-1(b)” to “Article M.06.02”
735	M.13.03	22	Change “AOAC International” to “AOAC”
760	M.15.15	21	Change “non-fusible” to “fused”
780	M.16.08	41	Change “Americans With Disabilities Act (ADA)” to “ADA”
790	M.16.10	24	Change “Underwriter’s Laboratory” to “UL”
800	M.17.01	19	Change “AAA 6061-T6” to “AA 6061-T6”
837	Pay Items	24	Change “Span Wire” to “Span Wire (Type)”
845	Index	6	Add page 133 to “Acceptance of Project”
846	Index	13	Add page 107 to “Bids: Consideration of”
847	Index	28	Add page 132 to “Cleaning Up, Final”
849	Index	25	Add page 107 to “Consideration of Bids”
849	Index	39	Add page 108 to “Contract: Intent of”
850	Index	3	Add page 133 to “Contractor’s: Responsibility, Termination of the”
850	Index	13	Add page 114 to “Cooperation by Contractor”
850	Index	15	Add page 114 to “Coordination of Special Provisions, Plans, Supplemental Specifications and Standard Specifications and Other Contract Requirements”
850	Index	40	Add page 128 to “Cutting and Patching:”
852	Index	16	Add page 106 to “Examination of Plans, Specifications, Special Provisions and Site of Work”
852	Index	38	Insert “Facilities, Temporary…126”
853	Index	7	Add page 132 to “Final: Cleaning Up”
854	Index	35	Add page 115 to “Inspection”
855	Index	11	Add page 108 to “Intent of Contract”
855	Index	22	Add page 106 to “Knowledge of Applicable Laws”
855	Index	25	Add page 106 to “Laws: Knowledge of Applicable”
856	Index	27	Add page 120 to “Materials: Source of Supply and Quality”
856	Index	28	Add page 121 to “Materials: Storage of”
857	Index	33	Add page 133 to “Operation and Maintenance Manuals:”
857	Index	34	Change page 133 to 136 for “Equipment and Systems Maintenance Manual”
859	Index	2	Add page 131 to “Personnel and Equipment”
860	Index	6	Add page 114 to “Plans: Coordination of Special Provisions, Supplemental Specifications and Standard Specifications and Other Contract Requirements”
860	Index	7	Add page 106 to “Plans: Examination of”
860	Index	30	Change page 108 to 112 for “Product Data”
860	Index	31	Change page 108 to 112 for “Product Samples “
860	Index	32	Add page 124 to “Product Selection:”
861	Index	12	Add page 126 to “Prosecution of Work”
861	Index	38	Change page 115 to 135 for “Record Drawings”
863	Index	3	Add page 125 to “Sanitary Provisions”
863	Index	18	Insert “Services, Temporary…126”
863	Index	23	Add page 111 to “Shop Drawings”
864	Index	4	Add page 106 to “Site of Work, Examination of”

PG.	ARTICLE OR SUBARTICLE	LINE NO.	CORRECTION
864	Index	12	Add page 120 to “Source of Supply and Quality”
864	Index	19	Add page 114 to “Special Provisions: Coordination of Plans, Supplemental Specifications and Standard Specifications and Other Contract Requirements”
864	Index	20	Add page 106 to “Special Provisions: Examination of”
864	Index	26	Add page 114 to “Specifications: Coordination of Plans, Special Provisions and Other Contract Requirements”
864	Index	27	Add page 106 to “Specifications: Examination of”
864	Index	43	Add page 121 to “Storage”
865	Index	27	Delete page 108 from “Submittals: Shop Drawings”
865	Index	45	Insert “Temporary Utilities, Services, and Facilities…126”
866	Index	2	Add page 133 to “Termination of Contractor’s Responsibility”
866	Index	23	Insert “Training…137”
866	Index	45	Add page 133 to “Utility Services”
867	Index	8	Insert “Warranties…121”
867	Index	24	Add page 126 to “Work: Prosecution of”

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.01
DEFINITIONS OF TERMS AND
PERMISSIBLE ABBREVIATIONS

1.01.01 — Definitions:

Add the following definition:

SUBSTANTIAL COMPLETION: The date at which the performance of all work on the Project has
been completed except minor or incidental items, final cleanup, work required under a warranty, and repair
of unacceptable work, and provided the Engineer has determined that:

A. The Project is safe and convenient for use by the public, and

B. All traffic lanes including all safety appurtenances are in their final configuration, and

C. Failure to complete the work and repairs excepted above does not result in the deterioration of other completed work; and provided further, that the value of work remaining to be performed, repairs, and cleanup is less than one percent (1%) of the estimated final Contract amount, and

D. If applicable a Certificate of Compliance has been issued.

1.01.02 — Abbreviations, Publications, and Standards:

Delete the like-named abbreviations and replace it with the following abbreviations:

"AA – Aluminum Association, Inc. (The)
ALSC – American Lumber Standard Committee, Incorporated
AMCA – Air Movement and Control Association International, Inc.
AOSA – Association of Official Seed Analysts, Inc.
ASME – ASME International (The American Society of Mechanical Engineers International)
CTI – Cooling Technology Institute
EIA – Electronic Industries Alliance
ICEA – Insulated Cable Engineers Association, Inc.
IEEE – Institute of Electrical and Electronics Engineers, Inc. (The)
NTMA – National Terrazzo & Mosaic Association, Inc. (The)
TCA – Tile Council of America, Inc."

Delete the Following abbreviations:

"ADA – Americans with Disabilities Act
AFPA – American Forest and Paper Association

BOCA – Building Officials and Code Administrators International
FM – Factory Mutual System
ICBO – International Conference of Building Officials
MIL – Military Standardization Documents, U.S Department of Defense
MS – Military Specifications
NWWDA – National Wood Window and Door Association
NFS – NFS International"

Add the following abbreviations:

"ADAAG – Americans with Disabilities Act (ADA)
AABC – Associated Air Balance Council
AAMA – American Architectural Manufacturers Association
ABMA – American Bearing Manufacturers Association
AF&PA – American Forest & Paper Association
AI – Asphalt Institute
BIA – Brick Industry Association (The)
CDA – Copper Development Association Inc.
CGA – Compressed Gas Association
FMG – FM Global
HI – Hydraulic Institute
HPVA – Hardwood Plywood & Veneer Association
ICC – International Code Council
ICC-ES – ICC Evaluation Service, Inc.
IEC – International Electrotechnical Commission
IGMA – Insulating Glass Manufacturers Alliance
ISO – International Organization for Standardization
MILSPEC – Military Specification and Standards
NADCA –National Air Duct Cleaners Association
NFRC – National Fenestration Rating Council
NHLA – National Hardwood Lumber Association
NSF – NSF International (National Sanitation Foundation International)
PDI – Plumbing & Drainage Institute
SDI – Steel Deck Institute *or*
- Steel Door Institute
SJI – Steel Joist Institute
SMACNA – Sheet Metal and Air Conditioning Contractors' National Association
SPRI – Single Ply Roofing Industry
SWRI – Sealant, Waterproofing, & Restoration Institute
TIA/EIA – Telecommunications Industry Association/Electronic Industries Alliance
TRB – Transportation Research Board
UFAS – Uniform Federal Accessibility Standards
USGBC – U.S. Green Building Council
WDMA – Window & Door Manufacturers Association"

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.05
CONTROL OF THE WORK

Replace Article 1.05.08 – Vacant with the following:

1.05.08—SCHEDULES AND REPORTS:

When a project coordinator is not required by the Contract the following shall apply:

Baseline Bar Chart Construction Schedule: Within 20 calendar days after contract award the Contractor shall develop a comprehensive bar chart as a baseline schedule for the project. The bar chart schedule shall be submitted to the Engineer for approval and shall be based on the following guidelines:
1. The bar chart schedule shall contain a list of activities that represents the major activities of the project. At a minimum, this list should include a breakdown by individual structure or stage, including major components of each. The bar chart schedule shall contain sufficient detail to describe the progression of the work in a comprehensive manner. As a guide, 10 to 15 bar chart activities should be provided for each $1 million of contract value. The following list is provided as an example only and is not meant to be all-inclusive or all-applicable:

General Activities Applicable to all projects

Project Constraints
- -Winter shutdowns
- -Environmental permits/application time of year restrictions
- -Milestones
- -Third Party approvals
- -Long lead time items (procurement and fabrication of major elements)
- -Adjacent Projects or work by others

Award
Notice to Proceed
Signing (Construction, temporary, permanent by location)
Mobilization
Permits as required
Field Office
Utility Relocations
Submittals/shop drawings/working drawings/product data
Construction of Waste Stock pile area
Clearing and Grubbing
Earthwork (Borrow, earth ex, rock ex etc.)
Traffic control items (including illumination and signalization)
Pavement markings
Roadway Construction (Breakdown into components)
Drainage (Breakdown into components)

Culverts
Plantings (including turf establishment)
Semi-final inspection
Final Cleanup

As required the following may supplement the activities listed above for the specific project types indicated:

a. For bridges and other structures, include major components such as abutments, wingwalls, piers, decks and retaining walls; further breakdown by footings, wall sections, parapets etc.

Temporary Earth Retention Systems
Cofferdam and Dewatering
Structure Excavation
Piles/test piles
Temporary Structures
Removal of Superstructure
Bearing Pads
Structural Steel (Breakdown by fabrication, delivery, installation, painting etc.)
Bridge deck

b. Multiple location projects such as traffic signal, incident management, lighting, planting and guiderail projects will be broken down first by location and then by operation. Other major activities of these types of projects should include, but are not limited to:

Installation of anchors
Driving posts
Foundations
Trenching and Backfilling
Installation of Span poles/mast arms
Installation of luminaries
Installation of cameras
Installation of VMS
Hanging heads
Sawcut loops
Energizing equipment

c. Facility Projects – Facilities construction shall reflect the same breakdown of the project as the schedule of values:

Division 2 – Existing Conditions
Division 3 – Concrete
Division 4 – Masonry
Division 5 – Metals

Division 6 – Wood, Plastic, and Composites
Division 7 – Thermal and Moisture Protection
Division 8 – Openings
Division 9 – Finishes
Division 10 – Specialties
Division 11 – Equipment
Division 12 - Furnishings
Division 13 – Special Construction
Division 14 – Conveying Equipment
Division 21 – Fire Suppression
Division 22 – Plumbing
Division 23 – Heating, Ventilating, and Air Conditioning
Division 26 – Electrical
Division 27 – Communications
Division 28 – Electronic Safety and Security
Division 31 – Earthwork
Division 32 – Exterior Improvements
Division 33 - Utilities

2. If the Engineer determines that additional detail is necessary, the Contractor shall provide it.
3. Each activity shall have a separate schedule bar. The schedule timeline shall be broken into weekly time periods with a vertical line to identify the first working day of each week.
4. The bar chart schedule shall show relationships among activities. The critical path for the Project shall be clearly defined on the schedule. The schedule shall show milestones for major elements of work, and shall be prepared on a sheet, or series of sheets of sufficient width to show data for the entire construction period.
5. If scheduling software is used to create the bar chart schedule, related reports such as a predecessor and successor report, a sort by total float, and a sort by early start shall also be submitted.

6. Project activities shall be scheduled to demonstrate that the construction completion date for the Project will occur prior to expiration of the Contract time. In addition, the schedule shall demonstrate conformance with any other dates stipulated in the Contract.
7. The Contractor is responsible to inform its subcontractor(s) and supplier(s) of the project schedule and any relevant updates.
8. There will be no direct payment for furnishing schedules, the cost thereof shall be considered as included in the general cost of the work.
9. For projects without a Mobilization item, 5% of the contract value will be withheld until such time as the Baseline Schedule is approved.
Monthly Updates: No later than the 10th day of each month, unless directed otherwise by the Engineer, the Contractor shall deliver to the Engineer three copies of the schedule to show the work actually accomplished during the preceding month, the actual time spent on each activity, and the estimated time needed to complete any

activity which has been started but not completed. Each time bar shall indicate, in 10% increments, the estimated percentage of that activity which remains to be completed. As the Project progresses, the Contractor shall place a contrasting mark in each bar to indicate the actual percentage of the activity that has been completed.

The monthly update shall include revisions of the schedule necessitated by revisions to the Project directed by the Engineer (including, but not limited to extra work), during the month preceding the update. Similarly, any changes of the schedule required due to changes in the Contractor's planning or progress shall also be included. The Engineer reserves the right to reject any such revisions. If the schedule revisions extend the contract completion date, due to extra or added work or delays beyond the control of the Contractor, the Contractor shall submit a request in writing for an extension of time in accordance with Article 1.08.08. This request shall be supported by an analysis of the schedules submitted previously.

Any schedule revisions shall be identified and explained in a cover letter accompanying the monthly update. The letter shall also describe in general terms the progress of the Project since the last schedule update and shall identify any items of special interest.

If the Contractor fails to provide monthly schedule updates, the Engineer has the right to hold 10% of the monthly estimated payment, or $5,000, whichever is less, until such time as an update has been provided in accordance with this provision.

Biweekly Schedules: Each week, the Contractor shall submit to the Engineer a two week look-ahead schedule. This short-term schedule may be handwritten but shall clearly indicate all work planned for the following two week period.

Recovery Schedules: If the updated schedule indicates that the Project has fallen behind schedule, the Contractor shall either submit a time extension request in accordance with 1.08.08 or immediately institute steps acceptable to the Engineer to improve its progress of the Project. In such a case, the Contractor shall submit a recovery plan, as may be deemed necessary by the Engineer, to demonstrate the manner in which an acceptable rate of progress will be regained.

Replace the first paragraph of Article 1.05.12 – Payrolls with the following:

For each week of the Project from the first week during which an employee of the Contractor does Project work to which prevailing wage requirements apply, until the last week on which such an employee does such work, the Contractor shall furnish to the Engineer certified copies of payrolls showing (a) the names of the employees who worked on the Project and whose work is subject to prevailing wage requirements, (b) the specific days and hours and numbers of hours that each such employee worked on the Project, and (c) the amount of money paid to each such employee for Project work. Each such payroll shall include the statement(s) of compliance with prevailing wage laws required by the State of Connecticut and, if applicable, by the Federal government. Said payrolls must contain all information required by Connecticut General Statutes Section 31-53 (as it may be revised). For contracts subject to Federal prevailing wage requirements, each payroll shall also contain the information required by the Davis Bacon and Related Acts (DBR). All of the payroll requirements in this Article shall also apply to the work of any subcontractor or other party that performs work on the Project site, and the Contractor shall be responsible for ensuring that each such party meets said requirements.

Add the following Article:

1.05.17 - WELDING

The Contractor shall ensure that all welding of materials permanently incorporated into the work, and welding of materials used temporarily during construction of the work is performed in accordance with the following codes:

- American Welding Society (AWS) Structural Welding Code – Steel – ANSI/AWS D1.1: Miscellaneous steel items that are statically loaded including but not limited to columns, and floor beams in buildings, railings, sign supports, cofferdams, tubular items, and modifications to existing statically loaded structures.
- AWS Structural Welding Code – Aluminum – AWS D1.2/D1.2M: Any aluminum structure or member including but not limited to brackets, light standards, and poles.
- AWS Structural Welding Code – Sheet Steel – AWS D1.3/D1.3M: Sheet steel and cold-formed members 0.18 in.(4.6 mm) or less in thickness used as, but not limited, to decking and stay-in-place forms.
- AWS Structural Welding Code – Reinforcing Steel – AWS D1.4/D1.4M: Steel material used in the reinforcement of cast-in-place or pre-cast Portland cement concrete elements including but not limited to bridge decks, catch basin components, walls, beams, deck units, and girders.
- AASHTO/AWS – Bridge Welding Code, AASHTO/AWS D1.5/D1.5M: Steel highway bridges and other dynamically loaded steel structures. Also includes sign supports, and any other fracture critical structure.

The edition governing the work shall be in effect on the date the Contract was advertised for solicitation of bids.

The Contractor is responsible to provide a Certified Welding Inspector in accordance with the above noted codes. The cost for this service is included in the general cost of the work.

All welders shall be certified by the Engineer in accordance with Section 6.03.

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.08
PROSECUTION AND PROGRESS

Article 1.08.01 – Transfer of Work or Contract:

Replace the last paragraph with the following:

The Contractor shall not sublet, sell, transfer, assign, or otherwise dispose of the Contract or any portion thereof, or of the work provided for therein, or of its right, title, or interest therein, to any individual or entity without the written consent of the Commissioner. No payment will be made for such work until written consent is provided by the Commissioner.

Article 1.08.07 – Determination of Contract Time:

Replace the fifth paragraph with the following:

The total elapsed time in calendar days, computed as described above, from the commencement date specified in the Engineer's "Notice to Proceed" to the “Substantial Completion” date specified in the Engineer's "Notice of Substantial Completion" shall be considered as the time used in the performance of the Contract work.

Article 1.08.09 – Failure to Complete Work on Time:

Replace the second paragraph with the following:

If the last day of the initial Contract time or the initial Contract date determined for Substantial Completion is before December 1 in the given year, liquidated damages as specified in the Contract shall be assessed against the Contractor per calendar day (including any days during a winter shutdown period) from that day until the date on which the Project is substantially completed.

1.08.12—Final Inspection:

Replace the first paragraph with the following:

If the Engineer determines that the work may be substantially complete, a Semi Final Inspection will be held as soon as practical. After the Semi Final Inspection is held and the Engineer determines that the requirements for Substantial Completion have been satisfied the Engineer will prepare a “Notice of Substantial Completion”.

When the Contractor has completed all work listed in the “Notice of Substantial Completion” the Contractor shall prepare a written notice requesting a Final Inspection and a “Certificate of Acceptance of Work”. The Engineer will hold an Inspection of the Project as soon as practical after the Engineer determines that the Project may be completed. If the Engineer deems the Project complete, said inspection shall constitute the Final Inspection, and the Engineer will notify the Contractor in writing that the Final Inspection has been performed.

1.08.13 – Acceptance of Work and Termination of the Contractor’s Responsibility:

Replace the only paragraph with the following:

The Contractor’s responsibility for non-administrative Project work will be considered terminated when the final inspection has been held, any required additional work and final cleaning-up have been completed, all final operation and maintenance manuals have been submitted, and all of the Contractor’s equipment and construction signs have been removed from the Project site. When these requirements have been met to the satisfaction of the Engineer, the Commissioner will accept the work by certifying in writing to the Contractor that the non-administrative Project work has been completed.

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.09
MEASUREMENT AND PAYMENT

Article 1.09.04 – Extra and Cost-Plus Work

Delete the word "bonding" *under section* ***(a) Labor****, (3).*

Delete existing section (e) and replace with the following:

(e) Administrative Expense: When extra work on a cost-plus basis is performed by an authorized subcontractor, the Department will pay the Contractor an additional 7.5% for that work; such payment will be in addition to the percentage payments described in (a), (b), (c) and (d) above, as a reimbursement for the Contractor's administrative expense in connection with such work. Approval of such additional payments will be given only after the Contractor provides to the Engineer receipted invoices for all relevant costs.

Change Section designation for Miscellaneous from:

(f) Miscellaneous to: **(g) Miscellaneous**

Add the following as ***(f)****:*

(f) Bonding Costs: For bonding on the total cost of the cost-plus work including administrative expenses as outlined in (e) above, the Contractor shall receive its actual cost. The Contractor shall provide to the Engineer documentation, satisfactory to the Engineer in form and substance, of all such costs.

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.10
ENVIRONMENTAL COMPLIANCE

Add the following Article:

1.10.08 – VEHICLE EMISSIONS

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

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

Idling of delivery trucks, dump trucks, and other equipment shall not be permitted in excess of 3 minutes during periods of non-activity except as allowed by the Regulations of Connecticut State Agencies Section 22a-174-18(b)(3)(c):

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

(i) When a mobile source is forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control,

(ii) When it is necessary to operate defrosting, heating or cooling equipment to ensure the safety or health of the driver or passengers,

(iii) When it is necessary to operate auxiliary equipment that is located in or on the mobile source to accomplish the intended use of the mobile source,

(iv) To bring the mobile source to the manufacturer's recommended operating temperature,

(v) When the outdoor temperature is below twenty degrees Fahrenheit (20 degrees F) [negative seven degrees Celsius (-7 degrees C)],

(vi) When the mobile source is undergoing maintenance that requires such mobile source be operated for more than three (3) consecutive minutes, or

(vii) When a mobile source is in queue to be inspected by U.S. military personnel prior to gaining access to a U.S. military installation."

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

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

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

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.11
CLAIMS

Add the following Section:

1.11.01 – General: When filing a formal claim under Section 4-61 (referred to as "Section 4-61" below) of the C.G.S. (as revised), either as a lawsuit in the Superior Court or as a demand for arbitration, the Contractor must follow the procedures and comply with the requirements set forth in this Section of the Specifications. This Section does not, unless so specified, govern informal claims for additional compensation which the Contractor may bring before the Department. The Contractor should understand, however, that the Department may need, before the Department can resolve such a claim, the same kinds of documentation and other substantiation that it requires under this Section. It is the intent of the Department to compensate the Contractor for actual increased costs caused by or arising from acts or omissions on the part of the Department that violate legal or contractual duties owed to the Contractor by the Department.

1.11.02 – Notice of Claim: Whenever the Contractor intends to file a formal claim against the Department under Section 4-61, seeking compensation for additional costs, the Contractor shall notify the Commissioner in writing (in strict compliance with Section 4-61) of the details of said claim. Such written notice shall contain all pertinent information described in Article 1.11.05 below.

Once formal notice of a claim under C.G.S. Section 4-61 (b) (as revised) has been given to the Commissioner, the claimant may not change the claim in any way, in either concept or monetary amount, (1) without filing a new notice of claim and demand for arbitration to reflect any such change and (2) without the minimum period of six months after filing of the new demand commencing again and running before any hearing on the merits of the claim may be held. The only exception to this limitation will be for damages that continue to accrue after submission of the notice, in ways described and anticipated in the notice.

1.11.03 – Record Keeping: The Contractor shall keep daily records of all costs incurred in connection with its construction-related activities on behalf of the Department. These daily records shall identify each aspect of the Project affected by matters related to any claim for additional compensation that the Contractor has filed, intends to file, or has reason to believe that it may file against the Department; the specific Project locations where Project work has been so affected; the number of people working on the affected aspects of the Project at the pertinent time(s); and the types and number of pieces of equipment on the Project site at the pertinent time(s). If possible, any potential or anticipated effect on the Project's progress or schedule which may result in a claim by the Contractor should also be noted contemporaneously with the cause of the effect, or as soon thereafter as possible.

1.11.04 – Claim Compensation: The payment of any claim, or any portion thereof, that is deemed valid by the Engineer shall be made in accordance with the following provisions of this Article:

(a) Compensable Items: The liability of the Department for claims will be limited to the following specifically-identified items of cost, insofar as they have not otherwise been paid for by the Department, and insofar as they were caused solely by the actions or omissions of the Department or its agents (except that with regard to payment for extra work, the Department will pay to the Contractor the mark-ups provided for in Article 1.04.05.):

(1) Additional Project-site labor expenses.
(2) Additional costs for materials.
(3) Additional, unabsorbed Project-site overhead (**e.g.**, for mobilization and demobilization).
(4) Additional costs for active equipment.
(5) For each day of Project delay or suspension caused solely by actions or omissions of the Department, either
    (i) an additional ten percent (10%) of the total amount of the costs identified in Subarticles (1) through (4) above; except that if the delay or suspension period prevented the Contractor from incurring enough Project costs under Subarticles (1) through (4) during that period to require a payment by the Department that would be greater than the payment described in subparagraph (ii) below, then the payment for affected home office overhead and profit shall instead be made in the following *per diem* amount:
    (ii) six percent (6%) of the original total Contract amount divided by the original number of days of Contract time.
    Payment under either (i) or (ii) hereof shall be deemed to be complete and mutually-satisfactory compensation for any unabsorbed home office overhead and any profit related to the period of delay or suspension.
(6) Additional equipment costs. Only actual equipment costs shall be used in the calculation of any compensation to be made in response to claims for additional Project compensation. Actual equipment costs shall be based upon records kept in the normal course of business and in accordance with generally-accepted accounting principles. Under no circumstances shall Blue Book or other guide or rental rates be used for this purpose (unless the Contractor had to rent the equipment from an unrelated party, in which case the actual rental charges paid by the Contractor, so long as they are reasonable, shall be used). Idle equipment, for instance, shall be paid for based only on its actual cost to the Contractor.
(7) Subcontractor costs limited to, and determined in accordance with, Subarticles (1), (2), (3), (4), and (5) above and applicable statutory and case law. Such subcontractor costs may be paid for by the Department only (a) in the context of an informal claims settlement or (b) if the Contractor has itself paid or legally-assumed, present unconditional liability for those subcontractor costs.

(b) Non-Compensable Items: The Department will have no liability for the following specifically-identified non-compensable items:

(1) Profit, in excess of that provided for herein.
(2) Loss of anticipated profit.
(3) Loss of bidding opportunities.
(4) Reduction of bidding capacity.
(5) Home office overhead in excess of that provided for in Article 1.11.04(a)(5) hereof.
(6) Attorneys fees, claims preparation expenses, or other costs of claims proceedings or resolution.
(7) Any other consequential or indirect expenses or costs, such as tort damages, or any other form of expense or damages not provided for in these Specifications or elsewhere in the Contract.

1.11.05 – Required Claim Documentation: All claims shall be submitted in writing to the Commissioner, and shall be sufficient in detail to enable the Engineer to ascertain the basis and the amount of each claim, and to investigate and evaluate each claim in detail. As a minimum, the Contractor must provide the following information for each and every claim and sub-claim asserted:

(a) A detailed factual statement of the claim, with all dates, locations and items of work pertinent to the claim.
(b) A statement of whether each requested additional amount of compensation or extension of time is based on provisions of the Contract or on an alleged breach of the Contract. Each supporting or breached Contract provision and a statement of the reasons why each such provision supports the claim, must be specifically identified or explained.
(c) Excerpts from manuals or other texts which are standard in the industry, if available, that support the Contractor's claim.
(d) The details of the circumstances that gave rise to the claim.
(e) The date(s) on which any and all events resulting in the claim occurred, and the date(s) on which conditions resulting in the claim first became evident to the Contractor.
(f) Specific identification of any pertinent document, and detailed description of the substance of any material oral communication, relating to the substance of such claim.
(g) If an extension of time is sought, the specific dates and number of days for which it is sought, and the basis or bases for the extension sought. A critical path method, bar chart, or other type of graphical schedule that supports the extension must be submitted.

(h) When submitting any claim over $50,000, the Contractor shall certify in writing, under oath and in accordance with the formalities required by the contract, as to the following:
    (1) That supporting data is accurate and complete to the Contractors best knowledge and belief;
    (2) That the amount of the dispute and the dispute itself accurately reflects what the Contractor in good faith believes to be the Departments liability;
    (3) The certification shall be executed by:
        a. If the Contractor is an individual, the certification shall be executed by that individual.
        b. If the Contractor is not an individual, the certification shall be executed by a senior company official in charge at the Contractor's plant or location involved or an officer or general partner of the Contractor having overall responsibility for the conduct of the Contractors affairs.

1.11.06 – Auditing of Claims: All claims filed against the Department shall be subject to audit by the Department or its agents at any time following the filing of such claim. The Contractor and its subcontractors and suppliers shall cooperate fully with the Department's auditors. Failure of the Contractor**,** its subcontractors, or its suppliers to maintain and retain sufficient records to allow the Department or its agents to fully evaluate the claim shall constitute a waiver of any portion of such claim that cannot be verified by specific, adequate, contemporaneous records, and shall bar recovery on any claim or any portion of a claim for which such verification is not produced. Without limiting the foregoing requirements, and as a minimum, the Contractor shall make available to the Department and its agents the following documents in connection with any claim that the Contractor submits:

(1) Daily time sheets and foreman's daily reports.
(2) Union agreements, if any.
(3) Insurance, welfare, and benefits records.
(4) Payroll register.
(5) Earnings records.
(6) Payroll tax returns.
(7) Records of property tax payments.
(8) Material invoices, purchase orders, and all material and supply acquisition contracts.
(9) Materials cost distribution worksheets.
(10) Equipment records (list of company equipment, rates, etc.).
(11) Vendor rental agreements
(12) Subcontractor invoices to the Contractor, and the Contractor's certificates of payments to subcontractors.
(13) Subcontractor payment certificates.
(14) Canceled checks (payroll and vendors).
(15) Job cost reports.
(16) Job payroll ledger.

(17) General ledger, general journal (if used), and all subsidiary ledgers and journals**,** together with all supporting documentation pertinent to entries made in these ledgers and journals.
(18) Cash disbursements journals.
(19) Financial statements for all years reflecting the operations on the Project.
(20) Income tax returns for all years reflecting the operations on the Project.
(21) Depreciation records on all company equipment**,** whether such records are maintained by the company involved, its accountant, or others.
(22) If a source other than depreciation records is used to develop costs for the Contractor's internal purposes in establishing the actual cost of owning and operating equipment, all such other source documents.
(23) All documents which reflect the Contractor's actual profit and overhead during the years that the Project was being performed**,** and for each of the five years prior to the commencement of the Project.
(24) All documents related to the preparation of the Contractor's bid**,** including the final calculations on which the bid was based.
(25) All documents which relate to the claim or to any sub-claim, together with all documents that support the amount of damages as to each claim or sub-claim.
(26) Worksheets used to prepare the claim, which indicate the cost components of each item of the claim, including but not limited to the pertinent costs of labor, benefits and insurance, materials, equipment, and subcontractors' damages, as well as all documents which establish the relevant time periods, individuals involved, and the Project hours and the rates for the individuals.
(27) The name, function, and pertinent activity of each Contractor's or subcontractor's official, or employee involved in or knowledgeable about events that give rise to, or facts that relate to, the claim.
(28) The amount(s) of additional compensation sought and a break-down of the amount(s) into the categories specified as payable under Article 1.11.04 above.
(29) The name, function, and pertinent activity of each Department official, employee or agent involved in or knowledgeable about events that give rise to, or facts that relate to, the claim.

January 2010

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 1.20
GENERAL CLAUSES FOR FACILITIES CONSTRUCTION

1.20-1.00 – General:

Delete the last sentence of the first paragraph and replace with the following:

"Facilities Construction is defined as the type of construction that requires the issuance of a Certificate of Compliance (C.O.C.) by the State Building Inspector or his authorized representative at the completion of a project, and includes site work considered ancillary to this type of construction."

Add the following article:

1.20-1.01.01—Definitions:

OWNER: Where used herein, it is synonymous with Department or State.

1.20-1.02.04 – Examination of Plans, Specifications, Special Provisions and Site of Work:

Delete the first sentence of the first paragraph and replace with the following:

"CSI-formatted specifications are organized into Divisions and Sections based on the CSI's "MasterFormat" numbering system."

1.20-1.02.13 – Knowledge of Applicable Laws:

Delete Items 1 through 9 in their entirety and replace with the following:

1. "The 2003 International Building Code with the State Building Code, including latest Connecticut Supplement and Amendments.
2. The 2003 International Plumbing Code.
3. The 2003 International Mechanical Code.
4. The 2003 International Existing Building Code.
5. The 2006 International Energy Conservation Code.
6. The 2005 NFPA 70 National Electrical Code.
7. The 2003 ICC/ANSI A117.1.

8. The Fire Safety Code, including latest Connecticut Supplement and Amendments.
9. The 2003 International Fire Code.
10. The 2003 NFPA 1 Uniform Fire Code.
11. The 2003 NFPA 101 Life Safety Code."

Add the following as the new last paragraph:

"All work to be performed by the Contractor shall comply with the "Americans with Disabilities Act Accessibility Guidelines."

1.20-1.03.01 – Consideration of Bids:

Delete the entire article and replace with the following:

"The apparent low bidder shall submit to the Manager of Contracts a Schedule of Values within 14 days after bid opening. Any other Contractor that the Department may subsequently designate as the apparent lowest bidder shall make the aforesaid submission within 14 days from the date on which the Department notifies said Contractor that it has become the apparent lowest bidder. If, however, the Department deems it necessary for such a subsequently designated Contractor to make said submission within a shorter period of time, the Contractor shall make the submission within the time designated by the Department.

The total in the Schedule of Values shall equal the bid dollar amount for the Major Lump Sum Item (MLSI).

The Schedule of Values shall be divided into "Line Items" listed separately for each CSI Section of the Special Provisions. An additional line item for "Mobilization" may be incorporated into the Schedule of Values; however, this item may not exceed 10% of the value of the MLSI. The "Mobilization" line item will also include costs associated with "General Conditions" and "Insurance/Bonding." Where requested by the Department, the Contractor shall break down the line items further into more specific line items.

In the event that this Contract is terminated or a portion of this Contract is deleted for any reason or in any way allowable by law under this Contract after the apparent low bidder has been awarded the Contract, the Schedule of Values will <u>not</u> be used for estimating payment due the Contractor for work completed prior to such termination of the Contract or deletion of work thereunder. In the case of Contract termination, payment shall be made in accordance with Article 1.05.14."

1.20-1.05.02--Shop Drawings, Product Data, Product Samples and Quality Assurance Submittals

Delete the last sentence of the first paragraph and replace with the following:

"All facsimiles or other electronic documents from the Contractor shall be followed by an official transmittal."

Delete the third paragraph and replace with the following:

"The Contractor shall number each submittal consecutively: When resubmitting a "Revise and Resubmit" or "Rejected" submittal, the Contractor shall label the transmittal with the original submittal number followed by a letter to designate the additional submission. All submittals shall be numbered conforming to the following examples:"

In column B of line 001, line 001a, and line 001b of the table in subsection 1, replace "07511" with "075110."

Add the following to the end of the first paragraph of subsection 2:

"The Department reserves the right to return partial submittals unreviewed to the Contractor."

Revise the third paragraph of subsection 2 to read:

"The Contractor shall allow at least 60 calendar days for review of any submittal requiring approval by FAA, FTA, any railroad, DEP, U.S. Coast Guard, Army Corps of Engineers, or any other outside agency."

Delete the third and fourth paragraphs of subsection 3 and replace with the following:

"The Designer will not review submittals and the Engineer will not process payment estimates until the initial submittal schedule has been provided. Any delays in construction due to the Contractor's failure to provide a submittal schedule shall be the responsibility of the Contractor.

The Contractor must update its submittal schedule at least once a month, and distribute and post each updated schedule in the manner described above. The Engineer reserves the right not to process payment estimates without a recently updated submittal schedule on file."

Replace the first sentence of the first paragraph of subsection 4 with the following:

"Shop Drawings consist of fabrication and installation drawings, roughing-in and setting drawings, schedules, patterns, templates and similar drawings, and wiring diagrams showing field-installed wiring, including power, signal, and control wiring."

Replace the second paragraph of subsection 4 with the following:

"Shop drawings shall include the following information: Contract number, Project description, number and title of the drawing, date of drawing, revision number, name of Contractor and subcontractor submitting drawings, dimensions, identification of products, shopwork manufacturing instructions, design calculations, statement of compliance with Contractual standards, notation of dimensions established by field measurement, relationship to adjoining construction clearly indicated, seal and signature of a professional engineer if specified, and any other information required by individual Contract provisions."

Replace the first sentence of the first paragraph of subsection 5 with the following:

"Product data consist of printed information such as manufacturer's product specifications, manufacturer's installation instructions, manufacturer's catalog cuts, standard color charts, wiring diagrams showing factory-installed wiring, printed performance curves, operational range diagrams, and mill reports."

Replace the first sentence of the first paragraph of subsection 7 with the following:

"Quality assurance submittals consist of qualification data, design data, certifications, manufacturer's instructions, manufacturer's field reports, test reports, Material Safety Data Sheets (MSDSs), and other quality assurance information required by individual Contract provisions."

1.20-1.05.04—Coordination of Special Provisions, Plans, Supplemental Specifications and Standard Specifications and Other Contract Requirements:

Delete the first and second paragraphs and replace with the following:

"Industry Standards: Each entity engaged in construction of the Contract shall be familiar with industry standards applicable to that entity's construction activities. If printed standards have been established by organizations referenced in Article 1.01.02 or in the Contract, the Contractor shall obtain copies of said standards directly from the publication source.

Unless the Special Provisions include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Special Provisions to the extent referenced. Such standards are made a part of the Contract by reference."

Add the following article:

1.20-1.05.08—Schedules and Reports:

Daily Construction Reports: The Contractor shall assist the Engineer in the preparation of a daily construction report, by ensuring that each of the Contractor's employees and subcontractors working on the Project site on a given day signs the Engineer's sign-in sheet for that day; and by keeping and providing to the Engineer its own daily list of employees and subcontractors who worked on the Project site on that day.

Add the following article:

1.20-1.05.23—Requests for Information (RFIs):

The Contractor shall forward all RFIs to the Engineer in writing (facsimile or other electronic document) for review. The Engineer will forward the RFI to the Designer for review. Upon receipt of an RFI, the Designer will attempt to determine if additional information is required from the Contractor to respond to the RFI, and request said information from the Engineer.

All other RFIs will be responded to within 10 calendar days of receipt by the Designer.

1.20-1.05.24--Project Meetings:

Delete the third paragraph under subsection 1.

Delete the second paragraph under subsection 2 and replace with the following:

"The meeting participants shall review progress of other construction activities and preparations for the particular activity under consideration, including requirements of Contract documents, related requests for interpretations, related construction orders, purchases, deliveries, submittals, review of mockups, possible conflicts, compatibility problems, time schedules, weather limitations, manufacturer's written recommendations, warranty requirements, compatibility of materials, acceptability of substrates, temporary facilities and controls, space and access limitations, regulations of authorities having jurisdiction, testing and inspecting requirements, installation procedures coordination with other work, required performance results, protection of adjacent work, and protection of construction and personnel."

Delete the second, third and fourth paragraph under subsection 3 and replace with the following:

"The Contractor shall provide the Engineer with a detailed agenda for the proposed

meeting, specifying what topics will be covered. In addition to representatives of the Engineer, each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall attend these meetings. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Project.

At each progress meeting, the participants shall (1) review items of significance that could affect progress; (2) discuss topics appropriate to the current status of the Project; (3) review progress since the last meeting; (4) determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to the Contractor's Construction Schedule; (5) determine how to expedite any Project work that may be behind schedule; (6) discuss whether or not schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract time; and (7) review the present and future needs of each entity represented at the meeting, including such items as interface requirements, time, sequences, deliveries, off-site fabrication problems, access, site utilization, temporary facilities and controls, hours of work, hazards and risks, housekeeping, quality and work standards, status of correction of deficient items, field observations, requests for interpretations, status of proposal requests, pending changes, status of construction orders, and documentation of information for payment requests. The Engineer will distribute copies of minutes of the meeting to the Designer and the Contractor. The Contractor shall distribute copies to parties who were or should have been at the meeting."

*Delete article **1.20-1.05.25—Schedules and Reports** in its entirety*

1.20-1.06.08 - Warranties:

Delete the eighth and ninth paragraph and replace with the following:

"The Contractor shall:

(a) Bind warranties in heavy-duty, commercial-quality, durable 3-ring vinyl-covered loose-leaf binders, thick enough to accommodate the contents, and sized to receive 8 1/2-inch x 11-inch paper (216-millimeter x 279-millimeter) paper.

(b) Identify the binder's contents on the binder's front and spine with the typed or printed title "WARRANTIES," the Project title or name, and the name of the Contractor.

(c) Provide a heavy paper divider with a tab for each separate warranty.

(d) Mark the tab to identify the related product or installation.

(e) Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the Contractor or pertinent subcontractor.

(f) Furnish to the Department a written warranty for all Project work accompanied by a cover letter with the following contents:

[Addressed to:]

Commissioner of Transportation
Department of Transportation
P.O. Box 317546
Newington, Connecticut 06131-7546

Project Title and Number

[We] hereby warrant all materials and workmanship for all work performed under this Contract for a period of one (1) year from [date of issuance of C.O.C.] against failures of workmanship and materials in accordance with the Contract. Furthermore, as a condition of this warranty, [we] agree to have in place all insurance coverage identified in the Contract for the performance of any warranty work.

[Signature:] [Name of authorized signatory]
[Title]

(g) Submit to the Engineer, upon completion of installation of materials or assemblies that are required to have either a flame-rating or a fire-endurance hourly rating, a detailed letter certifying that the required rating has been attained.

Upon determination by the Engineer that Project work covered by a warranty has failed, the Contractor shall replace or rebuild the work to an acceptable condition complying with Contract requirements. The Contractor is responsible for the cost of replacing or rebuilding defective construction or components and those which may have needed to be damaged or removed in order to cure the defective work including costs of material, equipment, labor, and material disposal, regardless of whether or not the State has benefited from use of the work through a portion of its anticipated useful service life. The Contractor shall respond to the Project Site when Project work covered by a warranty has failed within 3 calendar days, unless in the Engineer's opinion said failure is deemed to be an emergency, in which case the Contractor shall respond to the Project Site as directed by the Engineer."

1.20-1.08.03—Prosecution of Work:

Under subsection '3. Cutting and Patching,' delete the heading 'B. Protection of Structural Elements' and replace with the following:

"**B. Protection:**"

Move the existing first and second paragraphs to under the following subparagraph:

"1. Structural Elements:"

Add the following after the first paragraph under B:

"2. Operational Elements: The Contractor shall not cut and patch operating elements and related components in a manner that results in their reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

3. Miscellaneous Elements: The Contractor shall not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety."

Add the following after subsection 3:

"4. Selective Demolition:

A. Definitions:

Remove: The Contractor shall detach materials from existing construction and legally dispose or recycle them off-site, unless indicated to be removed and salvaged or removed and reinstalled. Except for materials indicated to be reused, salvaged,

reinstalled, or otherwise indicated to remain Engineer's property, demolished materials shall become Contractor's property and shall be removed from the Project Site.

Remove and Salvage: The Contractor shall detach materials from existing construction and deliver them to Engineer. The Engineer reserves the right to identify other materials for salvage during the course of demolition.

Remove and Reinstall: The Contractor shall detach materials from existing construction, prepare them for reuse, and reinstall them where indicated.

Existing to Remain: Existing materials of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

B. Approval Process:

The Contractor shall submit pre-demolition photographs to the Engineer prior to the commencement of Project work to show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations.

Well in advance of performing any selective demolition on the Project, the Contractor shall submit to the Engineer a proposal describing the procedures that the Contractor intends to use for same.

The Contractor shall include the following information, as applicable, in its proposal: (1) detailed sequence of selective demolition and removal work with starting and ending dates for each activity while ensuring that the Engineer's on-site operations are not disrupted; (2) interruption of utility services; (3) coordination for shutoff, capping, and continuation of utility services; (4) use of elevators and stairs; (5) locations of temporary partitions and means of egress; (6) coordination of Engineer's continuing occupancy of

portions of existing building and of Engineer's partial occupancy of completed Project work; and (7) means of protection for items to remain and items in path of waste removal from building.

The Contractor shall comply with (1) governing EPA notification regulations before beginning selective demolition; (2) hauling and disposal regulations of authorities having jurisdiction; (3) ANSI A10.6; and (4) NFPA 241.

The Engineer will conduct a Pre-Demolition Meeting at the Project site in accordance with Article 1.20-1.05.24. Said meeting will review the methods and procedures related to selective demolition including, but not limited to, the following: (1) an inspection and discussion of the condition of construction to be selectively demolished; (2) a review of the structural load limitations of the existing structure; (3) a review and finalization of the

selective demolition schedule and a verification of the availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays; (4) a review of requirements of Project work performed by other trades that rely on substrates exposed by selective demolition operations; and (5) a review of areas where existing construction is to remain and requires protection.

C. Repair Materials:

The Contractor shall comply with Article 1.20-1.08.03 subsection 3E for repair materials and shall comply with material and installation requirements specified in other Contract provisions.

D. Examination:

The Contractor shall (1) verify that utilities have been disconnected and capped; (2) survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required; (3) inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged; (4) investigate and measure the nature and extent of unanticipated mechanical, electrical, or structural elements that conflict with intended function or design and submit a written report to

Engineer; and (5) perform surveys as the Project work progresses to detect hazards resulting from selective demolition activities.

E. Utility Services:

The Contractor shall (1) maintain existing utility services indicated to remain and protect them against damage during selective demolition operations; (2) not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by the Engineer; (3) provide temporary services during interruptions to existing utilities, as acceptable to Engineer; (4) provide at least 3 calendar days notice to the Engineer if shutdown of service is required during changeover; and (5) locate, identify, disconnect,

and seal or cap off indicated utilities serving areas to be selectively demolished. The Contractor shall arrange to shut off indicated utilities with utility companies. If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition the Contractor shall provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building. The Contractor shall cut off pipe or conduit in walls or partitions
to be removed and shall cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

The Contractor shall refer to other Contract provisions for shutting off, disconnecting, removing, and sealing or capping utilities. The Contractor shall not start selective demolition work until utility disconnecting and sealing have been completed and verified by the Engineer in writing.

F. Preparation:

The Contractor shall conduct selective demolition and debris-removal operations to ensure minimum interference with adjacent occupied and used facilities on the Project site. The Contractor shall not disrupt the Owner's operations without the Engineer's permission. The Contractor shall protect existing site improvements, appurtenances, and landscaping to remain.

The Contractor shall provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain. The Contractor shall provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas. The Contractor shall protect walls, ceilings, floors, and other existing finish work that are to remain or that are
exposed during selective demolition operations. The Contractor shall cover and protect furniture, furnishings, and equipment that have not been removed.

The Contractor shall provide temporary enclosures for protection of existing building

and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. The Contractor shall provide temporary weathertight enclosure for building exterior. Where heating is needed and permanent enclosure is not complete, the Contractor shall provide insulated temporary enclosures and shall coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.

The Contractor shall erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

The Contractor shall provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished. The Contractor shall strengthen or add new supports when required during progress of selective demolition.

G. Pollution Controls:

The Contractor shall comply with governing regulations pertaining to environmental protection.

The Contractor shall not use water when it may create a hazardous or objectionable condition such as ice, flooding, or pollution.

The Contractor shall remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas. The Contractor shall remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

The Contractor shall clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. The Contractor shall return adjacent areas to condition existing before selective demolition operations began.

H. Performance:

The Contractor shall not use explosives for demolition purposes.

The Contractor shall demolish and remove existing construction only to the extent required by new construction and as indicated. The Contractor shall (1) proceed with selective demolition systematically; (2) neatly cut openings and holes plumb, square, and true to dimensions required; (3) use cutting methods least likely to damage

remaining or adjoining construction; (4) use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces; (5) temporarily cover openings to remain; (6) cut or drill from the

exposed or finished side into concealed surfaces to avoid marring existing finished surfaces; (7) not use cutting torches until work area is cleared of flammable materials; (8) verify condition and contents of concealed spaces such as duct and pipe interiors before starting flame-cutting operations; (9) maintain fire watch and portable fire-suppression devices during flame-cutting operations; (10) maintain adequate ventilation when using cutting torches; (11) remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site; (12) remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation; (13) locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing; and (14) dispose of demolished items and materials promptly.

The Contractor shall comply with the Engineer's requirements for using and protecting walkways, building entries, and other building facilities during selective demolition operations.

The Contractor shall demolish and remove foundations and other below grade structures completely unless otherwise indicated on the plans. The Contractor shall fill below grade areas and voids resulting from demolition of structures with granular fill materials. Prior to placement of fill materials, the Contractor shall ensure that the areas to be filled are free of standing water, frost, frozen material, trash, and debris. After fill placement and compaction, grade surface to meet adjacent contours and provide flow

to surface drainage structures. Backfilling and grading related to demolition is included in the Major Lump Sum Item (MLSI) for the Project. There will be no separate payment for this backfilling and grading.

The Contractor shall (1) demolish concrete in sections; (2) cut concrete at junctures with construction to remain to the depth shown on the Contract plans and at regular intervals using power-driven saw; and (3) remove concrete between saw cuts.

The Contractor shall (1) demolish masonry in small sections; (2) cut masonry at junctures with construction to remain using power-driven saw; and (3) remove masonry between saw cuts.

The Contractor shall (1) saw-cut perimeter of concrete slabs-on-grade to be demolished as shown on the Contract plans; and (2) break up and remove concrete slabs-on-grade.

The Contractor shall (1) remove floor coverings and adhesive according to recommendations in RFCI-WP and its Addendum; and (2) remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.

The Contractor shall (1) only remove existing roofing in one day to the extent that it can

be covered by new roofing; and (2) refer to other Contract provisions for new roofing requirements.

The Contractor shall remove air conditioning equipment without releasing refrigerants.

I. Reuse of Building Elements:

The Contractor shall not demolish building elements beyond what is indicated on the plans without the Engineer's approval.

J. Removed and Salvaged Materials:

Unless otherwise directed by the Engineer, the Contractor shall (1) store materials in a secure area until delivery to the owner; (2) transport materials to the owner's storage area off-site; and (3) protect materials from damage during transport and storage.

K. Removed and Reinstalled Materials:

Unless otherwise directed by the Engineer, the Contractor shall (1) clean and repair materials to functional condition adequate for intended reuse; (2) paint equipment to match the color of new equipment; (3) protect materials from damage during transport and storage; and (4) reinstall items in locations indicated complying with installation requirements for new materials and equipment and providing connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

L. Existing Materials to Remain:

The Contractor shall protect construction indicated to remain against damage and soiling during selective demolition.

The Contractor shall drain piping and cap or plug piping with the same or a compatible piping material for piping to be abandoned in place.

The Contractor shall cap or plug ducts with the same or a compatible ductwork material for ducts to be abandoned in place.

The Contractor shall cut and remove concealed conduits and wiring to be abandoned in place 2-inches (50-mm) below the surface of the adjacent construction, cap the conduit end, and patch the surface to match the existing finish. The Contractor shall cut existing conduits installed in concrete slabs to be abandoned in place flush with the top of the slab and fill conduit end with a minimum of 4-inches (100-mm) of concrete.

M. Patching and Repairing:

The Contractor shall comply with Article 1.20-1.08.03 subsection 3H for patching and

repairing damage to adjacent construction caused by selective demolition operations.

N. Disposal of Demolished Materials:

The Contractor shall (1) not allow demolished materials to accumulate or be sold on the Project Site; (2) not burn demolished materials on the Project Site; and (3) promptly and legally dispose or recycle demolished materials off the Project Site."

1.20-1.08.05--Personnel and Equipment:

Replace "FM with "FMG" in subsection (a)

Add the following article:

"**1.20-1.08.12--Semi-Final and Final Inspections:**

1. Semi-Final Inspection: Before requesting the Semi-Final Inspection, the Contractor shall show 100% completion for all Project work claimed as complete. The Contractor shall submit final test/adjust/balance records including the final air and water balance report. For all incomplete Project work, the Contractor shall prepare its own "Punch List" of the incomplete items and reasons the work is not complete. The Contractor shall submit final test/adjust/balance records including the final air and water balance report.

On receipt of a Contractor request for inspection, the Engineer will proceed with inspection or notify the Contractor of unfulfilled requirements. The Engineer will prepare a "Punch List" of unfilled, substandard, or incomplete items. During this inspection, the Contractor shall have all technicians necessary to demonstrate the complete operation of all systems on-site. Examples of such systems include, but are not limited to, the following: boiler, HVAC, fire alarm, and building automation. The Engineer will advise the Contractor of the construction that must be completed or corrected before the issuance of the C.O.C. Results of the completed inspection will form the basis of requirements for the Final Inspection. The Engineer reserves the right to issue the C.O.C. after the Semi-Final Inspection if there are no Building Code or Fire Code compliance issues or any major "Punch List" items.

2. Final Inspection: Before requesting Final Inspection for issuance of the C.O.C., the Contractor shall: (1) submit specific warranties, maintenance service agreements, final certifications and similar documents; (2) submit Record Drawings, Record Specifications, operations and maintenance manuals, final project photographs, property surveys, and similar final record information; (3) deliver spare parts; (4) make final changeover of permanent locks and deliver the keys to the Engineer; (5) complete start-up testing of systems; (6) train the owner's operation and maintenance personnel; (7) discontinue or change over and remove temporary facilities from the Project Site, along with construction tools, mock-ups, and similar elements; (8) complete final

cleaning requirements, including touch-up painting; (9) touch-up and otherwise repair and restore marred exposed finishes to eliminate visual defects; (10) submit a certified copy of the Engineer's “Punch List” of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Engineer; (11) submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Final Inspection, or when the Engineer took possession of and responsibility for corresponding elements of the Project work; and (12) install permanent electrical service. The Contractor shall

install permanent electrical service prior to Semi-Final Inspection if requested by the Engineer, or if necessary for the Engineer or Contractor to perform testing of building and other related systems and equipment to certify acceptance and completion of Project work. The Contractor shall submit all outstanding items or unacceptable submissions from the Semi-Final Inspection, or other outstanding items required for submittal, prior to the Final Inspection.

On receipt of a Contractor request for inspection, the Engineer will proceed with inspection and notify the Contractor of unfulfilled requirements.”

1.20 – 1.08.13 – Termination of the Contractor’s Responsibility:

Add subsection 3 as follows:

“**3. Insurance Coverage:** The Contractor shall have in place all insurance coverage identified in Article 1.03.07 for the performance of any warranty work.”

1.20-1.08.14--Acceptance of Project:

Add the following to subsection 2 under the heading “Equipment and Systems Maintenance Manual:”

“(j) Copies of maintenance agreements with service agent name and telephone number.”

Add the following paragraph in subsection 3 after the second paragraph:

“The Contractor shall provide a syllabus prior to the training to ensure that the appropriate owner’s operation and maintenance personnel are in attendance.”

Delete the last paragraph and replace with the following:

The Contractor shall submit to the Engineer for approval, a qualified commercial videographer to videotape the training sessions. The videographer shall be a firm or an individual of established reputation that has been regularly engaged as a professional videographer for not less than 3 years.

The Contractor shall video record each training session and provide said video in DVD format to the Engineer for the owner's future use."

Add the following section:

"1.20-1.09.06—Partial Payments:

With each payment request under the MLSI, the Contractor shall submit AIA Form G702 (Application and Certificate of Payment) and Form G703 (Continuation Sheet). The Contractor is not required to obtain the Architect's signature on Form G702. Once approved by the Engineer, the Forms G702 and G703 become the basis of payment under the MLSI."

Add the following section:

"1.20-9.75.04—Method of Measurement:

Mobilization as defined in Article 1.20-1.03.01 will be paid in the manner described hereinafter; however, the determination of the total contract price earned shall not include the amount of mobilization earned during the period covered by the current monthly estimate – but shall include amounts previously earned and certified for payment:

1. When the first payment estimate is made, 25 percent of the "Mobilization" line item will be certified for payment.

2. When the Baseline Schedule, as specified under Section 1.05.08, is accepted, 50 percent of the "Mobilization" line item, minus any previous payments, will be certified for payment.

3. When 10 percent of the total original contract price is earned and the Baseline Schedule, as specified under Section 1.05.08, is accepted, 75 percent of the "Mobilization" line item, minus any previous payments, will be certified for payment.

4. When 30 percent of the total original contract price is earned and the Baseline Schedule, as specified under Section 1.05.08, is accepted, 100 percent of the "Mobilization" line item, minus any previous payments, will be certified for payment."

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 2.02
ROADWAY EXCAVATION, FORMATION OF EMBANKMENT AND DISPOSAL OF SURPLUS MATERIAL

2.02.04 – Method of Measurement:

Second to last Paragraph - replace the last sentence with the following:

"Bituminous parking areas are considered as bituminous concrete pavement."

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 2.05
TRENCH EXCAVATION

Delete the entire Section and replace with the following:

2.05.01--Description:

Paragraph 2 - Delete the only sentence and replace with the following:

2) The removal of stormwater drainage structures, stormwater pipes and appurtenances beyond the limits of the roadway and structure excavation.

Sub article 2 - Rock in Trench - Delete the only sentence and replace with the following:

(2) Rock, insofar as it applies to trench excavation, shall be defined as rock in definite ledge formation, boulders, or portions of boulders, cement masonry structures, concrete structures, reinforced concrete pipe, Portland cement concrete pavement or base, of 1/2 cubic yard (0.5 cubic meters) or more in volume, removed as indicated or directed from within the payment lines for trench excavation.

2.05.05 -Basis of Payment

Paragraph 13 - Delete the entire sentence "There will be no direct payment for the plugging of existing pipes....." and replace with the following:

There will be no direct Payment for the plugging of existing pipes, removal and disposal of metal or plastic pipes or for the breaking up of floors in drainage structures being abandoned. The cost shall be included in the contract unit prices of the drainage and excavation items.

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 3.04
PROCESSED AGGREGATE BASE

Delete the entire Section and replace with the following:

3.04.01--Description: The base shall consist of a foundation constructed on the prepared subbase or subgrade in accordance with these specifications and in conformity with the lines, grades, compacted thickness and typical cross-section as shown on the plans.

3.04.02--Materials: All materials for this work shall conform to the requirements of Article M.05.01.

3.04.03--Construction Methods: Only one type of coarse aggregate shall be used on a project unless otherwise permitted by the Engineer.

Prior to placing the processed aggregate base, the prepared subbase or subgrade shall be maintained true to line and grade, for a minimum distance of 200 feet (60 meters) in advance of the work. None of the aggregate courses shall be placed more than 500 feet (150 meters) ahead of the compaction and binding operation on that particular course.

The processed aggregate base shall be spread uniformly by a method approved by the Engineer. The thickness of each course shall not be more than 4 inches (100 millimeters) after compaction, unless otherwise ordered.

After the aggregate is spread, it shall be thoroughly compacted and bound by use of equipment specifically manufactured for that purpose. Rollers shall deliver a ground pressure of not less than 300 pounds per lineal inch (52.5 newtons/millimeter) of contact width and shall have a weight (mass) not less than 10 tons (9100 kilograms). Vibratory units shall have a static weight (mass) of not less than 4 tons (3650 kilograms). Water may be used during the compaction and binding operation and shall be applied from an approved watering device. The compacting and binding operation shall begin at the outside edges, overlapping the shoulders for a distance of not less than 6 inches (150 millimeters) and progress towards the middle, parallel with the centerline of the pavement. The work shall cover the entire surface of the course with uniform overlapping of each preceding track or pass. Areas of super-elevation and special cross slope shall be compacted by beginning at the lowest edge and proceeding towards the higher edge, unless otherwise directed by the Engineer. The compacting and binding operation shall be continued until the voids in the aggregates have been reduced to provide a firm and uniform surface satisfactory to the Engineer. The amount of compactive effort shall in no case shall be less than four (4) complete passes of the compacting and binding operations. All aggregate shall be completely compacted and bound at the end of each day's work or when traffic is to be permitted to operate on the

road. The dry density of each layer of processed aggregate base after compaction shall not be less than 95 percent of the dry density for that material when tested in accordance with AASHTO T180, Method D.

Should the subbase or subgrade material become churned up or mixed with the processed aggregate base at any time, the Contractor shall, without additional compensation remove the mixture. The Contractor shall add new subbase material, if required, and reshape and recompact the subbase in accordance with the requirements of Article 2.12.03. New aggregate material shall be added, compacted and bound, as hereinbefore specified, to match the surrounding surface.

Any surface irregularities which develop during, or after work on each course, shall be corrected by loosening material already in place and removing or adding aggregate as required. The entire area, including the surrounding surface, shall be re-compacted and rebound until it is brought to a firm and uniform surface satisfactory to the Engineer.

3.04.04--Method of Measurement: Processed Aggregate Base will be measured horizontally in–place after final grading and compaction. Materials placed beyond the horizontal limits indicated on the plans will not be measured for payment.

The total thickness shall be as indicated on the plans, or as ordered by the Engineer and within a tolerance of minus three-fourths of an inch (-$^{3}/_{4}$”) to plus one-half inch (+ $^{1}/_{2}$”) (-19 millimeters to +13 millimeters).

Measurements to determine the thickness will be taken by the Engineer at intervals of 500 feet (150 meters) or less, along lanes, and shall be considered representative of the lane. For the purpose of these measurements, a shoulder will be considered a lane.

If a thickness measurement is taken and found deficient, the Engineer will take such additional measurements as he considers necessary to determine the longitudinal limits of the deficiency. Areas not within allowable tolerances shall be corrected, as ordered by the Engineer, without additional compensation to the Contractor.

3.04.05--Basis of Payment: This work will be paid for at the contract unit price per cubic yard for “Processed Aggregate Base”, complete in place, which price shall include all materials, tools, equipment and work incidental thereto.

Pay Item	Pay Unit
Processed Aggregate Base	c.y. (cu. m)

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 4.01
CONCRETE PAVEMENT

Article 4.01.03-A. Composition:

Add the following new paragraph before the last paragraph:

"The temperature of the concrete at the time of placement shall not be less than 60˚ F (15.5˚ C) or greater than 90˚ F (32˚ C). For pumped concrete, the temperature shall be determined at the placement end of the pump line. The temperature of the concrete shall be determined in accordance with ASTM C1064."

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 5.14
PRESTRESSED CONCRETE MEMBERS

Article 5.14.03 – Construction Methods:

Change the last sentence of 5.14.03-16 – Methods and Equipment to read:

"The results of this investigation, including computations, shall be submitted to the Engineer."

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 6.01
CONCRETE FOR STRUCTURES

Article 6.01.02 – Materials:

Add the following:

Material for stay-in-place metal forms shall be made of zinc-coated (galvanized) steel sheet conforming to ASTM Specification A653, Structural Steel (SS) Grade 33 through 80 (ASTM Specification A653M, Structural Steel (SS) Grade 250 through 550). The minimum gage thickness shall be 20 gage. Coating weight shall conform to ASTM A924, Class G235 (ASTM A924M, Class Z700) and shall otherwise meet all requirements relevant to steel stay-in-place metal forms and the placing of concrete as specified herein and as noted on the contract drawings.

Material for the form supports shall be fabricated from the same material and conform to the same material requirements as the forms themselves or they shall be fabricated from structural steel conforming to the requirements of ASTM A36 (ASTM A36M) which shall be hot-dip galvanized in accordance with ASTM A123 (ASTM A123M).

Lightweight filler material shall be as recommended by the form's manufacturer.

Subarticle 6.01.03 – 3, Forms:

Add the following:

Stay-in-Place Metal Form System:

Stay-in-place metal forms shall have a minimum depth of form valley equal to two inches (50 millimeters). The forms shall have closed tapered ends. Lightweight filler material shall be used in the form valleys.

The metal forms shall be designed on the basis of dead load of the form, reinforcement and the plastic concrete, including the additional weight of concrete due to the deflection of the metal forms, plus 50 pounds per square foot (2.40 kilopascals) for construction loads. The allowable stress in the corrugated form and the accessories shall not be greater than 0.725 times the yield strength of the furnished material and the allowable stress shall not exceed 36,000 psi (250 megapascal). The span for design and deflection shall be the clear distance between edges of the beams or girders less two inches (50 millimeters) and shall be measured parallel to the form flutes. Maximum deflection of the forms under the weight of the plastic concrete, reinforcement, and forms shall not exceed 1/180 of the form span or 0.5 inches (13 millimeters), whichever is less. The permissible form camber shall be based on the actual dead load condition. Camber shall not be used to compensate for deflection in excess of the foregoing limits.

Form support angles shall be designed as a cantilever. The horizontal leg of the form's support angle shall not be greater than 3 inches (75 millimeters).

Before fabricating any material, the Contractor shall submit working drawings to the Engineer for review in accordance with Article 1.05.02-2, Working Drawings. These drawings shall include the proposed method of form construction, erection plans including weld procedure(s), material lists, material designation, gage of all materials, and the details of corrugation. Also, copies of the form design computations shall be submitted with the working drawings.

Form supports shall be used and no stay-in-place metal forms shall be placed over or be directly supported by the top flanges of beams or girders. The form supports may be supported by or be attached to the top flanges. Stay-in-place metal forms shall not be used in bays where longitudinal slab construction joints are located. Stay-in-place metal forms shall not be used under cantilevered slabs such as the overhang outside of fascia members.

Welding to the top flanges of steel beams and girders is not allowed in the areas where the top flanges are in tension, or as indicated on the plans. Alternate installation procedures shall be submitted addressing this condition.

Drilling of holes in prestressed concrete beams or the use of power-actuated tools on the prestressed concrete beams for fastening of the form supports to the prestressed concrete beams will not be permitted. No welding will be permitted on the reinforcing steel in the prestressed units.

All edges of openings cut for drains, pipes, and similar appurtenances shall be independently supported around the entire periphery of the opening.

All fabricated stay-in-place metal forms shall be unloaded, stored, and handled in such a manner as to preclude damage to the forms. Damaged material shall be replaced at no additional cost. Any exposed form or form support metal where the galvanized coating has been damaged, shall be thoroughly cleaned, wire brushed, then coated with two coats of a zinc dust-zinc oxide primer, FS No. TT-P-641d, Type II, as directed by the Engineer.

All fabricated stay-in-place metal forms shall be stored at the project site at least four inches (100 millimeters) above the ground on platforms, skids or other suitable supports and shall be protected against corrosion and damage.

Forms shall be installed from the topside in accordance with the manufacturer's placing plans, recommended details, and printed instructions. Forms shall be constructed to the lines, grades, shapes, and dimensions shown on the plans, unless otherwise directed by the Engineer. Form supports shall ensure that forms retain their correct dimensions and positions during use at all times. Form supports shall provide vertical adjustment to maintain design slab thickness at the crest of corrugation, to compensate for variations in camber of beams and girders, and to allow for deflections.

Field cutting of form sheet metal shall be made by a steel cutting saw. Supports, closures and cut-outs shall be cut with shears or saw. No flame cutting will be permitted.

All welding shall be accomplished by Connecticut certified welders in accordance with Subarticle 6.03.03 – 6, Welding.

The steel form supports shall be placed in direct contact with the flange of stringer or floor beam flanges and attached by bolts, clips, welding where permitted, or other approved means. Form sheets shall not be permitted to rest directly on the top of the stringer or floor beam flanges. Forms shall be securely fastened to form supports with self-drilling fasteners and shall have a minimum bearing length of one inch (25 millimeters) at each end.

In the areas where the form sheets lap, the form sheets shall be securely fastened to one another by fasteners at a maximum spacing of eighteen inches (450 millimeters). The ends of the form sheets shall be securely attached to the support angles with fasteners at a maximum spacing of eighteen inches (450 millimeters) or two corrugation widths, whichever is less. Welding of forms to supports is not allowed.

The depth of the concrete slab shall be as shown on the plans and the corrugated forms shall be placed so that the top of the corrugation will coincide with the bottom of the deck slab. No part of the forms or their supports shall protrude into the slab. All reinforcement in the bottom reinforcement mat shall have a minimum concrete cover of one inch (25 millimeters) unless noted otherwise on the plans.

The completed stay-in-place metal form system shall be sufficiently tight to prevent leakage of mortar or concrete.

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

There will be no direct payment for the cost of the forms and form supports, or any material, tools, equipment, or labor incidental thereto, but the cost shall be considered included in the contract unit price per cubic yard (cu. m) for “Class ‘F’ Concrete”.

Article 6.01.03-8. Placing Concrete:

Add the following new paragraph after the first paragraph:

“The temperature of the concrete at the time of placement shall not be less than 60˚ F (15.5˚ C) or greater than 90˚ F (32˚ C). For pumped concrete, the temperature shall be determined at the placement end of the pump line. The temperature of the concrete shall be determined in accordance with ASTM C1064.”

Subarticle 6.01.03 – 9, Concrete for Bridge Decks:

Add the following:

Screed and runway supports shall not be located on any stay-in-place metal form sheets, form supports or reinforcing steel.

Concrete shall not be placed on the forms to a depth greater than twelve inches (300 millimeters) above the top of the forms. Concrete shall not be dropped more than three feet (1 meter) above the top of the forms, beams or girders.

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 6.03
STRUCTURAL STEEL

Delete the entire section and replace it with the following:

SECTION 6.03
STRUCTURAL STEEL

Description: Work under this item shall consist of furnishing, fabricating, transporting, storing, handling and erecting of structural steel of the type and size designated, as shown on the plans, as directed by the Engineer and in accordance with these specifications.

All work except as stated in the following paragraph shall conform to the requirements of the AASHTO LRFD Bridge Construction Specifications and the ANSI/AASHTO/AWS D1.5 – Bridge Welding Code.

All work subject to railroad loading shall conform to AREMA and the ANSI/AASHTO/AWS D1.5 – Bridge Welding Code.

Materials: The materials for this work shall conform to the requirements of Section M.06.

Materials for this work shall be stored off the ground before, during, and after fabrication. It shall be kept free from dirt, grease and other contaminants and shall be reasonably protected from corrosion. In addition, weathering steel shall be stored as to allow free drainage and promote the development of the oxide coating and a uniform appearance.

Construction Methods:

1. Pre-qualification:

(a) Fabricators producing material for Department projects under this item are required to have as a minimum, an active AISC Certification for Simple Steel Bridges. For fabrication of material for use on bridges other than un-spliced rolled beam bridges, AISC Major Steel Bridge Certification is required. If so noted on the plans, additional AISC endorsement for fabrication of fracture critical members is also required.

(b) Field Welders: Prior to working on material for Department projects under this specification, all field welders, field welding operators, and field tackers must posses a valid welder certification card issued by the Department's Division of Materials Testing. If such person has not been engaged in welding operations on a Department project or

project acceptable to the Department within a period of six months, or if he cannot produce an approved welding certificate dated within the previous twelve months from a welding agency acceptable to the Engineer, he shall be required to re-qualify through examination. The Engineer may require re-qualification of anyone whose quality of work he questions.

2. Submittals:

(a) Shop Drawings: Prior to any fabrication, the Contractor shall submit shop drawings in accordance with Article 1.05.02-3 to the Engineer for review and approval. Shop drawings shall include a cambering procedure and diagram. In the case of trusses, the Contractor is responsible for calculation of the camber (lengthening and shortening) of all truss members.

(b) Shop Schedule: The Contractor shall submit a detailed shop fabrication schedule to the Engineer for review within 30 days of the notice to proceed unless otherwise agreed to by the Engineer. At a minimum the schedule shall include the start date, milestone dates, and completion date. Any significant changes shall be brought to the attention of the Engineer immediately.

(c) Welding Procedures: Prior to start of fabrication, all weld procedures shall be submitted to the Engineer for review and approval.

(d) Working Drawings for Falsework and Erection of Structural Steel: Prior to erecting any steel fabricated under this specification, the Contractor shall submit drawings and supporting calculations, including erection stresses, in accordance with Article1.05.02-2 to the Engineer. The design of temporary supports and falsework shall conform to the *AASHTO Specifications,* the *AASHTO Guide Design Specifications for Bridge Temporary Works* or any other standard acceptable to the Engineer. Falsework shall be of sufficient rigidity and strength to safely support all loads imposed and to produce in the finished structure the lines and grades indicated in the contract documents. The submittal shall include at a minimum:

- Title block with contract number, project identification number (PIN), town, and structure number and name.
- Plan of the work area showing support structures, roads, railroad tracks, Federal and State regulated areas as depicted on the plans, utilities or any other information relative to erection.
- A detailed narrative describing the erection sequence for main members and secondary members (cross frames, diaphragms, lateral bracing, portals, etc.), noting use of holding cranes or temporary supports, falsework, or bents.
- Delivery location of each girder.
- Location of each crane for each pick.
- Capacity chart for each crane and boom length used in the work.
- The capacity of the crane and of all lifting and connecting devices shall be adequate for the total pick load including spreaders and other materials. In the area of railroads and navigable waterways, the capacity shall be as required by Amtrak, Metro North, U.S. Coast Guard or other regulatory authorities. No picks shall be

allowed over vehicular or pedestrian traffic unless otherwise noted on the plans or permitted by the Engineer.

- Pick point location(s) on each member.
- Lifting weight of each member (including clamps, spreader beams, etc.)
- Lift and setting radius for each pick (or maximum lift radius).
- Description of lifting devices or other connecting equipment.
- Girder tie-down details or other method of stabilizing erected girders.
- Bolting requirements, including the minimum number of bolts and erection pins required to stabilize members during the erection sequence.
- Blocking details for stabilizing members supported on expansion bearings and on bearings that do not limit movement in the transverse direction.
- The method and location for temporary supports for field spliced or curved girders, including shoring, false work, holding cranes, guys, etc. The Engineer will review, but not approve details of temporary supports. The design, erection, and stability of these supports shall be the sole responsibility of the Contractor.
- Offsets necessary to adjust expansion bearings during erection to provide for temperature variance and dead load rotation.

The following notes shall be placed on the Erection Drawings:

- Cranes shall be operated in accordance with the Connecticut Department of Public Safety regulations.
- The Contractor shall be responsible for verifying the weight of each lift and for insuring the stability of each member during all phases of erection.
- Members shall be subject to only light drifting to align holes. Any drifting that results in distortion of the member or damage to the holes will be cause for rejection of the member.
- Field reaming of holes shall not be performed unless required by the Contract Drawing or approved by the Engineer.

The Contractor shall submit these documents to the Engineer at least 60 calendar days in advance of their proposed use. If the proposed method of erection requires additional members or modifications to the existing members of the structure, such additions and modifications shall be made by the Contractor at no expense to the State.

3. Shop Fabrication: Unless otherwise shown on the plans or indicated in the Special Provisions, Structural Steel shall be fabricated in accordance with the AASHTO LRFD Bridge Construction Specifications, amended as follows:

(a) Notification: The Contractor shall submit written notification to both the Engineer and the Director of Research and Materials Testing not less than 30 calendar days prior to start of fabrication. No material shall be manufactured or worked in the shop before the Engineer has been so notified. The notification shall include the name and location of the fabrication shop where the work will be done so that arrangements can be made for an audit of the facility and the assignment of a Department Quality Assurance inspector.

(b) Camber: All members shall be cambered prior to heat curving and painting. Rolled beams shall be heat cambered by methods approved by the Engineer. Plate girders shall be cambered by cutting the web to the prescribed shape with allowances for shrinkage due to cutting, welding, and heat curving. The fabricator is responsible to determine what allowances should be made. Rolled, plate-rolled, or fabricated sections shall be cambered to the total amount shown on the plans and within the camber deviation tolerances permitted for welded beams and girders, as indicated in the ANSI/AASHTO/AWS D1.5 Bridge Welding Code. The Contractor must submit to the Engineer for approval, a plan for corrective action if the actual camber is not within tolerance.

(c) Welding: Unless otherwise indicated on the plans or specifications, all work shall be performed in accordance with ANSI/AASHTO/AWS D1.5 – Bridge Welding Code.

(d) Preassembly of Field Connections: Field connections of main members of continuous beams, plate girders, bents, towers, rigid frames, trusses and arches shall be preassembled prior to erection as necessary to verify the geometry of the completed structure or unit and to verify or prepare field splices. The Contractor shall propose an appropriate method of preassembly for review and comment by the Engineer. The method and details of preassembly shall be consistent with the erection procedures shown on the working drawings and camber diagrams. As a minimum, the preassembly procedure shall consist of assembling three contiguous panels accurately adjusted for line and camber. Successive assemblies shall consist of at least one section or panel of the previous assembly plus two or more sections or panels added at the advancing end. In the case of structures longer than 150 feet (45 meters), each assembly shall not be less than 150 feet (45 meters) long regardless of the length of individual continuous panels or section. All falsework, tools, machinery and appliances, including drift pins and bolts necessary for the expeditious handling of the work shall be provided by the Contractor at no cost to the State.

(e) Inspection: The Contractor shall furnish facilities for the inspection of material and workmanship in the shop by the Engineer. The Engineer and his representative shall be allowed free access to the necessary parts of the premises.

The Engineer will provide Quality Assurance (QA) inspection at the fabrication shop to assure that all applicable Quality Control plans and inspections are adequately adhered to and maintained by the Contractor during all phases of the fabrication. A thorough inspection of a random selection of elements at the fabrication shop may serve as the basis of this assurance.

Prior to shipment to the project, each individual piece of structural steel shall be stamped or marked in a clear and permanent fashion by a representative of the fabricators' Quality Control (QC) Department to indicate complete final inspection by the fabricator and conformance to the project specifications for that piece. The stamp or mark must be dated. A Materials Certificate in accordance with Article 1.06.07 may be used in lieu of individual stamps or markings, for all material in a single shipment. The Materials Certificate must list each piece within the shipment and accompany the shipment to the project site.

Following the final inspection by the fabricator's QC personnel, the Engineer may select pieces of structural steel for re-inspection by the Department's QA inspector. Should non-conforming pieces be identified, all similar pieces must be re-inspected by the fabricator and repair procedure(s) submitted to the Engineer for approval. Repairs will be made at the Contractor's expense.

The pieces selected for re-inspection and found to be in conformance, or adequately repaired pieces, may be stamped or marked by the QA inspector. Such markings indicate the Engineer takes no exception to the pieces being sent to the project site. Such marking does not indicate acceptance or approval of the material by the Engineer.

Following delivery to the project site, the Engineer will perform a visual inspection of all material to verify shipping documents, fabricator markings, and that there was no damage to the material or coatings during transportation and handling.

The Engineer is not responsible for approving or accepting any fabricated materials prior to final erection and assembly at the project site.

(f) Nondestructive Testing: All nondestructive testing of structural steel and welding shall be performed as designated on the plans and in the project specifications. Such testing shall be performed by personnel approved by the Engineer.

Personnel performing Radiographic, Ultrasonic or Magnetic Particle testing shall be certified as a NDT Level II technician in accordance with the American Society for Non Destructive Testing (ASNT), Recommended Practice SNT-TC-1A.

Nondestructive testing shall be performed in accordance with the procedures and standards set forth in the AASHTO/AWS D1.5, Bridge Welding Code. The Department reserves the right to perform additional testing as determined by the Engineer.

All nondestructive testing shall be witnessed by an authorized representative of the Department. Certified reports of all tests shall be submitted to the Materials Testing Division for examination. Each certified report shall identify the structure, member, and location of weld or welds tested. Each report shall also list the length and location of any defective welds and include information on the corrective action taken and results of all retests of repaired welds.

Should the Engineer require nondestructive testing on welds not designated in the contract, the cost of such inspection shall be borne by the Contractor if the testing indicates that any weld is defective. If the testing indicates the weld to be satisfactory, the actual cost of such inspection will be paid by the Department.

(g) Marking: Each member shall be identified with an erection mark corresponding with the member identification mark on the approved shop drawings. Identification marks shall be impressed into the member with a low stress stamp in a location in accordance with standard industry practice.

(h) Shipping, Handling, Storage and Receiving: The Contractor shall make all arrangements necessary to properly load, transport, unload, handle and store all material. The Contractor shall furnish to the Engineer copies of all shipping statements. The weight (mass) of the individual members shall be shown on the statements. Members having a weight (mass) of more than 3 tons (2700 kilograms) shall have the weight (mass) marked thereon. All material shall be unloaded promptly upon delivery. The Contractor shall be responsible for any demurrage charges. Damage to any material during transportation, improper storage, faulty erection, or undocumented fabrication errors may be cause for rejection of said material at the project site. Top lateral bracing should be installed in tub girders prior to shipping and erection of the field pieces. All costs associated with any corrective action will be borne by the Contractor.

4. Field Erection: A meeting shall be held on site prior to any erection of structural steel. The Contractor shall name the person responsible for the steel erection work and provide copies of all crane operator licenses. Proposed equipment, rigging, timetable and methods shall be proposed at this meeting.

(a) Falsework: Any temporary work shall be constructed in conformance with the working drawings. The Contractor shall verify that the quality of materials and work employed are consistent with their design.

All girders shall be stabilized with falsework, temporary braces, or holding cranes until a sufficient number of adjacent girders are erected with all diaphragms and cross frames connected to provide necessary lateral support as shown in the erecting diagrams.

Adjustment shall be provided in the falsework and other temporary supports so that the temporary elevation of the structural steel provided by the falsework is consistent with the deflections that will occur as the structure is completed. The elevation of falsework shall be such as to support the girders at the cambered no-load elevation. Unloading of temporary supports should be performed such that all temporary supports at each cross section are unloaded uniformly. Unless specifically permitted by the Engineer, welding of falsework support brackets to structural steel is not allowed.

Unless erected by the cantilever method, truss spans shall be erected on blocking. The blocking shall be left in place until the tension chord splices are fully bolted and all other truss connections pinned and bolted and the proper geometric shape is achieved.

(b) Anchorages: Anchor bolts and similar materials which are to be placed during the erection of the structural steel shall be carefully and accurately set to the requirements of Article 6.01.03.

(c) Bearings: Bearing plates shall have a full and uniform bearing upon the substructure masonry. Bearing plates shall be placed upon bearing areas which are finished according to the requirements of Article 6.01.03.

Prefabricated pads conforming to the requirements of Article M-12.01 shall be installed unless specifically noted otherwise on the contract plans.

Each piece shall be the same size as the bearing plate it is to support and the holes to accommodate the anchor bolts shall be clearly and accurately punched before setting the pad in place.

In placing expansion bearings, due consideration shall be given to the temperature at the time of erection and stage construction requirements. The nuts of anchor bolts at expansion bearings shall be adjusted to permit the free movement of the span.

(d) Field Assembly: Members and components shall be accurately assembled as shown on the plans and any match marks shall be followed. The material shall be carefully handled so that no components will be bent, broken or otherwise damaged.

Hammering which will injure or distort the members is not permitted. Bearing surfaces and surfaces to be in permanent contact shall be cleaned before the members are assembled.

Cylindrical erection pins shall be 1/32 inch (0.8 mm) larger than the nominal diameter of the holes.

Splices and field connections of main stress carrying members shall be made with a minimum of 50% of the holes filled and tightened with high strength bolts before the lifting system is released. The bolts shall be installed uniformly throughout the connection. Lateral stability must be maintained until the deck is placed.

The Contractor shall ensure that girders are stable throughout the erection process. The stage of completeness of the bolted connections shall be considered when evaluating the strength and stability of the steel during erection. For Closed Box and Tub Girders the Contractor shall ensure that the cross- section shape of each box is maintained during erection. Top lateral bracing should be installed in tub girders prior to shipping and erection of the field pieces.

(e) Welded Connections:

Unless otherwise shown on the plans or indicated by the special provisions, welding of structural steel shall be done in accordance with “ANSI/AASHTO/AWS D1.5 Bridge Welding Code.”

The Contractor’s welding and inspection procedures for each type of field weld and field tacking must be submitted to the Engineer on the form designated by the Department. All procedures must be approved by the Materials Testing Division prior to any work and must be adhered to at all times.

Quality control is the responsibility of the Contractor. The Contractor must provide an AWS Certified Welding Inspector (CWI) in accordance with AWS D1.5. The CWI must be qualified and certified in accordance with the provisions of AWS QC1, *Standard for Qualification and Certification of Welding Inspectors.*

The CWI shall make visual inspection of all welds. The Contractor will perform magnetic particle inspection, ultrasonic testing inspection, or radiographic testing inspection of field welds when required on the plans or special provisions. Each test may be witnessed by an authorized representative of the Engineer.

Welds or sections of welds containing imperfections determined to be unacceptable by either the CWI or the Engineer shall be removed and re-welded by the Contractor at their expense. Welds so removed and replaced shall be re-inspected by the CWI. All costs for re-inspection or testing of such welds shall be borne by the Contractor.

(f) High Strength Bolted Connections:

The assembly of structural connections using ASTM A 325/ A 325M or ASTM A 490/A 490M high-strength bolts shall be installed so as to develop the minimum required bolt tension specified in Table A. The Manufacturer's certified test report; including the rotational capacity test results **must** accompany the fastener assemblies. Fastener Assemblies delivered without the certified reports will be rejected.

Bolts, nuts and washers from each rotational-capacity lot shall be shipped in the same container. If there is only one production lot number for each size of nut and washer, the nuts and washers may be shipped in separate containers. Each container shall be permanently marked with the rotational-capacity lot number such that identification will be possible at any stage prior to installation. Assemblies of bolts, nuts and washers shall be installed from the same rotational-capacity lot. Pins, small parts and packages of bolts, washers, and nuts shall be shipped in boxes, crates, kegs, or barrels. A list and description of the contained materials shall be plainly marked on the outside of each shipping container.

Bolted Parts: All material within the grip of the bolt shall be steel; there shall be no compressible material, such as gaskets or insulation, within the grip. Bolted steel shall fit solidly together after the bolts are tensioned. The length of the bolts shall be such that the end of the bolt will be flush with or outside of the face of the nut when properly installed.

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

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

- Connections specified to have un-coated faying surfaces: any paint, including any inadvertent over spray, shall be excluded from areas closer than one bolt diameter, but not less than 1.0 in. (25 mm), from the edge of any hole and all areas within the bolt pattern.

- Connections specified to have painted faying surfaces: shall be blast cleaned and coated in accordance with Section 6.04, and shall not be assembled until the coating system has been properly cured.

- Connections specified to have galvanized faying surfaces: shall be hot-dip galvanized in accordance with ASTM A 123/A 123M, and shall subsequently be roughened by means of hand wire brushing. Power wire brushing is not permitted.

Installation: At the pre-erection meeting, the Contractor shall inform the Engineer of their planned method of tensioning high strength bolts. Acceptable methods are: Turn-of-Nut, Calibrated Wrench or Direct Tension Indicator.

Fastener Assemblies:

A "fastener assembly" is defined as a bolt, a nut, and a washer. Only complete fastener assemblies of appropriately assigned lot numbers shall be installed.

Fastener assemblies shall be stored in an area protected from dirt and moisture. Only as many fastener assemblies as are anticipated to be installed and tensioned during a work shift shall be taken from protected storage. Fastener assemblies not used shall be returned to protected storage at the end of the shift. Prior to installation, fastener assemblies shall not be cleaned of lubricant. Fastener assemblies which accumulate rust or dirt resulting from site conditions shall be cleaned, relubricated and tested for rotational-capacity prior to installation. All galvanized nuts shall be lubricated with a lubricant containing a visible dye. Plain bolts must be oily to the touch when delivered and installed. Lubricant shall be removed prior to painting.

All bolts shall have a hardened washer under the turned element (nut or bolt head). All hardened washers shall conform to the requirements of ASTM F 436/F 436M.

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

Bolt Tension Measuring Device: The Contractor shall provide a calibrated bolt tension measuring device (a Skidmore-Wilhelm calibrator (Skidmore) or other acceptable bolt tension indicating device) at all times when, and at all locations where high-strength fasteners are being installed and tensioned. The tension measuring device (Skidmore) shall be calibrated by an approved testing agency at least annually. The Skidmore shall be used to perform the rotational-capacity test of the fastener assemblies. The Skidmore will also be used to substantiate (1) the suitability of the fastener assembly to satisfy the requirements of Table A, including lubrication as required, (2) calibration of the installation wrenches, if applicable, and (3) the understanding and proper use by the contractor of the selected method of tensioning to be used.

Complete fastener assemblies shall be installed in properly aligned holes and then tensioned by the Turn-of-Nut, Calibrated Wrench or Direct Tension Indicator method to the minimum tension specified in Table A. Tensioning may be done by turning the bolt while the nut is prevented from rotating when it is impractical to turn the nut. Impact wrenches, if

used, shall be of adequate capacity and sufficiently supplied with air to perform the required tensioning of each bolt in approximately 10 seconds.

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

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

Unless otherwise approved by the Engineer fastener assemblies shall be brought to full tension immediately following snugging.

Fully tensioned fastener assemblies shall not be reused. Retightening previously tensioned bolts which may have been loosened by the tensioning of adjacent bolts shall not be considered as reuse.

Rotational-Capacity Tests: In addition to the certified test reports, on site Rotational-capacity tests may be required by the Engineer. This test shall be performed by the Contractor at the location where the fasteners are installed and tensioned. When performed in the field, the procedure shall conform to the requirements of ASTM A 325/ A 325M Appendix A-1.

Turn-of-Nut Installation Method:

At the start of the work, the Contractor shall demonstrate that the procedure used by the bolting crew to develop a snug condition and to control the turns from a snug condition develops the tension required in Table A. To verify their procedure, the Contractor shall test a representative sample of not less than three complete fastener assemblies of each diameter, length and grade to be used in the work. This shall be performed at the start of work using a Skidmore. Periodic retesting shall be performed when ordered by the Engineer.

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

Calibrated Wrench Installation Method:

Calibrated wrench method may be used only when the installation wrenches are properly calibrated daily, or as determined by the Engineer. Standard torques determined from tables or from formulas which are assumed to relate torque to tension **shall not** be acceptable.

The Contractor shall demonstrate to the Engineer periodically that all equipment and wrenches are providing a torque which has been calibrated to produce the minimum tension specified in Table A. The installation procedures shall be verified periodically, as determined by the Engineer, for each bolt diameter, length and grade using the fastener assemblies that are being installed in the work. This verification testing shall be accomplished in a Skidmore by tensioning three complete fastener assemblies of each diameter, length and grade from those being installed with a hardened washer under the element turned.

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

When calibrated wrenches are used to install and tension bolts in a connection, bolts shall be installed with hardened washers under the element turned to tension the bolts. Once the connection has been snugged, the bolts shall be tensioned using the calibrated wrench. Tensioning shall progress systematically from the most rigid part of the connection to its free edges. A calibrated torque wrench shall be used to "touch up" previously tensioned bolts which may have been relaxed as a result of the subsequent tensioning of adjacent bolts until all bolts are tensioned to the prescribed amount.

Direct Tension Indicator Installation Method:

When Direct Tension Indicators (DTIs) meeting the requirements of Section M.06 are used with high-strength bolts to indicate bolt tension, they shall be subjected to the verification testing described below and installed in accordance with the method specified below. Unless otherwise approved by the Engineer, the DTIs shall be installed under the head of the bolt and the nut turned to tension the bolt. The Manufacturer’s recommendations shall be followed for the proper orientation of the DTI and additional washers, if any, required for the correct use of the DTI. Installation of a DTI under the turned element may be permitted if a washer is used to separate the turned element from the DTI.

Verification: Verification testing shall be performed in a Skidmore. A special flat insert shall be used in place of the normal bolt head holding insert. Three verification tests shall be required for each combination of fastener assembly rotational-capacity lot, DTI lot, and DTI position relative to the turned element (bolt head or nut) to be used on the project. The fastener assembly shall be installed in the tension-measuring device with the DTI located in the same position as in the work. The element intended to be stationary (bolt or nut) shall be restrained from rotation.

The verification tests shall be conducted in two stages. The bolt nut and DTI assembly shall be installed in a manner so that at least three and preferably not more than five threads are located between the bearing face of the nut and the bolt head. The bolt shall be tensioned first to the load equal to that listed in Table C

under Verification Tension for the grade and diameter of the bolt. If an impact wrench is used, the tension developed using the impact wrench shall be no more than two-thirds of the required tension. Subsequently, a manual wrench shall be used to attain the required tension. The number of refusals of the 0.005-in. (0.125-mm) tapered feeler gage in the spaces between the protrusions shall be recorded. The number of refusals for uncoated DTIs under the stationary or turned element, or coated DTIs under the stationary element, shall not exceed the number listed under Maximum Verification Refusals in Table C for the grade and diameter of bolt used. The maximum number of verification refusals for coated DTIs (galvanized, painted, or epoxy-coated), when used under the turned element, shall be no more than the number of spaces on the DTI less one. The DTI lot shall be rejected if the number of refusals exceeds the values in the table or, for coated DTIs if the gage is refused in all spaces.

After the number of refusals is recorded at the verification load, the bolt shall be further tensioned until the 0.005-in (0.125-mm) feeler gage is refused at all the spaces and a visible gap exists in at least one space. The load at this condition shall be recorded and the bolt removed from the tension-measuring device. The nut shall be able to be run down by hand for the complete thread length of the bolt excluding thread run-out. If the nut cannot be run down for this thread length, the DTI lot shall be rejected unless the load recorded is less than 95 percent of the average load measured in the rotational capacity test of the fastener lot as specified previously in "Rotational-Capacity Tests."

If the bolt is too short to be tested in the calibration device, the DTI lot shall be verified on a long bolt in a calibrator to determine the number of refusals at the verification tension listed in Table C. The number of refusals shall not exceed the values listed under maximum verification refusals in Table C. Another DTI from the same lot shall then be verified with the short bolt in a convenient hole in the work. The bolt shall be tensioned until the 0.005-in. (0.125-mm) feeler gage is refused in all spaces and a visible gap exists in at least one space. The bolt shall then be removed from the tension-measuring device and the nut shall be able to be run down by hand for the complete thread length of the bolt excluding thread run-out. The DTI lot shall be rejected if the nut cannot be run down this thread length.

Installation: Installation of fastener assemblies using DTIs shall be performed in two stages. The stationary element shall be held against rotation during each stage of the installation. The connection shall be first snugged with bolts installed in all holes of the connection and tensioned sufficiently to bring all the plies of the connection into firm contact. The number of spaces in which a 0.005-in. (0.125-mm) feeler gage is refused in the DTI after snugging shall not exceed those listed under maximum verification refusals in Table C. If the number exceeds the values in the table, the fastener assembly shall be removed and another DTI installed and snugged.

For uncoated DTIs used under a stationary or turned element and for coated DTIs used under a stationary element, the bolts shall be further tensioned until the number of refusals of the 0.005-in. (0.125-mm) feeler gage shall be equal or greater than the number listed under Minimum Installation Refusals in Table C. If the bolt is

tensioned so that no visible gap in any space remains, the bolt and DTI shall be removed and replaced by a new properly tensioned bolt and DTI.

When coated DTIs (galvanized, painted or epoxy coated) are used under a turned element, the 0.005-in (0.125-mm) feeler gage shall be refused in all spaces.

Inspection:

The Contractor shall provide all the material, equipment, tools and labor necessary for the inspection of the bolted connections. Access to the bolted parts and fastener assemblies, both before and after the fasteners are installed and tensioned, shall be provided.

The Contractor is responsible for Quality Control (QC). The Contractor shall review this specification with its project personnel prior to performing the work. The Contractor shall verify the proper markings, surface conditions and storage of fastener assemblies. The Contractor shall inspect the faying surfaces of connections for compliance with the plans and specifications. The Contractor shall provide to the Engineer a copy of their written QC report for each shift of the calibration or verification testing specified. This report shall confirm that the selected procedure is properly used and that the fastener assemblies installed meet the tensions specified in Table A. The Contractor shall monitor the installation of fasteners in the work to assure that the selected procedure, as demonstrated in the initial testing to provide the specified tension, is routinely and properly applied.

The Contractor, in the presence of the Engineer, shall inspect the tensioned bolts using an inspection torque wrench, as defined below. If direct tension indicator devices are used, the appropriate feeler gauge will be used. Inspection tests shall be performed within 24 hours of bolt tensioning to prevent possible loss of lubrication or corrosion influence on tensioning torque.

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

Twenty-five percent, but a minimum of two, of the tensioned bolts shall be selected by the Engineer for inspection in each connection. (The Engineer may reduce the number of bolts tested at a connection to 10% based on the Contractor's past performance and splice location.) The job-inspection torque shall then be applied to each selected assembly with the inspection torque wrench turned in the tightening direction. If all inspected bolt heads or nuts do not turn, the bolts in the connection shall be considered to be properly tensioned. If the torque turns one or more bolt heads or nuts, the job-inspection torque shall then be applied to **all** bolts in the connection or to the satisfaction of the Engineer. Any bolt whose head or nut turns shall be re-tensioned and re-inspected. The Contractor

may, however, re-tension all the bolts in the connection with the inspection torque wrench and resubmit it for inspection, so long as the bolts are not over-tensioned or damaged by this action.

(g) Field Corrections and Misfits: Reaming of bolt holes during erection shall be permitted only with approval of the Engineer. No excessive forces shall be applied to any member to provide for proper alignment of the bolt holes.

The correction of minor misfits involving minor amounts of reaming, cutting, grinding and chipping shall be considered a legitimate part of the erection. However, any error in the shop fabrication or deformation resulting from handling and transportation may be cause for rejection. The Contractor shall be responsible for all misfits, errors and damage and shall make the necessary corrections and replacements.

TABLE A (Metric)
Minimum Bolt Tension in Kilonewtons*

Bolt Size	ASTM A 325M	ASTM A 490M
M16	91	114
M20	142	179
M22	176	221
M24	205	257
M27	267	334
M30	326	408
M36	475	595

*Equal to 70% of specified minimum tensile strength of bolts (as specified in ASTM Specifications for tests of full-size A 325M and A 490M bolts with metric coarse threads series ANSI B1.13M, loaded in axial tension) rounded to the nearest kilonewton.

Table A (English)
Minimum Bolt Tension in kips*

Bolt Size (Inches)	ASTM A 325	ASTM A 490
5/8	19	24
¾	28	35
7/8	39	49
1	51	64
11/8	56	80
1¼	71	102
13/8	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 A 325 and A 490 bolts with UNC threads, loaded in axial tension) rounded to the nearest kip.

TABLE B (English and Metric)
Nut Rotation from the Snug Condition
Geometry[a,b,c] of Outer Faces of Bolted Parts

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

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

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

(b) The values, given in Table B, shall be applicable only to connections in which all material within grip of the bolt is steel.

(c) No research work has been performed by the Research Council Riveted and Bolted Structural Joints to establish the turn-of-nut procedure when bolt lengths exceed 12 diameters. For situations in which the bolt length, measured from the underside of the head to the end of the bolt, exceeds 12 diameters, the required rotation shall be determined by actual tests in a suitable tension device simulating the actual conditions.

TABLE C (Metric)

Bolt Dia. (in.)	Verification Tension		Maximum Verification Refusals		DTI Spaces		Minimum Installation Refusals	
	A325	A490	Type 8.8	Type 10.9	Type 8.8	Type 10.9	Type 8.8	Type 10.9
M16	96	120	1	1	4	4	2	2
M20	149	188	2	2	5	6	3	3
M22	185	232	2	2	5	6	3	3
M24	215	270	2	2	5	6	3	3
M27	280	351	2	3	6	7	3	4
M30	342	428	3	3	7	8	4	4
M36	499	625	3	4	8	9	4	5

TABLE C (English)

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

Method of Measurement: Payment under this item will be at the contract lump sum price per each complete bridge structure or shall be based on the net weight (mass) of metal in the fabricated structure, whichever method appears on the proposal form.

When payment is based on a lump sum basis, the work, including anchor bolts, steel bearings and plates will not be measured for payment. Bearing plates welded to the girder are included in the price of the structural steel and bearing plates bonded to the bearings are included in the price of the bearing.

When payment is based on the net weight (mass) of metal in the fabricated structure, it shall be computed as described below.

The weight (mass) of the metal works to be paid for under the item of structural steel shall be computed on the basis of the net finished dimensions of the parts as shown on the shop drawings, deducting for copes, cuts, clips and all open holes, except bolt holes, and on the following basis:

1. The weights (masses) of rolled shapes shall be computed on the basis of their nominal weights (masses) per foot (meter), as shown in the shop drawings or listed in handbooks.

The weight (mass) of plates shall be computed on the basis of the nominal weight (mass) for their width and thickness as shown on the shop drawings.

2. The weight (mass) of temporary erection bolts, shop and field paint, galvanization, boxes, crates and other containers used for shipping, and materials used for supporting members during transportation and erection, shall not be included.

3. The weight (mass) of all high strength bolts, nuts, and washers shall be included on the basis of the following weights (masses):

Weight per 100				
Nominal diameter of H.S. bolt (inch)	**Bolthead, nut, 1 washer and stickthrough (lbs)**		**Nominal diameter of H.S. bolt (mm)**	**Bolthead, nut, 1 washer and stickthrough (kg)**
1/2	22		16	17
5/8	33		20	26
3/4	55		22	39
7/8	84		24	50
1	120		27	60
1 1/8	169		30	73
1 1/4	216		36	122

4. The weight (mass) of weld metal shall be computed on the basis of the theoretical volume from plan dimensions of the welds.

Size of fillet in Inches (mm)		**Weight of weld in pounds per foot (kg per meter)**	
3/16	(5)	0.08	(0.119)
¼	(6)	0.14	(0.208)
5/16	(8)	0.22	(0.327)
3/8	(9.5)	0.30	(0.446)
½	(13)	0.55	(0.818)
5/8	(16)	0.80	(1.190)
¾	(19)	1.10	(1.636)
7/8	(22)	1.50	(2.231)
1	(25)	2.00	(2.974)

5. The weight (mass) of steel shims, filler plates and anchor bolts shall be measured for payment.

When the pay item “Materials for Structural Steel (Site No.)” is included in the Contract, payment for furnishing of the raw steel material for the plates and shape material only, excluding any markup, based on the net weight (mass) required, and the payment will be made under the estimated item “Materials for Structural Steel (Site No.)”. The overruns or wastage shall not exceed ten per cent for straight girders and fifteen per cent for curved girders. All other work specified in this section for the bridge will be deemed paid for under the lump sum price. In the absence of the pay item “Materials for Structural Steel (Site No.)”, the cost of the raw material is included in the Lump Sum payment for this item, “Structural Steel (Site No.)”.

Basis of Payment: The structural steel, incorporated in the completed and accepted structure, will be paid for at the contract lump sum price for "Structural Steel (Site No.)," or at the contract unit price per hundred weight (kilogram) for "Structural Steel," whichever is indicated in the contract documents.

Payment for either method shall be for structural steel, complete in place, which price shall include quality control, furnishing, fabricating, transporting, storing, erecting, welding, surface preparation and all materials including fastener assemblies, steel bearing assemblies and anchor bolts, equipment, tools and labor incidental thereto.

When the pay item “Materials for Structural Steel (Site No.)” is included in the Contract, payment for furnishing of the raw steel material for the plates and shape material only,

excluding any markup, based on the net weight (mass) required, and the payment will be made under the estimated item “Materials for Structural Steel (Site No.)”. All remaining work including, but not limited to, preparation of shop drawings, fabricating, transporting, storage and handling, erecting, surface preparation and all materials, equipment, tools and labor incidental thereto, will be paid for under “Structural Steel (Site No.)”.

In the absence of the pay item “Materials for Structural Steel (Site No.)”, the cost of the raw material is included in the Lump Sum payment for this item, “Structural Steel (Site No.)”. All remaining work including, but not limited to, preparation of shop drawings, fabricating, transporting, storage and handling, erecting, surface preparation and all materials, equipment, tools and labor incidental thereto, will be paid for under “Structural Steel (Site No.)”.

No direct payment will be made for setting anchor bolts, preparing bearing areas, furnishing and placing materials under bearings. No direct payment will be made for non destructive testing as shown on the plans.

Pay Item	Pay Unit
Structural Steel (Site No.)	l.s. (l.s.)
Structural Steel	cwt. (kg)

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 6.12
CONCRETE CYLINDER CURING BOX

Delete the entire section and replace with it the following:

6.12.01 –Description: This item shall consist of furnishing a box for curing concrete test cylinders. The box shall be commercially available and manufactured specifically for curing concrete test cylinders. The box will remain the property of the Contractor at the conclusion of the project. The box shall be delivered to a location on the project as directed by the Engineer.

6.12.02 – Materials: A catalog cut listing detailed specifications of the box and operating instructions from the manufacturer must be submitted to the Engineer. The box and its components shall be constructed of non-corroding materials and shall be capable of storing a minimum of 18 test cylinders, 6” X 12” (152 mm X 305 mm) stored vertically with the lid closed. The lid must be watertight when closed and hinged in the back with security latches on the front that can be padlocked. The box must be capable of holding water to a maximum level of one inch above test cylinders placed in the box vertically. A drain hole must be provided in a wall of the box to allow manual drainage of the water that exceeds this level. A drain hole must also be provided at the bottom of the box so that it can be manually emptied. The temperature of the water must be controlled by heating and cooling device capable of maintaining the temperature of the water within a range of 60 to 80º F, +/- 2 ºF (15.5 to 26.7 ºC, +/- 1 ºC) within an outside ambient air temperature range of -10 to 120 º F (-23.3 to 49 ºC). The heating and cooling device must be positioned to allow free circulation of air and water around the cylinders and be rated at 120 volts and 15 amps. A rack must be provided within the box to support the cylinders above the pool of temperature controlled water. The device must be thermostatically controlled with a digital readout that is capable of displaying the high/low water temperature within the box since the last reading was taken.

6.12.03 - Construction Methods: The Contractor shall maintain the curing box in working order and shall provide all necessary electrical service and water so that the curing box can be used properly during the entire course of the project. Any curing box that is not operating properly, as determined by the Engineer, shall be replaced within 24 hours by the Contractor at no expense to the State. The Engineer reserves the right to prohibit placement of fresh concrete on the project until a curing box acceptable to the Engineer is operational on the project site.

6.12.04 - Method of Measurement: The furnishing of the concrete test cylinder curing box will be measured for payment by the number of boxes delivered by the Contractor and accepted by the Engineer.

6.12.05 – Basis of Payment: This item will be paid for at the contract unit price each for "Concrete Cylinder Curing Box" ordered and accepted on the project, which price shall include all submittals, material, tools, equipment, and labor incidental thereto. The price shall also include all maintenance and operating costs related to the curing box for the duration of the project.

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 6.51
CULVERTS

6.51.02 – Materials:

In the 2nd paragraph replace "Gravel fill" with "Granular fill".

6.51.03 – Construction Methods:

In the 8th paragraph replace "gravel fill" with "granular fill".

Delete the 13th paragraph, "Bituminous fiber and … as the pipe."

6.51.04 – Methods of Measurement:

In the 7th paragraph replace "Gravel Fill" with "Granular Fill".

6.51.05 – Basis of Payment:

In the 8th paragraph replace "Gravel Fill" with "Granular Fill".

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 7.02
PILES

Article 7.02.05- Basis of Payment:

In the first sentence of the first paragraph of Section "2. Timber Piles" change "Furnishing Timber Piles Foot (Meter Length) and Furnishing Treated Timber Piles Foot (Meter Length)" to "Furnishing (Type) Timber Piles (Foot (Meter) Length)".

In the first sentence of the last paragraph of Section "2. Timber Piles" change "Driving Timber Piles" and "Driving Treated Timber Piles " to "Driving (Type) Timber Piles".

Under Pay Items:

Delete:

Pay Item	Pay Unit
Furnishing (Type) Piles (Lengths)	lb. (kg)

Add:

Pay Item	Pay Unit
Furnishing (Type) Timber Piles (Length)	ea. (ea)
Furnishing Steel Piles	lb. (kg)
Furnishing (Type) Prestressed Concrete Piles	l.f. (m)
Cast-in-Place Concrete Piles	l.f. (m)

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 8.22
TEMPORARY PRECAST CONCRETE BARRIER CURB

Article 8.22.04 – Method of Measurement:

Add the following sentence to the end of the second paragraph:

"Relocation of Temporary Precast Concrete Barrier Curb for access to the work area or for the convenience of the Contractor shall be considered incidental to Maintenance and Protection of Traffic and will not be measured for payment."

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.10
METAL BEAM RAIL

Article 9.10.04 – Method of Measurement

Subarticle 1 – Metal Beam Rail (Type)

Delete the only sentence and replace with the following:

The length of metal beam rail measured for payment will be the number of linear feet (meters) of accepted rail of the type or designation installed, including radius rail other than Curved Guide Rail Treatment, measured along the top of rail between centers of end posts in each continuous section.

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.18
THREE CABLE GUIDE RAILING
(I-BEAM POSTS) AND ANCHORAGES

9.18.03 – Construction Methods:

In the 10th paragraph, replace "MIL" with "MILSPEC."

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.22
BITUMINOUS CONCRETE SIDEWALK
BITUMINOUS CONCRETE DRIVEWAY

9.22.03 – Construction Methods:

Replace the first paragraph with the following:

"**1. Excavation:** Excavation, including saw cutting, removal of any existing sidewalk, or driveway, shall be made to the required depth below the finished grade, as shown on the plans or as directed by the Engineer. All soft and yielding material shall be removed and replaced with suitable material."

9.22.05 – Basis of Payment:

Replace the only paragraph with the following:

"This work will be paid for at the contract unit price per square yard (square meter) for "Bituminous Concrete Sidewalk" or "Bituminous Concrete Driveway," as the case may be, complete in place, which price shall include all saw cutting, excavation as specified above, backfill, disposal of surplus material, gravel or reclaimed miscellaneous aggregate base, and all equipment, tools, labor and materials incidental thereto."

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.44
TOPSOIL

Add the following paragraph to the beginning of article 9.44.03 – Construction Methods:

"The Contractor shall notify the Engineer of the location of the topsoil at least 15 calendar days prior to delivery. The topsoil and its source shall be inspected and approved by the Engineer before the material is delivered to the project. Any material delivered to the project, which does not meet specifications or which has become mixed with undue amounts of subsoil during any operation at the source or during placing and spreading, will be rejected and shall be replaced by the Contractor with acceptable material."

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.49
FURNISHING, PLANTING and MULCHING
TREES, SHRUBS, VINES and GROUND COVER PLANTS

9.49.03 – Construction Methods:

Replace subsection 5. Pits with the following:

> "5. Pits: The pit diameters shall be twice the diameter of the root-spread or container diameters, and shall be 2- inches (50 millimeters) less than the height of the rootball measured from the bottom of the ball to the root collar. (i. e. A 12-inch (300 millimeters) measurement between the root collar and the bottom of the rootball will require a 10-inch (250 millimeters) deep pit). Any excavation in excess of that required shall be replaced with planting soil and compacted to the satisfaction of the Engineer."

Add the following sentence to subsection 6. Obstructions Below Ground:

"If removal of obstructions results in a deeper hole than needed for planting, backfill material shall be added and compacted to the satisfaction of the Engineer."

Replace subsection 7. Preparation of Backfill with the following:

> "**7. Backfill:** Backfill shall conform to M.13.01-1 Planting Soil."

Replace subsection 8. Setting Plants with the following:

> "**8. Setting Plants:** All plants shall be plumb and at a level that is 2-inches (50 millimeters) higher than the surrounding ground. Backfill material for all plants shall be thoroughly and properly settled by firming or tamping. Thorough watering shall accompany backfilling. Saucers capable of holding water shall be formed at individual plants (exclusive of plant beds) by placing ridges of planting soil around each, or as directed by the Engineer.
>
> **a. Balled and Burlapped plants:** Plants shall be handled in such manner so that the soil will not be loosened from the roots inside of the ball. Carefully place the plant into the prepared pits and backfill with planting soil to one - half the depth of the pit, thoroughly tamp to the satisfaction of the Engineer around the ball. Fill the remaining area of the pit with water. Once water has completely drained, loosen the burlap and peel down the top one third. If wire baskets are used, cut and bend down the top third of the basket. Roots that have been wrapped around the ball within the burlap shall be straightened and the remainder of the pit filled with planting soil tamped to ensure that no air pockets remain.

b. Container Grown Plants: Carefully remove the plant from the container over the prepared pits. Gently loosen the soil and straighten all roots as naturally as possible. Place into the bottom of the pit. Backfill with planting soil to one - half the depth of the pit. Thoroughly tamp to the satisfaction of the Engineer. Fill remaining area of the pit with water. Once water has completely drained fill the remainder of the pit with planting soil tamped to ensure that no air pockets remain.

c. Bare-roots Plants: Carefully spread roots as naturally as possible and place into the bottom of the pit. All broken or frayed roots shall be cleanly cut off. Backfill with planting soil to one - half the depth of the pit. Thoroughly tamp to the satisfaction of the Engineer. Fill remaining area of the pit with water. Once water has completely drained fill the remainder of the pit with planting soil tamped to ensure that no air pockets remain."

Replace subsection 10. Watering with the following:

"**10. Watering:** All plants shall be watered upon setting and as many times thereafter as conditions warrant.

The following is a guide for minimum requirements:

Trees:
2 ½" Caliper and less – Fifteen (15) gallons each.
3" to 5" Caliper – Twenty (20) gallon each.
5 ½" Caliper and above – Twenty-five (25) gallon each.
Shrubs:
24" and less – Six (6) gallon each.
More than 24"- Ten (10) gallon each.
Vines, Perennials, and Ornamental Grasses – Three (3) gallons each.
Groundcovers and Bulbs – Two (2) gallons per square foot.

Water shall be applied at a controlled rate and in such a manner to ensure that the water reaches the root zone (saucer) of the plant or plant bed and does not run off to adjacent areas. Watering shall be applied in a manner that does not dislodge plants, erode soil or mulch, or cause damage to saucer.

The Contractor may use slow-release, drip irrigation bags for watering in accordance with manufacturer's instructions. The use of these portable/temporary irrigation bags will require the approval of the Engineer.

Overhead hydro-seeder spray nozzles shall not be used as watering devices."

Replace subsection 17. Establishment Period with the following:

"**17. One-Year Establishment Period:** All plant material shall be subject to a One-Year Establishment Period. During this time, the Contractor shall use currently accepted horticultural practices to keep all plant material installed in a healthy, vigorous growing condition at the date of final acceptance. The date of final

acceptance shall be one full calendar year following the satisfactory completion of the planting activities as confirmed by the Engineer.

An inspection will be held one year from the date of installation with the Contractor, Engineer, and Landscape Designer to determine the acceptability of the plant establishment. An inventory of losses and rejected materials will be made and corrective and necessary clean up measures will be determined at the plant inspection."

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 9.75
MOBILIZATION

9.75.04 – Method of Measurement:

Delete the entire section and replace with the following:

This work will be measured for payment in the manner described hereinafter; however, the determination of the total contract price earned shall not include the amount of mobilization earned during the period covered by the current monthly estimate- but shall include amounts previously earned and certified for payment:

1. When the first payment estimate is made, 25 percent of the lump sum bid price for this item or 2.5 percent of the total original contract price, whichever is less, shall be certified for payment.

2. When the Baseline Schedule, as specified under Section 1.05.08, is accepted, 50 percent of the lump sum bid price or 5 percent of the total original contract price, whichever is less, minus any previous payments, will be certified for payment.

3. When 10 percent of the total original contract price is earned and the Baseline Schedule, as specified under Section 1.05.08, is accepted, 75 percent of the lump sum price of this item or 7.5 percent of the total original contract price, whichever is less, minus any previous payments, will be certified for payment.

4. When 30 percent of the total original contract price is earned and the Baseline Schedule, as specified under Section 1.05.08, is accepted, 100 percent of the lump sum price of this item or 10 percent of the total original contract price, whichever is less, minus any previous payments, will be certified for payment.

Upon completion of all work on the project, payment of any amount bid for mobilization in excess of 10 percent of the original contract amount will be paid.

Nothing herein shall be construed to limit or preclude partial payments otherwise provided for by the contract.

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 10.01
TRENCHING AND BACKFILLING

Article 10.01.01- Description:

In the only sentence of the first paragraph after "…satisfactory…" *add the following:* "clean-up and".

In the only sentence of the second paragraph after "…reconstruction of…" *add the following:* "bituminous, concrete and granite curbing,".

Article 10.01.05- Basis of Payment:

In the only sentence of the second paragraph after "…mulching…" *add the following:* "clean-up and". *After* "…installing…" *add the word* "curbing,".

At the end of the third paragraph, add the following: "In the absence of a "Rock in Trench Excavation" item, the work will be compensated as extra work."

In the only sentence of the sixth paragraph, after …"…unit price for 'Concrete Sidewalk'…" *add the following:* "or as extra work, if no unit price has been established."

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 10.10
CONCRETE HANDHOLE

Article 10.10.05 – Basis of Payment

Remove the words "ground wire".

At the end of the paragraph add the following sentence:

The ground wire (bonding wire) is included in the Contract unit price under Section 10.08 – Electrical Conduit.

Add the word "Cover" *to the end of the pay item* "Cast Iron Handhole"

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 11.13
CONTROL CABLE

11.13.03 – Construction Methods:

In the 1st paragraph of subsection 2 replace “MIL” with “MILSPEC.”

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION 12.10
EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS

12.10.03 (2) – Procedures:

Insert the following after the sixth paragraph:

The epoxy shall be uniformly applied to the surface to be marked to ensure a wet film thickness of the applied epoxy, without glass beads, of 20 mils +/- 1 mil (500 um +/- 25 um).

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.06
METALS

Article M.06.01 – Reinforcing Steel:

Subarticle 1. Bar Reinforcement:

Delete the third paragraph and replace it with:

"Epoxy coated bar reinforcement shall conform to the requirements of ASTM A 615/A 615M, Grade 60 (420) and shall be epoxy coated to the requirements of ASTM A 775/A 775M. All field repairs of the epoxy coating shall conform to the requirements of ASTM D 3963/D 3963M."

Article M.06.02—Structural Steel and Other Structural Materials:

Delete the entire article and replace it with the following:

Article M.06.02—Structural Steel: The materials for this work shall conform to the following requirements:

1. **Structural Steel:**
   Structural steel for bridges shall conform to the designation shown on the plans. Unless otherwise indicated in the plans or specifications, structural steel for non-bridge related members or components shall conform to ASTM A709/A709M, Grade 36 (250).

   All surfaces of steel plates and shapes used in the fabrication of bridge girders shall be blast cleaned and visually inspected by the Contractor prior to any fabrication or preparation for fabrication. Blast cleaning shall conform to the requirements of SSPC-SP-6-Commercial Blast.

   All steel plates and shapes used in the fabrication of bridge girders shall be substantially free from pitting and gouges, regardless of the cause. Substantially free is defined as:
   - The measured surface area of all pits and gouges regardless of depth represent less than 1% of the surface area of theplate or shape.
   - No pit or gouge greater than 1/32 (0.08mm) inch deep.
   - No pit or gouge closer than six inches (15.25 cm) from another.

Any repair of plates or shapes will be performed in accordance with ASTM A6/A 6M.

2. **Anchor Bolts:**
Unless otherwise designated on the plans, anchor bolts, including suitable nuts and washers, shall conform to the following requirements:

Anchor bolt assemblies shall conform to the requirements of ASTM F1554, Grade 36 (250). All components of the bolt assembly shall be galvanized in conformance with ASTM A 153/A 153M.

Certified Test Reports and Material Samples: The Contractor shall submit notarized copies of Certified Test Reports in conformance with Article 1.06.07. Prior to incorporation into the work, the Contractor shall submit samples of the anchor bolt assemblies to the Engineer for testing in accordance with the latest edition of the "Schedule of Minimum Requirements for Acceptance Testing". One sample shall be submitted for each diameter, material designation, grade or coating of anchor bolt assembly.

3. **High Strength Bolts:** High strength bolts, including suitable nuts and hardened washers, shall conform to the following requirements:

a) High strength bolts shall conform to ASTM A325 or ASTM A490 as shown on the plans. High-strength bolts used with coated steel shall be mechanically galvanized, unless otherwise specified. High-strength bolts used with uncoated weathering grades of steel shall be Type 3.

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

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

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

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

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

b) Identifying Marks: ASTM A325 for bolts and the specifications referenced therein for nuts require that bolts and nuts manufactured to the specification be identified by specific markings on the top of the bolt head and on one face of the nut. Head markings must identify the grade by the symbol "A325", the manufacturer and the type, if Type 2 or 3. Nut markings must identify the grade, the manufacturer and if Type 3, the type. Markings on direct tension indicators must identify the manufacturer and Type "325". Other washer markings must identify the manufacturer and if Type 3, the type.

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

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

d) Galvanized Bolts: Galvanized bolts shall conform to ASTM A325, Type 1. The bolts shall be hot-dip galvanized in accordance with ASTM A153, Class C or mechanically galvanized in accordance with ASTM B695, Class 50. Bolts, nuts, and washers of any assembly shall be galvanized by the same process. The nuts shall be overtapped to the minimum amount required for the fastener assembly, and shall be lubricated with a lubricant containing a visible dye so a visual check can be made for the lubricant at the time of field installation. Galvanized bolts shall be tension tested after galvanizing. ASTM A 490 bolts shall not be galvanized.

e) Test Requirements: The maximum hardness of A325 bolts 1" or less in diameter shall be 33 HRC.

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

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

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

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

f) Certified Test Reports and Materials Certificates: The Contractor shall submit notarized copies of Certified Test Reports and Materials Certificates in conformance with Article 1.06.07 for fastener assemblies. In addition the Certified Test Reports and Materials Certificates shall include the following:

a. Mill test reports shall indicate the place where the material was melted and manufactured.

b. Test reports for proof load tests, wedge tests, and rotational-capacity tests shall indicate where the tests were performed, date of tests, location of where the components were manufactured and lot numbers.

c. The test report for galvanized components shall indicate the thickness of the galvanizing.

g) Material Samples: Prior to incorporation into the work, the Contractor shall submit samples of the bolt assemblies to the Engineer for testing in accordance with the latest edition of the "Schedule of Minimum Requirements for Acceptance Testing". Samples shall be submitted for each diameter, length, material designation, grade, coating and manufacturer of bolt assembly.

4. Welded Stud Shear Connectors:

a) Materials: Stud shear connectors shall conform to the requirements of ASTM A 108, cold-drawn bar, Grades 1015, 1018 or 1020, either semi- or fully-killed. If flux-retaining caps are used, the steel for the caps shall be of a low carbon grade suitable for welding and shall comply with ASTM A 109.

Stud shear connectors shall be of a design suitable for electrically end-welding to steel with automatically timed stud welding equipment. The studs shall be of the sizes and dimensions noted on the plans. Flux for welding shall be furnished with each stud, either attached to the end of the stud or combined with the arc shield for automatic application in the welding operation. Each stud shall be furnished with a disposable ferrule of sufficient strength to remain intact during the welding operation and not crumble or break; it shall not be detrimental to the weld or create excessive slag.

Tensile properties, as determined by tests of bar stock after drawing or of finished studs, shall conform to the following requirements in which the yield strength is as determined by the 0.2% offset method:

Tensile strength (min.)	60,000 psi (415 megapascals)
Yield strength (min.)	50,000 psi (345 megapascals)
Elongation (min.)	20% in 2 inches (50 millimeters)
Reduction of area (min.)	50%

b) Test Methods: Tensile properties shall be determined in accordance with the applicable sections of ASTM A 370. Tensile tests of finished studs shall be made on studs welded to test plates using a test fixture similar to that shown in Figure 7.2 of the current AASHTO/AWS D1.5 – Bridge Welding Code. If fracture occurs outside of the middle half of the gage length, the test shall be repeated.

c) Finish: Finished studs shall be of uniform quality and condition, free from injurious laps, fins, seams, cracks, twists, bends or other injurious defects. Finish shall be as produced by cold-drawing, cold-rolling or machining.

d) Certified Test Reports and Materials Certificates: The Contractor shall submit a certified copy of the in-plant quality control test report in conformance with Article 1.06.07. The Contractor shall submit a Materials Certificate in conformance with Article 1.06.07 for the welded studs.

e) Sample Materials for Testing: Prior to incorporation into the work, the Contractor shall submit samples of the stud shear connectors to the Engineer for testing in accordance with the latest edition of the "Schedule of Minimum Requirements for Acceptance Testing". One sample shall be submitted for each diameter and length of welded stud.

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.13
ROADSIDE DEVELOPMENT

Delete article M.13.01 – Topsoil and replace it with the following:

"**Article M.13.01 – Topsoil:** The term topsoil used herein shall mean a soil meeting the soil textural classes established by the USDA Classification System based upon the proportion of sand, silt, and clay size particles after passing a No. 10 (2 millimeter) sieve and subjected to a particle size analysis. The topsoil shall contain 5% to 20% organic matter as determined by loss on ignition of oven-dried samples dried at 221° F (105° C). The pH range of the topsoil shall be 5.5 to 7.0.

The following textural classes shall be acceptable:

Loamy sand, including coarse, loamy fine, and loamy very fine sand, with not more than 80% sand
Sandy loam, including coarse, fine and very fine sandy loam
Loam
Clay loam, with not more than 30% clay
Silt loam, with not more than 60% silt
Sandy clay loam, with not more than 30% clay
All textural classes of topsoil with greater than 80% sand content will be rejected.

The topsoil furnished by the Contractor shall be a natural, workable soil that is screened and free of subsoil, refuse, stumps, roots, brush, weeds, rocks and stones over 1 1/4 inches (30 millimeters) in diameter, and any other foreign matter that would be detrimental to the proper development of plant growth.

The Contractor shall notify the Engineer of the location of the topsoil at least 15 calendar days prior to delivery. The topsoil and its source shall be inspected and approved by the Engineer before the material is delivered to the project. Any material delivered to the project, which does not meet specifications or which has become mixed with undue amounts of subsoil during any operation at the source or during placing and spreading, will be rejected and shall be replaced by the Contractor with acceptable material.

When topsoil is not furnished by the Contractor, it shall be material that is stripped in accordance with Section 2.02 or is furnished by the State, and will be tested as determined by the Engineer.

1. Planting Soil: Soil Material to be used for plant backfill shall be one of the following textural classes:

Loamy sand, with not more than 80% sand
Sandy loam
Loam
Clay loam, with not more than 30% clay
Silt loam, with not more than 60% silt
Sandy clay loam, with not more than 30% clay

Planting soil shall be premixed, consisting of approximately 50 % topsoil, 25 % compost or peat, and 25% native soil. Planting soil shall be loose, friable, and free from refuse, stumps, roots, brush, weeds, rocks and stones 2 inches (50 millimeters) in diameter. In addition, the material shall be free from any material that will prevent proper development and plant growth.

(a) For ericaceous plants and broad-leaved evergreens requiring an acid soil, planting soil shall have a true pH of 4.5 to 5.5. If it has not, it shall be amended by the Contractor at his own expense to the proper pH range by mixing with sulphur.

(b) Planting soil for general planting of nonacid-loving plants shall have a true pH value of 5.6 to 6.5. If it has not, it shall be amended by the Contractor at his own expense to the proper pH range by mixing with dolomitic limestone.

The amount of either sulphur or limestone required to adjust the planting soil to the proper pH range (above) shall be determined by the Engineer based on agronomic tests. The limestone shall conform to the requirements of Article M.13.02. The sulphur shall be commercial or flour sulphur, unadulterated, and shall be delivered in containers with the name of the manufacturer, material, analysis, and net weight (mass) appearing on each container.

The Engineer reserves the right to draw such samples and to perform such tests as he deems necessary to ensure that these specifications are met.”

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.16
TRAFFIC CONTROL SIGNALS

Article M.16.04 – Poles:

Subarticle 1. Steel Poles:

(i) Wire Entrance Fitting:

In the second sentence, delete "required to accept the cables".

Article M.16.06 – Traffic Signals:

In the 1st paragraph of subsection 9 replace "MIL" with "MILSPEC".

Under the paragraph entitled Third Coat, replace the first two sentence with the following:

" Dark Green Enamel: Shall be Dark Green exterior baked enamel and shall comply with FS A-A 2962. The color shall be No. 14056, FS No. 595."

and in the third sentence replace "MIL" with "MILSPEC."

Article M.16.08 – Pedestrian Push Button

Subarticle – Painting

Delete the entire "Third Coat" paragraph and replace with the following:

Third Coat: Dark Green Enamel, shall be DARK GREEN exterior-baking enamel and shall comply with Federal Specifications A-A 2962. The color shall be No. 14056, Federal Standard No. 595.

M.16.15 – Messenger and Span Wire:

Delete the entire article and replace with the following:

The materials for this work shall conform to the following requirements:

1. Messenger wire shall be made of double-galvanized 7-strand utilities-grade steel wire cable, not less than 3/16 inch (4.8 millimeters) in diameter, with at least a 2,400-pound (10.7-killinewton) breaking strength.

2. Span wire:

(a) "Span wire" shall be made of double-galvanized 7-strand utilities-grade steel wire cable, not less than 3/8 inch (9.5 millimeters) in diameter, with at least an 11,200-pound (50-kilonewton) breaking strength.

(b) "Span wire (high strength)" shall be made of double-galvanized 7-strand extra-high-strength-grade steel wire cable, not less than 7/16 inch (11.1 millimeters) in diameter, with at least a 20,800-pound (94-kilonewton) breaking strength.

3. All hardware accessories shown on the plans to be used in span wire or messenger mounting shall be made of high-strength, double-galvanized, first-quality materials.

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.17
ELASTOMERIC MATERIALS

M.17.01 – Elastomeric Bearing Pads:

In the 2nd paragraph of subsection 4(b), replace "MS MIL" with "MILSPEC."

CONNECTICUT
SUPPLEMENTAL SPECIFICATION
SECTION M.18
SIGNING

M.18.10 – Demountable Copy:

In the chart under subsection 3H, replace "MS MIL" with "MILSPEC."

Construction Contracts - Required Contract Provisions
(State Funded Only Contracts)

Index

18. Tangible Personal Property

19. Bid Rigging and/or Fraud – Notice to Contractor

20. Consulting Agreement Affidavit

Index of Exhibits

1. Title VI of the Civil Rights Act of 1964 / Nondiscrimination Requirements

The Contractor shall comply with Title VI of the Civil Rights Act of 1964 as amended (42 U.S.C. 2000 et seq.), all requirements imposed by the regulations of the United States Department of Transportation (49 CFR Part 21) issued in implementation thereof, and the Title VI Contractor Assurances attached hereto at Exhibit A, all of which are hereby made a part of this Contract.

2. Contractor Work Force Utilization / Equal Employment Opportunity

(a) The Contractor shall comply with the Contractor Work Force Utilization / Equal Employment Opportunity requirements attached at Exhibit B and hereby made part of this Contract, whenever a contractor or subcontractor at any tier performs construction work in excess of $10,000. These goals shall be included in each contract and subcontract. Goal achievement is calculated for each trade using the hours worked under each trade.

(b) Companies with contracts, agreements or purchase orders valued at $10,000 or more will develop and implement an Affirmative Action Plan utilizing the ConnDOT Affirmative Action Plan Guideline. This Plan shall be designed to further the provision of equal employment opportunity to all persons without regard to their race, color, religion, sex or national origin, and to promote the full realization of equal employment opportunity through a positive continuation program. Plans shall be updated as required by ConnDOT.

3. Contract Wage Rates

The Contractor shall comply with:

The State wage rate requirements indicated in Exhibit E hereof are hereby made part of this Contract.

Prevailing Wages for Work on State Highways; Annual Adjustments. With respect to contracts for work on state highways and bridges on state highways, the Contractor shall comply with the provisions of Section 31-54 and 31-55a of the Connecticut General Statutes, as revised.

As required by section 1.05.12 (Payrolls) of the State of Connecticut, Department of Transportation's Standard Specification for Roads, Bridges and Incidental Construction (FORM 816), as may be revised, every Contractor or subcontractor performing project work on a federal aid project is required to post the relevant prevailing wage rates as determined by the United States Secretary of Labor. The wage rate determinations shall be posted in prominent and easily accessible places at the work site.

4. Americans with Disabilities Act of 1990

This provision applies to those Contractors who are or will be responsible for compliance with the terms of the Americans with Disabilities Act of 1990, (42 U.S.C. 12101 et seq.), (Act), during the term of the Contract. The Contractor represents that it is familiar with the terms of this Act and that it is in compliance with the Act. Failure of the Contractor to satisfy this standard as the same applies to performance under this Contract, either now or during the term of the Contract as it may be amended, will render the Contract voidable at the option of the State upon notice to the contractor. The Contractor warrants that it will hold the State harmless and indemnify the State from any liability which may be imposed upon the State as a result of any failure of the Contractor to be in compliance with this Act, as the same applies to performance under this Contract.

5. Connecticut Statutory Labor Requirements

(a) Construction, Alteration or Repair of Public Works Projects; Wage Rates. The Contractor shall comply with Section 31-53 of the Connecticut General Statutes, as revised. The wages paid on an hourly basis to any person performing the work of any mechanic, laborer or worker on the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such person to any employee welfare fund, as defined in subsection (i) of section 31-53 of the Connecticut General Statutes, shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the town in which such public works project is being constructed. Any contractor who is not obligated by agreement to make payment or contribution on behalf of such persons to any such employee welfare fund shall pay to each mechanic, laborer or worker as part of such person's wages the amount of payment or contribution for such person's classification on each pay day.

(b) Debarment List. Limitation on Awarding Contracts. The Contractor shall comply with Section 3l-53a of the Connecticut General Statutes, as revised.

(c) Construction Safety and Health Course. The Contractor shall comply with section 31-53b of the Connecticut General Statutes, as revised. The contractor shall furnish proof to the Labor Commissioner with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 of the Connecticut General Statutes, as revised, on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

Any employee required to complete a construction safety and health course as required that has not completed the course, shall have a maximum of fourteen (14) days to complete the course. If the employee has not been brought into compliance, they shall be removed from the project until such time as they have completed the required training.

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

(d) Awarding of Contracts to Occupational Safety and Health Law Violators Prohibited. The Contract is subject to Section 31-57b of the Connecticut General Statutes, as revised.

(e) Residents Preference in Work on Other Public Facilities. NOT APPLICABLE TO FEDERAL AID CONTRACTS. Pursuant to Section 31-52a of the Connecticut General Statutes, as revised, in the employment of mechanics, laborers or workmen to perform the work specified herein, preference shall be given to residents of the state who are, and continuously for at least six months prior to the date hereof have been, residents of this state, and if no such person is available, then to residents of other states

6. Tax Liability - Contractor's Exempt Purchase Certificate (CERT – 141)

The Contractor shall comply with Chapter 219 of the Connecticut General Statutes pertaining to tangible personal property or services rendered that is/are subject to sales tax. The Contractor is responsible for determining its tax liability. If the Contractor purchases materials or supplies pursuant to the Connecticut Department of Revenue Services' "Contractor's Exempt Purchase Certificate (CERT-141)," as may be revised, the Contractor acknowledges and agrees that title to such materials and supplies installed or placed in the project will vest in the State simultaneously with passage of title from the retailers or vendors thereof, and the Contractor will have no property rights in the materials and supplies purchased.

Forms and instructions are available anytime by:

Internet: Visit the DRS website at www.ct.gov/DRS to download and print Connecticut tax forms; or Telephone: Call 1-800-382-9463 (Connecticut calls outside the Greater Hartford calling area only) and select Option 2 or call 860-297-4753 (from anywhere).

7. Executive Orders

This Contract is subject to the provisions of Executive Order No. Three of Governor Thomas J. Meskill, promulgated June 16, 1971, concerning labor employment practices, Executive Order No. Seventeen of Governor Thomas J. Meskill, promulgated February 15, 1973, concerning the listing of employment openings and Executive Order No. Sixteen of Governor John G. Rowland promulgated August 4, 1999, concerning violence in the workplace, all of which are incorporated into and are made a part of the Contract as if they had been fully set forth in it. The Contract may also be subject to the applicable parts of Executive Order No. 7C of Governor M. Jodi Rell, promulgated July 13, 2006, concerning contracting reforms and Executive Order No. 14 of Governor M. Jodi Rell, promulgated April 17, 2006, concerning procurement of cleaning products and services, in accordance with their respective terms and conditions. If Executive Orders 7C and 14 are applicable, they are deemed to be incorporated into and are made a part of the Contract as if they had been fully set forth in it. At the Contractor's request, the Department shall provide a copy of these orders to the Contractor.

8. Non Discrimination Requirement (pursuant to section 4a-60 and 4a-60a of the Connecticut General Statutes, as revised): References to "minority business enterprises" in this Section are not applicable to Federal-aid projects/contracts. Federal-aid projects/contracts are instead subject to the Federal Disadvantaged Business Enterprise Program.

(a) For purposes of this Section, the following terms are defined as follows:

i. "Commission" means the Commission on Human Rights and Opportunities;
ii. "Contract" and "contract" include any extension or modification of the Contract or contract;
iii. "Contractor" and "contractor" include any successors or assigns of the Contractor or contractor;
iv. "gender identity or expression" means a person's gender-related identity, appearance or behavior, whether or not that gender-related identity, appearance or behavior is different from that traditionally associated with the person's physiology or assigned sex at birth, which gender-related identity can be shown by providing evidence including, but not limited to, medical history, care or treatment of the gender-related identity, consistent and uniform assertion of the gender-related identity or any other evidence that the gender-related identity is sincerely held, part of a person's core identity or not being asserted for an improper purpose.

v. “good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations;

vi. "good faith efforts" shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements;

vii. "marital status" means being single, married as recognized by the state of Connecticut, widowed, separated or divorced;

viii. "mental disability" means one or more mental disorders, as defined in the most recent edition of the American Psychiatric Association's "Diagnostic and Statistical Manual of Mental Disorders", or a record of or regarding a person as having one or more such disorders;

ix. "minority business enterprise" means any small contractor or supplier of materials fifty-one percent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise, and (3) who are members of a minority, as such term is defined in subsection (a) of Connecticut General Statutes § 32-9n; and

x. “public works contract" means any agreement between any individual, firm or corporation and the State or any political subdivision of the State other than a municipality for construction, rehabilitation, conversion, extension, demolition or repair of a public building, highway or other changes or improvements in real property, or which is financed in whole or in part by the State, including, but not limited to, matching expenditures, grants, loans, insurance or guarantees.

For purposes of this Section, the terms "Contract" and “contract” do not include a contract where each contractor is (1) a political subdivision of the state, including, but not limited to, a municipality, (2) a quasi-public agency, as defined in Conn. Gen. Stat. Section 1-120, (3) any other state, including but not limited to any federally recognized Indian tribal governments, as defined in Conn. Gen. Stat. Section 1-267, (4) the federal government, (5) a foreign government, or (6) an agency of a subdivision, agency, state or government described in the immediately preceding enumerated items (1), (2), (3), (4) or (5).

(b) (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such Contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the State of Connecticut; and the Contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by the Contractor that such disability prevents performance of the work involved; (2) the Contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the Commission; (3) the Contractor agrees to provide each labor union or representative of workers with which the Contractor has a collective bargaining Agreement or other contract or understanding and each vendor with which the Contractor has a contract or

understanding, a notice to be provided by the Commission, advising the labor union or workers' representative of the Contractor's commitments under this section and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) the Contractor agrees to comply with each provision of this Section and Connecticut General Statutes §§ 46a-68e and 46a-68f and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes §§ 46a-56, 46a-68e and 46a-68f; and (5) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor as relate to the provisions of this Section and Connecticut General Statutes § 46a-56. If the contract is a public works contract, the Contractor agrees and warrants that he will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works projects.

(c) Determination of the Contractor's good faith efforts shall include, but shall not be limited to, the following factors: The Contractor's employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the Commission may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.

(d) The Contractor shall develop and maintain adequate documentation, in a manner prescribed by the Commission, of its good faith efforts.

(e) The Contractor shall include the provisions of subsection (b) of this Section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes §46a-56; provided if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.

(f) The Contractor agrees to comply with the regulations referred to in this Section as they exist on the date of this Contract and as they may be adopted or amended from time to time during the term of this Contract and any amendments thereto.

(g) (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or the State of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) the Contractor agrees to provide each labor union or representative of workers with which such Contractor has a collective bargaining Agreement or other contract or understanding and each vendor with which such Contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the Contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (3) the Contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes § 46a-56;

and (4) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor which relate to the provisions of this Section and Connecticut General Statutes § 46a-56.

(h) The Contractor shall include the provisions of the foregoing paragraph in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes § 46a-56; provided, if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter."

The Nondiscrimination Certifications can be found at the Office of Policy and Management website.

http://www.ct.gov/opm/cwp/view.asp?a=2982&Q=390928

9. Whistleblower Provision

The following clause is applicable if the Contract has a value of Five Million Dollars ($5,000,000) or more.

Whistleblowing. This Contract may be subject to the provisions of Section 4-61dd of the Connecticut General Statutes. In accordance with this statute, if an officer, employee or appointing authority of the Contractor takes or threatens to take any personnel action against any employee of the Contractor in retaliation for such employee's disclosure of information to any employee of the contracting state or quasi-public agency or the Auditors of Public Accounts or the Attorney General under the provisions of subsection (a) of such statute, the Contractor shall be liable for a civil penalty of not more than five thousand dollars for each offense, up to a maximum of twenty per cent of the value of this Contract. Each violation shall be a separate and distinct offense and in the case of a continuing violation, each calendar day's continuance of the violation shall be deemed to be a separate and distinct offense. The State may request that the Attorney General bring a civil action in the Superior Court for the Judicial District of Hartford to seek imposition and recovery of such civil penalty. In accordance with subsection (f) of such statute, each large state contractor, as defined in the statute, shall post a notice of the provisions of the statute relating to large state contractors in a conspicuous place which is readily available for viewing by the employees of the Contractor.

10. Connecticut Freedom of Information Act

(a) Disclosure of Records. This Contract may be subject to the provisions of section 1-218 of the Connecticut General Statutes. In accordance with this statute, each contract in excess of two million five hundred thousand dollars between a public agency and a person for the performance of a governmental function shall (a) provide that the public agency is entitled to receive a copy of records and files related to the performance of the governmental function, and (b) indicate that such records and files are subject to FOIA and may be disclosed by the public agency pursuant to FOIA. No request to inspect or copy such records or files shall be valid unless the request is made to the public agency in accordance with FOIA. Any complaint by a person who is denied the right to inspect or copy such records or files shall be brought to the Freedom of Information Commission in accordance with the provisions of sections 1-205 and 1-206 of the Connecticut General Statutes.

(b) Confidential Information. The State will afford due regard to the Contractor's request for the protection of proprietary or confidential information which the State receives from the Contractor. However, all materials associated with the Contract are subject to the terms of the FOIA and all corresponding rules, regulations and interpretations. In making such a request, the Contractor may not merely state generally that the materials are proprietary or confidential in nature and not, therefore, subject to release to third parties. Those particular sentences, paragraphs, pages or sections that the Contractor believes are exempt from disclosure under the FOIA must be specifically identified as such. Convincing explanation and rationale sufficient to justify each exemption consistent with the FOIA must accompany the request. The rationale and explanation must be stated in terms of the prospective harm to the competitive position of the Contractor that would result if the identified material were to be released and the reasons why the materials are legally exempt from release pursuant to the FOIA. To the extent that any other provision or part of the Contract conflicts or is in any way inconsistent with this section, this section controls and shall apply and the conflicting provision or part shall not be given effect. If the Contractor indicates that certain documentation is submitted in confidence, by specifically and clearly marking the documentation as "CONFIDENTIAL," DOT will first review the Contractor's claim for consistency with the FOIA (that is, review that the documentation is actually a trade secret or commercial or financial information and not required by statute), and if determined to be consistent, will endeavor to keep such information confidential to the extent permitted by law. See, *e.g.*, Conn. Gen. Stat. §1-210(b)(5)(A-B). The State, however, has no obligation to initiate, prosecute or defend any legal proceeding or to seek a protective order or other similar relief to prevent disclosure of any information that is sought pursuant to a FOIA request. Should the State withhold such documentation from a Freedom of Information requester and a complaint be brought to the Freedom of Information Commission, the Contractor shall have the burden of cooperating with DOT in defense of that action and in terms of establishing the availability of any FOIA exemption in any proceeding where it is an issue. In no event shall the State have any liability for the disclosure of any documents or information in its possession which the State believes are required to be disclosed pursuant to the FOIA or other law.

11. Service of Process

The Contractor, if not a resident of the State of Connecticut, or, in the case of a partnership, the partners, if not residents, hereby appoints the Secretary of State of the State of Connecticut, and his successors in office, as agent for service of process for any action arising out of or as a result of this Contract; such appointment to be in effect throughout the life of this Contract and six (6) years thereafter.

12. Substitution of Securities for Retainages on State Contracts and Subcontracts

This Contract is subject to the provisions of Section 3-ll2a of the General Statutes of the State of Connecticut, as revised.

13. Health Insurance Portability and Accountability Act of 1996 (HIPAA)

The Contractor shall comply, if applicable, with the Health Insurance Portability and Accountability Act of 1996 and, pursuant thereto, the provisions attached at Exhibit C, and hereby made part of this Contract.

14. Forum and Choice of Law

Forum and Choice of Law. The parties deem the Contract to have been made in the City of Hartford, State of Connecticut. Both parties agree that it is fair and reasonable for the validity and construction of the Contract to be, and it shall be, governed by the laws and court decisions of the State of Connecticut, without giving effect to its principles of conflicts of laws. To the extent that any immunities provided by Federal law or the laws of the State of Connecticut do not bar an action against the State, and to the extent that these courts are courts of competent jurisdiction, for the purpose of venue, the complaint shall be made returnable to the Judicial District of Hartford only or shall be brought in the United States District Court for the District of Connecticut only, and shall not be transferred to any other court, provided, however, that nothing here constitutes a waiver or compromise of the sovereign immunity of the State of Connecticut. The Contractor waives any objection which it may now have or will have to the laying of venue of any Claims in any forum and further irrevocably submits to such jurisdiction in any suit, action or proceeding.

15. Summary of State Ethics Laws

Pursuant to the requirements of section 1-101qq of the Connecticut General Statutes, the summary of State ethics laws developed by the State Ethics Commission pursuant to section 1-81b of the Connecticut General Statutes is incorporated by reference into and made a part of the Contract as if the summary had been fully set forth in the Contract.

16. Audit and Inspection of Plants, Places of Business and Records

(a) The State and its agents, including, but not limited to, the Connecticut Auditors of Public Accounts, Attorney General and State's Attorney and their respective agents, may, at reasonable hours, inspect and examine all of the parts of the Contractor's and Contractor Parties' plants and places of business which, in any way, are related to, or involved in, the performance of this Contract. For the purposes of this Section, "Contractor Parties" means the Contractor's members, directors, officers, shareholders, partners, managers, principal officers, representatives, agents, servants, consultants, employees or any one of them or any other person or entity with whom the Contractor is in privity of oral or written contract and the Contractor intends for such other person or entity to Perform under the Contract in any capacity.

(b) The Contractor shall maintain, and shall require each of the Contractor Parties to maintain, accurate and complete Records. The Contractor shall make all of its and the Contractor Parties' Records available at all reasonable hours for audit and inspection by the State and its agents.

(c) The State shall make all requests for any audit or inspection in writing and shall provide the Contractor with at least twenty-four (24) hours' notice prior to the requested audit and inspection date. If the State suspects fraud or other abuse, or in the event of an emergency, the State is not obligated to provide any prior notice.

(d) The Contractor shall keep and preserve or cause to be kept and preserved all of its and Contractor Parties' Records until three (3) years after the latter of (i) final payment under this Agreement, or (ii) the expiration or earlier termination of this Agreement, as the same may be modified for any reason. The State may request an audit or inspection at any time during this period. If any Claim or audit is started before the expiration of this period, the Contractor shall retain or cause to be retained all Records until all Claims or audit findings have been resolved.

(e) The Contractor shall cooperate fully with the State and its agents in connection with an audit or inspection. Following any audit or inspection, the State may conduct and the Contractor shall cooperate with an exit conference.

(f) The Contractor shall incorporate this entire Section verbatim into any contract or other agreement that it enters into with any Contractor Party.

17.Campaign Contribution Restriction

For all State contracts, defined in Conn. Gen. Stat. §9-612(g)(1) as having a value in a calendar year of $50,000 or more, or a combination or series of such agreements or contracts having a value of $100,000 or more, the authorized signatory to this Agreement expressly acknowledges receipt of the State Elections Enforcement Commission's notice advising state contractors of state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice, as set forth in "Notice to Executive Branch State Contractors and Prospective State Contractors of Campaign Contribution and Solicitation Limitations," attached as Exhibit D.

18. Tangible Personal Property

(a) The Contractor on its behalf and on behalf of its Affiliates, as defined below, shall comply with the provisions of Conn. Gen. Stat. §12-411b, as follows:

(1) For the term of the Contract, the Contractor and its Affiliates shall collect and remit to the State of Connecticut, Department of Revenue Services, any Connecticut use tax due under the provisions of Chapter 219 of the Connecticut General Statutes for items of tangible personal property sold by the Contractor or by any of its Affiliates in the same manner as if the Contractor and such Affiliates were engaged in the business of selling tangible personal property for use in Connecticut and had sufficient nexus under the provisions of Chapter 219 to be required to collect Connecticut use tax;
(2) A customer's payment of a use tax to the Contractor or its Affiliates relieves the customer of liability for the use tax;
(3) The Contractor and its Affiliates shall remit all use taxes they collect from customers on or before the due date specified in the Contract, which may not be later than the last day of the month next succeeding the end of a calendar quarter or other tax collection period during which the tax was collected;
(4) The Contractor and its Affiliates are not liable for use tax billed by them but not paid to them by a customer; and
(5) Any Contractor or Affiliate who fails to remit use taxes collected on behalf of its customers by the due date specified in the Contract shall be subject to the interest and penalties provided for persons required to collect sales tax under chapter 219 of the general statutes.

(b) For purposes of this section of the Contract, the word "Affiliate" means any person, as defined in section 12-1 of the general statutes, that controls, is controlled by, or is under common control with another person. A person controls another person if the person owns, directly or indirectly, more than ten per cent of the voting securities of the other person. The word "voting security" means a security that confers upon the holder the right to vote for the election of members of the board of directors or similar governing body of the business, or that is convertible into, or entitles the holder to receive, upon its exercise, a security that confers such a right to vote. "Voting security" includes a general partnership interest.

(c) The Contractor represents and warrants that each of its Affiliates has vested in the Contractor plenary authority to so bind the Affiliates in any agreement with the State of Connecticut. The Contractor on its own behalf and on behalf of its Affiliates shall also provide, no later than 30 days after receiving a request by the State's contracting authority, such information as the State may require to ensure, in the State's sole determination, compliance with the provisions of Chapter 219 of the Connecticut General Statutes, including, but not limited to, §12-411b.

19. Bid Rigging and/or Fraud – Notice to Contractor

The Connecticut Department of Transportation is cooperating with the U.S. Department of Transportation and the Justice Department in their investigation into highway construction contract bid rigging and/or fraud.

A toll-free "HOT LINE" telephone number 800-424-9071 has been established to receive information from contractors, subcontractors, manufacturers, suppliers or anyone with knowledge of bid rigging and/or fraud, either past or current. The "HOT LINE" telephone number will be available during normal working hours (8:00 am – 5:00 pm EST). Information will be treated confidentially and anonymity respected.

20. Consulting Agreement Affidavit

The Contractor shall comply with Connecticut General Statutes Section 4a-81(a) and 4a-81(b), as revised. Pursuant to Public Act 11-229, after the initial submission of the form, if there is a change in the information contained in the form, a contractor shall submit the updated form, as applicable, either (i) not later than thirty (30) days after the effective date of such change or (ii) prior to execution of any new contract, whichever is earlier.

The Affidavit/Form may be submitted in written format or electronic format through the Department of Administrative Services (DAS) website.

EXHIBIT A

TITLE VI CONTRACTOR ASSURANCES

During the performance of this Contract, the contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "Contractor") agrees as follows:

1. **Compliance with Regulations:** The Contractor shall comply with the regulations relative to nondiscrimination in federally assisted programs of the United States Department of Transportation (hereinafter, "USDOT"), Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time (hereinafter referred to as the "Regulations"), which are herein incorporated by reference and made a part of this contract.

2. **Nondiscrimination:** The Contractor, with regard to the work performed by it during the Contract, shall not discriminate on the grounds of race, color, national origin, sex, age, or disability in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor shall not participate either directly or indirectly in the discrimination prohibited by Subsection 5 of the Regulations, including employment practices when the Contract covers a program set forth in Appendix B of the Regulations.

3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:**
In all solicitations either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the Contractor of the Contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, national origin, sex, age, or disability.

4. **Information and Reports:** The Contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Connecticut Department of Transportation (ConnDOT) or the Funding Agency (FHWA, FTA and FAA) to be pertinent to ascertain compliance with such Regulations, orders, and instructions. Where any information required of a Contractor is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to ConnDOT or the Funding Agency, as appropriate, and shall set forth what efforts it has made to obtain the information.

5. **Sanctions for Noncompliance:** In the event of the Contractor's noncompliance with the nondiscrimination provisions of this Contract, the ConnDOT shall impose such sanctions as it or the Funding Agency may determine to be appropriate, including, but not limited to:

A. Withholding contract payments until the Contractor is in-compliance; and/or
B. Cancellation, termination, or suspension of the Contract, in whole or in part.

6. **Incorporation of Provisions:** The Contractor shall include the provisions of paragraphs 1 through 5 in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations or directives issued pursuant thereto. The Contractor shall take such action with respect to any subcontract or procurement as the ConnDOT or the Funding Agency may -direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the Contractor may request the ConnDOT to enter into such litigation to protect the interests of the Funding Agency, and, in addition, the Contractor may request the United States to enter into such litigation to protect the interests of the United States

EXHIBIT B

CONTRACTOR WORKFORCE UTILIZATION / EQUAL EMPLOYMENT OPPORTUNITY

1. **Project Workforce Utilization Goals:**
These goals are applicable to all the Contractor's construction work (whether or not it is Federal or Federally assisted or funded) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for the geographical area where the work is actually performed.

Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications which contain the applicable goals for minority and female participation.

The goals for minority and female utilization are expressed in percentage terms for the contractor's aggregate work-force in each trade on all construction work in the covered area, are referenced in the Appendix A below.

STATE FUNDED PROJECTS (only)
APPENDIX A
(Labor Market Goals)

LABOR MARKET AREA GOAL			***Minority*** **Female**
Bridgeport			**14%** **6.9%**
Ansonia	Beacon Falls	Bridgeport	Derby
Easton	Fairfield	Milford	Monroe
Oxford	Seymour	Shelton	Stratford
Trumbull			
Danbury			**4%** **6.9%**
Bethel	Bridgewater	Brookfield	Danbury
Kent	New Fairfield	New Milford	Newtown
Redding	Ridgefield	Roxbury	Sherman
Washington			
Danielson			**2%** **6.9%**
Brooklyn	Eastford	Hampton	Killingly
Pomfret	Putnam	Scotland	Sterling
Thompson	Voluntown	Union	Woodstock
Hartford			**15%** **6.9%**
Andover	Ashford	Avon	Barkhamsted

Belin	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
Harwinton	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

Lower River 6.9%				**2%**
Chester	Deep River	Essex	Old Lyme	
Westbrook				

New Haven 6.9%				**14%**
Bethany	Branford	Cheshire	Clinton	
East Haven	Guilford	Hamden	Killingworth	
Madison	Meriden	New Haven	North Branford	
North Haven	Orange	Wallingford	West Haven	
Woodbridge				

New London 6.9%				**8%**
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 Rhode Island			

Stamford 6.9%				**17%**
Darien	Greenwich	New Canaan	Norwalk	
Stamford	Weston	Westport	Wilton	

Torrington 6.9%				**2%**
Canaan	Colebrook	Cornwall	Goshen	
Hartland	Kent	Litchfield	Morris	
Norfolk	North Canaan	Salisbury	Sharon	
Torrington	Warren			

Waterbury			**10%**
6.9%			
Bethlehem	Middlebury	Naugatuck	Prospect
Southbury	Thomaston	Waterbury	Watertown
Wolcott	Woodbury		

EXHIBIT C

Health Insurance Portability and Accountability Act of 1996 ("HIPAA").

(a) If the Contactor is a Business Associate under the requirements of the Health Insurance Portability and Accountability Act of 1996 ("HIPAA"), the Contractor must comply with all terms and conditions of this Section of the Contract. If the Contractor is not a Business Associate under HIPAA, this Section of the Contract does not apply to the Contractor for this Contract.

(b) The Contractor is required to safeguard the use, publication and disclosure of information on all applicants for, and all clients who receive, services under the Contract in accordance with all applicable federal and state law regarding confidentiality, which includes but is not limited to HIPAA, more specifically with the Privacy and Security Rules at 45 C.F.R. Part 160 and Part 164, subparts A, C, and E; and

(c) The State of Connecticut Agency named on page 1 of this Contract (hereinafter the "Department") is a "covered entity" as that term is defined in 45 C.F.R. § 160.103; and

(d) The Contractor, on behalf of the Department, performs functions that involve the use or disclosure of "individually identifiable health information," as that term is defined in 45 C.F.R. § 160.103; and

(e) The Contractor is a "business associate" of the Department, as that term is defined in 45 C.F.R. § 160.103; and

(f) The Contractor and the Department agree to the following in order to secure compliance with the HIPAA, the requirements of Subtitle D of the Health Information Technology for Economic and Clinical Health Act (hereinafter the HITECH Act), (Pub. L. 111-5, sections 13400 to 13423), and more specifically with the Privacy and Security Rules at 45 C.F.R. Part 160 and Part 164, subparts A, C, and E.

(g) Definitions

(1) "Breach shall have the same meaning as the term is defined in section 13400 of the HITECH Act (42 U.S.C. §17921(1))

(2) "Business Associate" shall mean the Contractor.

(3) "Covered Entity" shall mean the Department of the State of Connecticut named on page 1 of this Contract.

(4) "Designated Record Set" shall have the same meaning as the term "designated record set" in 45 C.F.R. § 164.501.

(5) "Electronic Health Record" shall have the same meaning as the term is defined in section 13400 of the HITECH Act (42 U.S.C. §17921(5))

(6) "Individual" shall have the same meaning as the term "individual"' in 45 C.F.R. § 160.103 and shall include a person who qualifies as a personal representative as defined in 45 C.F.R. § 164.502(g).

(7) "Privacy Rule" shall mean the Standards for Privacy of Individually Identifiable Health Information at 45 C.F.R. part 160 and parts 164, subparts A and E.

(8) "Protected Health Information" or "PHI" shall have the same meaning as the term "protected health information" in 45 C.F.R. § 160.103, limited to information created or received by the Business Associate from or on behalf of the Covered Entity.

(9) "Required by Law"' shall have the same meaning as the term "required by law" in 45 C.F.R. § 164.103.

(10) "Secretary" shall mean the Secretary of the Department of Health and Human Services or his designee.

(11) "More stringent" shall have the same meaning as the term "more stringent" in 45 C.F.R. § 160.202.

(12) "This Section of the Contract" refers to the HIPAA Provisions stated herein, in their entirety.

(13) "Security Incident" shall have the same meaning as the term "security incident" in 45 C.F.R.§ 164.304.

(14) "Security Rule" shall mean the Security Standards for the Protection of Electronic Protected Health Information at 45 C.F.R. part 160 and parts 164, subpart A and C.

(15) "Unsecured protected health information" shall have the same meaning as the term as defined in section 13402(h)(1)(A) of HITECH. Act. (42 U.S.C. §17932(h)(1)(A)).

(h) Obligations and Activities of Business Associates.

(1) Business Associate agrees not to use or disclose PHI other than as permitted or required by this Section of the Contract or as Required by Law.

(2) Business Associate agrees to use appropriate safeguards to prevent use or disclosure of PHI other than as provided for in this Section of the Contract.

(3) Business Associate agrees to use administrative, physical and technical safeguards that reasonably and appropriately protect the confidentiality, integrity, and availability of electronic protected health information that it creates, receives, maintains, or transmits on behalf of the Covered Entity.

(4) Business Associate agrees to mitigate, to the extent practicable, any harmful effect that is known to the Business Associate of a use or disclosure of PHI by Business Associate in violation of this Section of the Contract.

(5) Business Associate agrees to report to Covered Entity any use or disclosure of PHI not provided for by this Section of the Contract or any security incident of which it becomes aware.

(6) Business Associate agrees to insure that any agent, including a subcontractor, to whom it provides PHI received from, or created or received by Business Associate, on behalf of the Covered Entity, agrees to the same restrictions and conditions that apply through this Section of the Contract to Business Associate with respect to such information.

(7) Business Associate agrees to provide access, at the request of the Covered Entity, and in the time and manner agreed to by the parties, to PHI in a Designated Record Set, to Covered Entity or, as directed by Covered Entity, to an Individual in order to meet the requirements under 45 C.F.R. § 164.524.

(8) Business Associate agrees to make any amendments to PHI in a Designated Record Set that the Covered Entity directs or agrees to pursuant to 45 C.F.R. § 164.526 at the request of the Covered Entity, and in the time and manner agreed to by the parties.

(9) Business Associate agrees to make internal practices, books, and records, including policies and procedures and PHI, relating to the use and disclosure of PHI received from, or created or received by, Business Associate on behalf of Covered Entity, available to Covered Entity or to the Secretary in a time and manner agreed to by the parties or designated by the Secretary, for purposes of the Secretary determining Covered Entity's compliance with the Privacy Rule.

(10) Business Associate agrees to document such disclosures of PHI and information related to such disclosures as would be required for Covered Entity to respond to a request by an Individual for an accounting of disclosures of PHI in accordance with 45 C.F.R. § 164.528 and section 13405 of the HITECH Act (42 U.S.C. § 17935) and any regulations promulgated thereunder.

(11) Business Associate agrees to provide to Covered Entity, in a time and manner agreed to by the parties, information collected in accordance with clause h. (10) of this Section of the Contract, to permit Covered Entity to respond to a request by an Individual for an accounting of disclosures of PHI in accordance with 45 C.F.R. § 164.528 and section 13405 of the HITECH Act (42 U.S.C. § 17935) and any regulations promulgated thereunder. Business Associate agrees at the Covered Entity's direction to provide an accounting of disclosures of PHI directly to an individual in accordance with 45 C.F.R. § 164.528 and section 13405 of the HITECH Act (42 U.S.C. § 17935) and any regulations promulgated thereunder.

(12) Business Associate agrees to comply with any state or federal law that is more stringent than the Privacy Rule.

(13) Business Associate agrees to comply with the requirements of the HITECH Act relating to privacy and security that are applicable to the Covered Entity and with the requirements of 45 C.F.R. sections 164.504(e), 164.308, 164.310, 164.312, and 164.316.

(14) In the event that an individual requests that the Business Associate (a) restrict disclosures of PHI; (b) provide an accounting of disclosures of the individual's PHI; or (c) provide a copy of the individual's PHI in an electronic health record, the Business Associate agrees to notify the covered entity, in writing, within two business days of the request.

(15) Business Associate agrees that it shall not, directly or indirectly, receive any remuneration in exchange for PHI of an individual without (1) the written approval of the covered entity, unless receipt of remuneration in exchange for PHI is expressly authorized by this Contract and (2) the valid authorization of the individual, except for the purposes provided under section 13405(d)(2) of the HITECH Act,(42 U.S.C. § 17935(d)(2)) and in any accompanying regulations

(16) Obligations in the Event of a Breach

A. The Business Associate agrees that, following the discovery of a breach of unsecured protected health information, it shall notify the Covered Entity of such breach in accordance with the requirements of section 13402 of HITECH (42 U.S.C. 17932(b) and the provisions of this Section of the Contract.
B. Such notification shall be provided by the Business Associate to the Covered Entity without unreasonable delay, and in no case later than 30 days after the breach is discovered by the Business Associate, except as otherwise instructed in writing by a law enforcement official pursuant to section 13402 (g) of HITECH (42 U.S.C. 17932(g)) . A breach is considered discovered as of the first day on which it is, or reasonably should have been, known to the Business Associate. The notification shall include the identification and last known address, phone number and email address of each individual (or the next of kin of the individual if the individual is deceased) whose unsecured protected health information has been, or is reasonably believed by the Business Associate to have been, accessed, acquired, or disclosed during such breach.
C. The Business Associate agrees to include in the notification to the Covered Entity at least the following information:
    1. A brief description of what happened, including the date of the breach and the date of the discovery of the breach, if known.

    2. A description of the types of unsecured protected health information that were involved in the breach (such as full name, Social Security number, date of birth, home address, account number, or disability code).

    3. The steps the Business Associate recommends that individuals take to protect themselves from potential harm resulting from the breach.

    4. A detailed description of what the Business Associate is doing to investigate the breach, to mitigate losses, and to protect against any further breaches.

    5. Whether a law enforcement official has advised either verbally or in writing the Business Associate that he or she has determined that notification or notice to

individuals or the posting required under section 13402 of the HITECH Act would impede a criminal investigation or cause damage to national security and; if so, include contact information for said official.

D. Business Associate agrees to provide appropriate staffing and have established procedures to ensure that individuals informed by the Covered Entity of a breach by the Business Associate have the opportunity to ask questions and contact the Business Associate for additional information regarding the breach. Such procedures shall include a toll-free telephone number, an e-mail address, a posting on its Web site and a postal address. Business Associate agrees to include in the notification of a breach by the Business Associate to the Covered Entity, a written description of the procedures that have been established to meet these requirements. Costs of such contact procedures will be borne by the Contractor.

E. Business Associate agrees that, in the event of a breach, it has the burden to demonstrate that it has complied with all notifications requirements set forth above, including evidence demonstrating the necessity of a delay in notification to the Covered Entity.

(i) Permitted Uses and Disclosure by Business Associate.

(1) General Use and Disclosure Provisions Except as otherwise limited in this Section of the Contract, Business Associate may use or disclose PHI to perform functions, activities, or services for, or on behalf of, Covered Entity as specified in this Contract, provided that such use or disclosure would not violate the Privacy Rule if done by Covered Entity or the minimum necessary policies and procedures of the Covered Entity.

(2) Specific Use and Disclosure Provisions

(A) Except as otherwise limited in this Section of the Contract, Business Associate may use PHI for the proper management and administration of Business Associate or to carry out the legal responsibilities of Business Associate.

(B) Except as otherwise limited in this Section of the Contract, Business Associate may disclose PHI for the proper management and administration of Business Associate, provided that disclosures are Required by Law, or Business Associate obtains reasonable assurances from the person to whom the information is disclosed that it will remain confidential and used or further disclosed only as Required by Law or for the purpose for which it was disclosed to the person, and the person notifies Business Associate of any instances of which it is aware in which the confidentiality of the information has been breached.

(C) Except as otherwise limited in this Section of the Contract, Business Associate may use PHI to provide Data Aggregation services to Covered Entity as permitted by 45 C.F.R. § 164.504(e)(2)(i)(B).

(j) Obligations of Covered Entity.

(1) Covered Entity shall notify Business Associate of any limitations in its notice of privacy practices of Covered Entity, in accordance with 45 C.F.R. § 164.520, or to the extent that such limitation may affect Business Associate's use or disclosure of PHI.

(2) Covered Entity shall notify Business Associate of any changes in, or revocation of, permission by Individual to use or disclose PHI, to the extent that such changes may affect Business Associate's use or disclosure of PHI.

(3) Covered Entity shall notify Business Associate of any restriction to the use or disclosure of PHI that Covered Entity has agreed to in accordance with 45 C.F.R. § 164.522, to the extent that such restriction may affect Business Associate's use or disclosure of PHI.

(k) Permissible Requests by Covered Entity. Covered Entity shall not request Business Associate to use or disclose PHI in any manner that would not be permissible under the Privacy Rule if done by the Covered Entity, except that Business Associate may use and disclose PHI for data aggregation, and management and administrative activities of Business Associate, as permitted under this Section of the Contract.

(l) Term and Termination.

(1) Term. The Term of this Section of the Contract shall be effective as of the date the Contract is effective and shall terminate when the information collected in accordance with clause h. (10) of this Section of the Contract is provided to the Covered Entity and all of the PHI provided by Covered Entity to Business Associate, or created or received by Business Associate on behalf of Covered Entity, is destroyed or returned to Covered Entity, or, if it is infeasible to return or destroy PHI, protections are extended to such information, in accordance with the termination provisions in this Section.

(2) Termination for Cause Upon Covered Entity's knowledge of a material breach by Business Associate, Covered Entity shall either:

(A) Provide an opportunity for Business Associate to cure the breach or end the violation and terminate the Contract if Business Associate does not cure the breach or end the violation within the time specified by the Covered Entity; or

(B) Immediately terminate the Contract if Business Associate has breached a material term of this Section of the Contract and cure is not possible; or

(C) If neither termination nor cure is feasible, Covered Entity shall report the violation to the Secretary.

(3) Effect of Termination

(A) Except as provided in (l)(2) of this Section of the Contract, upon termination of this Contract, for any reason, Business Associate shall return or destroy all PHI received from Covered Entity, or created or received by Business Associate on behalf of Covered Entity. Business Associate shall also provide the information collected in accordance with clause h. (10) of this Section of the Contract to the Covered Entity

within ten business days of the notice of termination. This provision shall apply to PHI that is in the possession of subcontractors or agents of Business Associate. Business Associate shall retain no copies of the PHI.

(B) In the event that Business Associate determines that returning or destroying the PHI is infeasible, Business Associate shall provide to Covered Entity notification of the conditions that make return or destruction infeasible. Upon documentation by Business Associate that return or destruction of PHI is infeasible, Business Associate shall extend the protections of this Section of the Contract to such PHI and limit further uses and disclosures of PHI to those purposes that make return or destruction infeasible, for as long as Business Associate maintains such PHI. Infeasibility of the return or destruction of PHI includes, but is not limited to, requirements under state or federal law that the Business Associate maintains or preserves the PHI or copies thereof.

(m) Miscellaneous Provisions.

(1) Regulatory References. A reference in this Section of the Contract to a section in the Privacy Rule means the section as in effect or as amended.

(2) Amendment. The Parties agree to take such action as in necessary to amend this Section of the Contract from time to time as is necessary for Covered Entity to comply with requirements of the Privacy Rule and the Health Insurance Portability and Accountability Act of 1996, Pub. L. No. 104-191.

(3) Survival. The respective rights and obligations of Business Associate shall survive the termination of this Contract.

(4) Effect on Contract. Except as specifically required to implement the purposes of this Section of the Contract, all other terms of the Contract shall remain in force and effect.

(5) Construction. This Section of the Contract shall be construed as broadly as necessary to implement and comply with the Privacy Standard. Any ambiguity in this Section of the Contract shall be resolved in favor of a meaning that complies, and is consistent with, the Privacy Standard.

(6) Disclaimer. Covered Entity makes no warranty or representation that compliance with this Section of the Contract will be adequate or satisfactory for Business Associate's own purposes. Covered Entity shall not be liable to Business Associate for any claim, civil or criminal penalty, loss or damage related to or arising from the unauthorized use or disclosure of PHI by Business Associate or any of its officers, directors, employees, contractors or agents, or any third party to whom Business Associate has disclosed PHI contrary to the provisions of this Contract or applicable law. Business Associate is solely responsible for all decisions made, and actions taken, by Business Associate regarding the safeguarding, use and disclosure of PHI within its possession, custody or control.

(7) Indemnification. The Business Associate shall indemnify and hold the Covered Entity harmless from and against any and all claims, liabilities, judgments, fines, assessments, penalties, awards and any statutory damages that may be imposed or assessed pursuant to HIPAA, as amended or the

HITECH Act, including, without limitation, attorney's fees, expert witness fees, costs of investigation, litigation or dispute resolution, and costs awarded thereunder, relating to or arising out of any violation by the Business Associate and its agents, including subcontractors, of any obligation of Business Associate and its agents, including subcontractors, under this section of the contract, under HIPAA, the HITECH Act, the Privacy Rule and the Security Rule.

Notice to Executive Branch State Contractors and Prospective State Contractors of Campaign Contribution and Solicitation Limitations

This notice is provided under the authority of Connecticut General Statutes §9-612(g)(2), as amended by P.A. 10-1, and is for the purpose of informing state contractors and prospective state contractors of the following law (italicized words are defined on the reverse side of this page).

CAMPAIGN CONTRIBUTION AND SOLICITATION LIMITATIONS

No *state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor*, with regard to a *state contract* or *state contract solicitation* with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall make a contribution to (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee (which includes town committees).

In addition, no holder or principal of a holder of a valid prequalification certificate, shall make a contribution to (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of State senator or State representative, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

On and after January 1, 2011, no state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor, with regard to a state contract or state contract solicitation with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall **knowingly** *solicit* contributions from the state contractor's or prospective state contractor's employees or from a *subcontractor* or *principals of the subcontractor* on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

DUTY TO INFORM

State contractors and prospective state contractors are required to inform their principals of the above prohibitions, as applicable, and the possible penalties and other consequences of any violation thereof.

PENALTIES FOR VIOLATIONS

Contributions or solicitations of contributions made in violation of the above prohibitions may result in the following civil and criminal penalties:

Civil penalties—Up to $2,000 or twice the amount of the prohibited contribution, whichever is greater, against a principal or a contractor. Any state contractor or prospective state contractor which fails to make reasonable efforts to comply with the provisions requiring notice to its principals of these prohibitions and the possible consequences of their violations may also be subject to civil penalties of up to $2,000 or twice the amount of the prohibited contributions made by their principals.

Criminal penalties—Any knowing and willful violation of the prohibition is a Class D felony, which may subject the violator to imprisonment of not more than 5 years, or not more than $5,000 in fines, or both.

CONTRACT CONSEQUENCES

In the case of a state contractor, contributions made or solicited in violation of the above prohibitions may resulting the contract being voided.

In the case of a prospective state contractor, contributions made or solicited in violation of the above prohibitions shall result in the contract described in the state contract solicitation not being awarded to the prospective state contractor, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

The State shall not award any other state contract to anyone found in violation of the above prohibitions for a period of one year after the election for which such contribution is made or solicited, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.
Additional information may be found on the website of the State Elections Enforcement Commission, www.ct.gov/seec. Click on the link to “Lobbyist/Contractor Limitations.”

DEFINITIONS

"State contractor" means a person, business entity or nonprofit organization that enters into a state contract. Such person, business entity or nonprofit organization shall be deemed to be a state contractor until December thirty-first of the year in which such contract terminates. "State contractor" does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

"Prospective state contractor" means a person, business entity or nonprofit organization that (i) submits a response to a state contract solicitation by the state, a state agency or a quasi-public agency, or a proposal in response to a request for proposals by the state, a state agency or a quasi-public agency, until the contract has been entered into, or (ii) holds a valid prequalification certificate issued by the Commissioner of Administrative Services under section 4a-100. "Prospective state contractor" does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

"Principal of a state contractor or prospective state contractor" means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a state contractor or prospective state contractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization**,** (ii) an individual who is employed by a state contractor or prospective state contractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a state contractor or prospective state contractor, which is not a business entity, or if a state contractor or prospective state contractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any state contractor or prospective state contractor who has *managerial or discretionary responsibilities with respect to a state contract*, (v) the spouse or a *dependent child* who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the state contractor or prospective state contractor.

"State contract" means an agreement or contract with the state or any state agency or any quasi-public agency, let through a procurement process or otherwise, having a value of fifty thousand dollars or more, or a combination or series of such agreements or contracts having a value of one hundred thousand dollars or more in a calendar year, for (i) the rendition of services, (ii) the furnishing of any goods, material, supplies, equipment or any items of any kind, (iii) the construction, alteration or repair of any public building or public work, (iv) the acquisition, sale or lease of any land or building, (v) a licensing arrangement, or (vi) a grant, loan or loan guarantee. "State contract" does not include any agreement or contract with the state, any state agency or any quasi-public agency that is exclusively federally funded, an education loan, a loan to an individual for other than commercial purposes or any agreement or contract between the state or any state agency and the United States Department of the Navy or the United States Department of Defense.

"State contract solicitation" means a request by a state agency or quasi-public agency, in whatever form issued, including, but not limited to, an invitation to bid, request for proposals, request for information or request for quotes, inviting bids, quotes or other types of submittals, through a competitive procurement process or another process authorized by law waiving competitive procurement.

"Managerial or discretionary responsibilities with respect to a state contract" means having direct, extensive and substantive responsibilities with respect to the negotiation of the state contract and not peripheral, clerical or ministerial responsibilities.

"Dependent child" means a child residing in an individual's household who may legally be claimed as a dependent on the federal income tax of such individual.

"Solicit" means (A) requesting that a contribution be made, (B) participating in any fund-raising activities for a candidate committee, exploratory committee, political committee or party committee, including, but not limited to, forwarding tickets to potential contributors, receiving contributions for transmission to any such committee or bundling contributions, (C) serving as chairperson, treasurer or deputy treasurer of any such committee, or (D) establishing a political committee for the sole purpose of soliciting or receiving contributions for any committee. Solicit does not include: (i) making a contribution that is otherwise permitted by Chapter 155 of the Connecticut General Statutes; (ii) informing any person of a position taken by a candidate for public office or a public official, (iii) notifying the person of any activities of, or contact information for, any candidate for public office; or (iv) serving as a member in any party committee or as an officer of such committee that is not otherwise prohibited in this section.

"Subcontractor" means any person, business entity or nonprofit organization that contracts to perform part or all of the obligations of a state contractor's state contract. Such person, business entity or nonprofit organization shall be deemed to be a subcontractor until December thirty first of the year in which the subcontract terminates. "Subcontractor" does not include (i) a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or (ii) an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

"Principal of a subcontractor" means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a subcontractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization, (ii) an individual who is employed by a subcontractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a subcontractor, which is not a business entity, or if a subcontractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any subcontractor who has managerial or discretionary responsibilities with respect to a subcontract with a state contractor, (v) the spouse or a dependent child who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the subcontractor.

EXHIBIT E

(state wages will be inserted here)

Project: Sea Street Salt Storage Facility

Minimum Rates and Classifications for Building Construction

Connecticut Department of Labor
Wage and Workplace Standards Division

ID# : B 17151

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number:
State#: 92-549

Project Town New Haven
FAP#:

Project: Sea Street Salt Storage Facility

CLASSIFICATION	Hourly Rate	Benefits
1a) Asbestos Worker/Insulator (Includes application of insulating materials, protective coverings, coatings, & finishes to all types of mechanical systems; application of firestopping material for wall openings & penetrations in walls, floors, ceilings - Last updated 7/21/11	36.86	25.51
1b) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters.**See Laborers Group 7**		
2) Boilermaker	34.65	24.10

As of: **Tuesday, November 20, 2012**

3a) Bricklayer, Cement Mason, Concrete Finisher (including caulking), Stone Masons	32.50	25.20 + a
3b) Tile Setter	32.94	22.42
3c) Terrazzo Mechanics and Marble Setters	31.69	22.35
3d) Tile, Marble & Terrazzo Finishers	26.25	19.20
3e) Plasterer	32.50	25.20

------LABORERS------

As of: **Tuesday, November 20, 2012**

4) Group 1: Laborers (common or general), acetylene burners, carpenter tenders, concrete specialists, wrecking laborers, fire watchers.	25.80	16.45
4a) Group 2: Mortar mixers, plaster tender, power buggy operators, powdermen, fireproofer/mixer/nozzleman, fence erector.	26.05	16.45
4b) Group 3: Jackhammer operators, mason tender (brick) and mason tender (cement/concrete)	26.30	16.45
4c) **Group 4: Pipelayers (Installation of water, storm drainage or sewage lines outside of the building line with P6, P7 license) (the pipelayer rate shall apply only to one or two employees of the total crew who primary task is to actually perform the mating of pipe sections) P6 and P7 rate is $26.80	26.05	16.45
4d) Group 5: Air track operators, Sand blasters	26.55	16.45
4e) Group 6: Nuclear toxic waste removers, blasters	28.80	16.45

As of: **Tuesday, November 20, 2012**

4f) Group 7: Asbestos/lead removal and encapsulation (except it's removal from mechanical systems which are not to be scrapped)	26.80	16.45
4g) Group 8: Bottom men on open air caisson, cylindrical work and boring crew	26.30	16.45
4h) Group 9: Top men on open air caisson, cylindrical work and boring crew	25.80	16.45
4i) Group 10: Traffic Control Signalman	16.00	16.45
5) Carpenter, Acoustical Ceiling Installation, Soft Floor/Carpet Laying, Metal Stud Installation, Form Work and Scaffold Building, Drywall Hanging, Modular-Furniture Systems Installers, Lathers, Piledrivers, Resilient Floor Layers.	29.65	21.00
5a) Millwrights	30.15	21.39

As of: **Tuesday, November 20, 2012**

6) Electrical Worker (including low voltage wiring) (Trade License required: E1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	36.25	22.49
7a) Elevator Mechanic (Trade License required: R-1,2,5,6)	45.97	23.535+a+b
-----LINE CONSTRUCTION----		
Groundman	23.80	3% + 13.70
Linemen/Cable Splicer	43.28	3% + 13.70
8) Glazier (Trade License required: FG-1,2)	33.78	16.90 + a

As of: **Tuesday, November 20, 2012**

9) Ironworker, Ornamental, Reinforcing, Structural, and Precast Concrete Erection	33.50	27.98 + a
----OPERATORS----		
Group 1: Crane handling or erecting structural steel or stone, hoisting engineer 2 drums or over, front end loader (7 cubic yards or over); work boat 26 ft. and over. (Trade License Required)	35.50	20.50 + a
Group 2: Cranes (100 ton rate capacity and over); Backhoe/Excavator over 2 cubic yards; Piledriver ($3.00 premium when operator controls hammer). (Trade License Required)	35.18	20.50 + a
Group 3: Excavator; Backhoe/Excavator under 2 cubic yards; Cranes (under 100 ton rated capacity), Grader/Blade; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar);Grader Operator; Bulldozer Fine Grade. (slopes, shaping, laser or GPS, etc.).	34.44	20.50 + a
Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper).	34.05	20.50 + a

As of: **Tuesday, November 20, 2012**

Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell)	33.46	20.50 + a
Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller; Pile Testing Machine.	33.46	20.50 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	33.15	20.50 + a
Group 7: Asphalt roller, concrete saws and cutters (ride on types), vermeer concrete cutter, Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and under Mandrell).	32.81	20.50 + a
Group 8: Mechanic, grease truck operator, hydroblaster; barrier mover; power stone spreader; welding; work boat under 26 ft.; transfer machine.	32.41	20.50 + a
Group 9: Front end loader (under 3 cubic yards), skid steer loader regardless of attachments, (Bobcat or Similar): forklift, power chipper; landscape equipment (including Hydroseeder).	31.98	20.50 + a

As of: **Tuesday, November 20, 2012**

Group 10: Vibratory hammer; ice machine; diesel and air, hammer, etc.	29.94	20.50 + a
Group 11: Conveyor, earth roller, power pavement breaker (whiphammer), robot demolition equipment.	29.94	20.50 + a
Group 12: Wellpoint operator.	29.88	20.50 + a
Group 13: Compressor battery operator.	29.30	20.50 + a
Group 14: Elevator operator; tow motor operator (solid tire no rough terrain).	28.16	20.50 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	27.75	20.50 + a

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Group 16: Maintenance Engineer/Oiler.	27.10	20.50 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	31.41	20.50 + a
Group 18: Power safety boat; vacuum truck; zim mixer; sweeper; (Minimum for any job requiring a CDL license).	28.99	20.50 + a
------PAINTERS (Including Drywall Finishing)------		
10a) Brush and Roller	30.22	16.90
10b) Taping Only/Drywall Finishing	30.97	16.90

As of: **Tuesday, November 20, 2012**

10c) Paperhanger and Red Label	30.72	16.90
10e) Blast and Spray	33.22	16.90
11) Plumber (excluding HVAC pipe installation) (Trade License required: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2)	38.67	25.56
12) Well Digger, Pile Testing Machine	33.01	19.40 + a
Roofer: Cole Tar Pitch	37.00	12.75 + a
Roofer: Slate, Tile, Composition, Shingles, Singly Ply and Damp/Waterproofing	35.50	12.75 + a

As of: **Tuesday, November 20, 2012**

15) Sheetmetal Worker (Trade License required for HVAC and Ductwork: SM-1,SM-2,SM-3,SM-4,SM-5,SM-6)	33.21	30.56
16) Pipefitter (Including HVAC work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4, G-1, G-2, G-8 & G-9)	38.67	25.56
------TRUCK DRIVERS------		
17a) 2 Axle	27.88	17.22 + a
17b) 3 Axle, 2 Axle Ready Mix	27.98	17.22 + a
17c) 3 Axle Ready Mix	28.03	17.22 + a

As of: **Tuesday, November 20, 2012**

17d) 4 Axle, Heavy Duty Trailer up to 40 tons	28.08	17.22 + a
17e) 4 Axle Ready Mix	28.13	17.22 + a
17f) Heavy Duty Trailer (40 Tons and Over)	28.33	17.22 + a
17g) Specialized Earth Moving Equipment (Other Than Conventional Type on-the-Road Trucks and Semi-Trailers, Including Euclids)	28.13	17.22 + a
18) Sprinkler Fitter (Trade License required: F-1,2,3,4)	40.50	16.85 + a
19) Theatrical Stage Journeyman	22.22	6.53

As of: **Tuesday, November 20, 2012**

Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional $1.25 per hour for truck drivers.*

***Note: Hazardous waste premium $3.00 per hour over classified rate*

Crane with 150 ft. boom (including jib) - $1.50 extra
Crane with 200 ft. boom (including jib) - $2.50 extra
Crane with 250 ft. boom (including jib) - $5.00 extra
Crane with 300 ft. boom (including jib) - $7.00 extra
Crane with 400 ft. boom (including jib) - $10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyperson instructing and supervising the work of each apprentice in a specific trade.

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

As of: **Tuesday, November 20, 2012**

Project: Sea Street Salt Storage Facility

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)
Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

As of: **Tuesday, November 20, 2012**

Project: Sea Street Salt Storage Facility

Minimum Rates and Classifications
for Heavy/Highway Construction

Connecticut Department of Labor
Wage and Workplace Standards Division

ID#: **H** 17151

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number:
FAP Number:
Project: Sea Street Salt Storage Facility

Project Town New Haven
State Number: 92-549

CLASSIFICATION	Hourly Rate	Benefits
01) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters. **See Laborers Group 5 and 7**		
1) Boilermaker	33.79	34% + 8.96
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	32.50	24.55
2) Carpenters, Piledrivermen	29.65	21.00

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Project: Sea Street Salt Storage Facility

2a) Diver Tenders	29.65	21.00
3) Divers	38.11	21.00
4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	42.75	16.90
4a) Painters: Brush and Roller	30.22	16.90
4b) Painters: Spray Only	33.22	16.90
4c) Painters: Steel Only	30.47	15.40
4d) Painters: Blast and Spray	33.22	16.90

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Project: Sea Street Salt Storage Facility

4e) Painters: Tanks, Tower and Swing	32.22	16.90
5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	36.25	22.49
6) Ironworkers: (Ornamental, Reinforcing, Structural, and Precast Concrete Erection)	33.50	27.98 + a
7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9)	38.67	25.56

----LABORERS---- - Last updated 4/11/12

8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	25.80	16.45
9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen, air tool operator	26.05	16.45

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Project: Sea Street Salt Storage Facility

10) Group 3: Pipelayers	26.30	16.45
11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block pavers and curb setters	26.30	16.45
12) Group 5: Toxic waste removal (non-mechanical systems)	27.80	16.45
13) Group 6: Blasters	27.55	16.45
Group 7: Asbestos Removal, non-mechanical systems (does not include leaded joint pipe)	26.80	16.45
Group 8: Traffic control signalmen	16.00	16.45

----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.---- Last updated 4/11/12----

As of: Tuesday, November 20, 2012

Project: Sea Street Salt Storage Facility

13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	31.28	16.45 + a
13b) Brakemen, Trackmen	30.37	16.45 + a
----CLEANING, CONCRETE AND CAULKING TUNNEL----Last updated 4/11/12----		
14) Concrete Workers, Form Movers, and Strippers	30.37	16.45 + a
15) Form Erectors	30.68	16.45 + a
----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----Last updated 4/11/12----		
16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	30.37	16.45 + a

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17) Laborers Topside, Cage Tenders, Bellman	30.26	16.45 + a
18) Miners	31.28	16.45 + a
----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ----Last updated 4/11/12----		
18a) Blaster	37.41	16.45 + a
19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	37.22	16.45 + a
20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	35.35	16.45 + a
21) Mucking Machine Operator	37.97	16.45 + a

Project: Sea Street Salt Storage Facility

----TRUCK DRIVERS----(*see note below)

Two axle trucks	27.88	17.22 + a
Three axle trucks; two axle ready mix	27.98	17.22 + a
Three axle ready mix	28.03	17.22 + a
Four axle trucks, heavy duty trailer (up to 40 tons)	28.08	17.22 + a
Four axle ready-mix	28.13	17.22 + a
Heavy duty trailer (40 tons and over)	28.33	17.22 + a

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Project: Sea Street Salt Storage Facility

Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	28.13	17.22 + a
----POWER EQUIPMENT OPERATORS----		
Group 1: Crane handling or erecting structural steel or stone, hoisting engineer (2 drums or over), front end loader (7 cubic yards or over), Work Boat 26 ft. & Over. (Trade License Required)	35.50	20.50 + a
Group 2: Cranes (100 ton rate capacity and over); Backhoe/Excavator over 2 cubic yards; Piledriver ($3.00 premium when operator controls hammer). (Trade License Required)	35.18	20.50 + a
Group 3: Excavator/Backhoe under 2 cubic yards; Cranes (under 100 ton rated capacity), Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar);Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required)	34.44	20.50 + a
Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper)	34.05	20.50 + a
Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell)	33.46	20.50 + a

Project: Sea Street Salt Storage Facility

Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	33.46	20.50 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	33.15	20.50 + a
Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and Under Mandrel).	32.81	20.50 + a
Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	32.41	20.50 + a
Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder).	31.98	20.50 + a
Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	29.94	20.50 + a
Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	29.94	20.50 + a

As of: Tuesday, November 20, 2012

Project: Sea Street Salt Storage Facility

Group 12: Wellpoint Operator.	29.88	20.50 + a
Group 13: Compressor Battery Operator.	29.30	20.50 + a
Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	28.16	20.50 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	27.75	20.50 + a
Group 16: Maintenance Engineer/Oiler	27.10	20.50 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	31.41	20.50 + a
Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	28.99	20.50 + a

As of: Tuesday, November 20, 2012

Project: Sea Street Salt Storage Facility

**NOTE: SEE BELOW

----LINE CONSTRUCTION----(Railroad Construction and Maintenance)----Last updated 9/3/2010----

20) Lineman, Cable Splicer, Dynamite Man	44.36	3% + 13.70
21) Heavy Equipment Operator	39.92	3% + 13.70
22) Equipment Operator, Tractor Trailer Driver, Material Men	37.71	3% + 13.70
23) Driver Groundmen	33.27	3% + 13.70

----LINE CONSTRUCTION----Last updated 4/17/09----

As of: Tuesday, November 20, 2012

Project: Sea Street Salt Storage Facility

24) Driver Groundmen	30.92	6.5% + 9.70
25) Groundmen	22.67	6.5% + 6.20
26) Heavy Equipment Operators	37.10	6.5% + 10.70
27) Linemen, Cable Splicers, Dynamite Men	41.22	6.5% + 12.20
28) Material Men, Tractor Trailer Drivers, Equipment Operators	35.04	6.5% + 10.45

As of: Tuesday, November 20, 2012

Project: Sea Street Salt Storage Facility

Welders: Rate for craft to which welding is incidental.

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***Note: Hazardous waste premium $3.00 per hour over classified rate*

Crane with 150 ft. boom (including jib) - $1.50 extra
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Crane with 300 ft. boom (including jib) - $7.00 extra
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All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyperson instructing and supervising the work of each apprentice in a specific trade.

~~Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work ~~

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

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As of: Tuesday, November 20, 2012

Project: Sea Street Salt Storage Facility

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

As of: Tuesday, November 20, 2012

Connecticut Department of Labor
Wage and Workplace Standards Division
FOOTNOTES

Please Note: If the "Benefits" listed on the schedule for the following occupations includes a letter(s) (+ a or + a+b for instance), refer to the information below.

Benefits to be paid at the appropriate prevailing wage rate for the listed occupation.

If the "Benefits" section for the occupation lists only a dollar amount, disregard the information below.

Bricklayers, Cement Masons, Cement Finishers, Concrete Finishers, Stone Masons
(Building Construction) and
(Residential- Hartford, Middlesex, New Haven, New London and Tolland Counties)

a. Paid Holiday: Employees shall receive 4 hours for Christmas Eve holiday provided the employee works the regularly scheduled day before and after the holiday. Employers may schedule work on Christmas Eve and employees shall receive pay for actual hours worked in addition to holiday pay.

Elevator Constructors: Mechanics

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, Christmas Day, plus the Friday after Thanksgiving.

b. Vacation: Employer contributes 8% of basic hourly rate for 5 years or more of service or 6% of basic hourly rate for 6 months to 5 years of service as vacation pay credit.

Glaziers

a. Paid Holidays: Labor Day and Christmas Day.

Power Equipment Operators
(Heavy and Highway Construction & Building Construction)

a. Paid Holidays: New Year's Day, Good Friday, Memorial day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday. Holidays falling on Saturday may be observed on Saturday, or if the employer so elects, on the preceding Friday.

Ironworkers

a. Paid Holiday: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

Laborers (Tunnel Construction)

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. No employee shall be eligible for holiday pay when he fails, without cause, to work the regular work day preceding the holiday or the regular work day following the holiday.

Roofers

a. Paid Holidays: July 4th, Labor Day, and Christmas Day provided the employee is employed 15 days prior to the holiday.

Sprinkler Fitters

a. Paid Holidays: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

Truck Drivers

(Heavy and Highway Construction & Building Construction)

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas day, and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

Information Bulletin
Occupational Classifications

The Connecticut Department of Labor has the responsibility to properly determine "job classification" on prevailing wage projects covered under C.G.S. Section 31-53.

Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification.

Below are additional clarifications of specific job duties performed for certain classifications:

- **ASBESTOS WORKERS**

  Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.

- **ASBESTOS INSULATOR**

  Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.

- **BOILERMAKERS**

  Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.

- **BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS**

  Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.

- **CARPENTERS, MILLWRIGHTS. PILEDRIVERMEN. LATHERS. RESILEINT FLOOR LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS**

  Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.

- **CLEANING LABORER**

  The clean up of any construction debris and the general cleaning, including sweeping, wash down, mopping, wiping of the construction facility, washing, polishing, dusting, etc., prior to the issuance of a certificate of occupancy falls under the *Labor classification.*

- **DELIVERY PERSONNEL**

  If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages are not required. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.

  An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer/tradesman and not a delivery personnel.

- **ELECTRICIANS**

  Install, erect, maintenance, alteration or repair of any wire, cable, conduit, etc., which generates, transforms, transmits or uses electrical energy for light, heat, power or other purposes, including the Installation or maintenance of telecommunication, LAN wiring or computer equipment, and low voltage wiring. ***License required per Connecticut General Statutes: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9.**

- **ELEVATOR CONSTRUCTORS**

  Install, erect, maintenance and repair of all types of elevators, escalators, dumb waiters and moving walks. ***License required by Connecticut General Statutes: R-1,2,5,6.**

- **FORK LIFT OPERATOR**

  Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.

  Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.

- **GLAZIERS**

  Glazing wood and metal sash, doors, partitions, and 2 story aluminum storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which requires either a blended rate or equal composite workforce.

- **IRONWORKERS**

  Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which requires either a blended rate or equal composite workforce. Insulated metal and insulated composite panels are still installed by the Ironworker.

- **INSULATOR**

  Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings. Past practice using the applicable licensed trades, Plumber, Sheet Metal, Sprinkler Fitter, and Electrician, is not inconsistent with the Insulator classification and would be permitted.

- **LABORERS**

  Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.

- **PAINTERS**

  Maintenance, preparation, cleaning, blasting (water and sand, etc.), painting or application of any protective coatings of every description on all bridges and appurtenances of highways, roadways, and railroads. Painting, decorating, hardwood finishing, paper hanging, sign writing, scenic art work and drywall hhg for any and all types of building and residential work.

- **LEAD PAINT REMOVAL**

  Painter's Rate
  1. Removal of lead paint from bridges.
  2. Removal of lead paint as preparation of any surface to be repainted.
  3. Where removal is on a Demolition project prior to reconstruction.

  Laborer's Rate
  1. Removal of lead paint from any surface NOT to be repainted.
  2. Where removal is on a *TOTAL* Demolition project only.

- **PLUMBERS AND PIPEFITTERS**

  Installation, repair, replacement, alteration or maintenance of all plumbing, heating, cooling and piping. ****License required per Connecticut General Statutes: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2 S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4.***

- **POWER EQUIPMENT OPERATORS**

  Operates several types of power construction equipment such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers or motor graders, etc. Repairs and maintains equipment. ***License required, crane operators only, per Connecticut General Statutes.**

- **ROOFERS**

  Covers roofs with composition shingles or sheets, wood shingles, slate or asphalt and gravel to waterproof roofs, including preparation of surface. (tear-off and/or removal of any type of roofing and/or clean-up of any and all areas where a roof is to be relaid)

- **SHEETMETAL WORKERS**

  Fabricate, assembles, installs and repairs sheetmetal products and equipment in such areas as ventilation, air-conditioning, warm air heating, restaurant equipment, architectural sheet metal work, sheetmetal roofing, and aluminum gutters. Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, facia, louvers, partitions, wall panel siding, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc. The sheet metal classification also applies to the vast variety of coated metal material panels and composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Insulated metal and insulated composite panels are still installed by the Iron Worker. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal and composite lockers and shelving, kitchen equipment, and walk-in coolers.

- **SPRINKLER FITTERS**

  Installation, alteration, maintenance and repair of fire protection sprinkler systems. ***License required per Connecticut General Statutes: F-1,2,3,4.**

- **TILE MARBLE AND TERRAZZO FINISHERS**

  Assists and tends the tile setter, marble mason and terrazzo worker in the performance of their duties.

- **TRUCK DRIVERS**

Definitions:

1) "Site of the work" (29 Code of Federal Regulations (CFR) 5.2(l)(b) is the physical place or places where the building or work called for in the contract will remain and any other site where a significant portion of the building or work is constructed, provided that such site is established specifically for the performance of the contact or project;

(a) Except as provided in paragraph (l) (3) of this section, job headquarters, tool yards, batch plants, borrow pits, etc. are part of the "site of the work"; provided they are dedicated exclusively, or nearly so, to the performance of the contract or project, and provided they are adjacent to "the site of work" as defined in paragraph (e)(1) of this section;

(b) Not included in the "site of the work" are permanent home offices, branch plant establishments, fabrication plants, tool yards etc, of a contractor or subcontractor whose location and continuance in operation are determined wholly without regard to a particular State or political subdivision contract or uncertain and indefinite periods of time involved of a few seconds or minutes duration and where the failure to count such time is due to consideration justified by industrial realities (29 CFR 785.47)

2) "Engaged to wait" is waiting time that belongs to and is controlled by the employer which is an integral part of the job and is therefore compensable as hours worked. (29 CFR 785.15)

3) "Waiting to be engaged" is waiting time that an employee can use effectively for their own purpose and is not compensable as hours worked. (29 CFR 785.16)

4) "De Minimus" is a rule that recognizes that unsubstantial or insignificant periods of time which cannot as a practical administrative matter be precisely recorded for payroll purposes, may be disregarded. This rule applies only where there are uncertain and indefinite periods of time involved of a short duration and where the failure to count such time is due to consideration justified by worksite realities. For example, with respect to truck drivers on prevailing wage sites, this is typically less than 15 minutes at a time.

Coverage of Truck Drivers on State or Political subdivision Prevailing Wage Projects

Truck drivers <u>are covered</u> for payroll purposes under the following conditions:

- Truck Drivers for time spent working on the site of the work.
- Truck Drivers for time spent loading and/or unloading materials and supplies on the site of the work, if such time is not de minimus

- Truck drivers transporting materials or supplies between a facility that is deemed part of the site of the work and the actual construction site.

- Truck drivers transporting portions of the building or work between a site established specifically for the performance of the contract or project where a significant portion of such building or work is constructed and the physical places where the building or work outlined in the contract will remain.

For example: Truck drivers delivering asphalt are covered under prevailing wage while" engaged to wait" on the site and when directly involved in the paving operation, provided the total time is not "de minimus"

Truck Drivers <u>are not</u> covered in the following instances:

- Material delivery truck drivers while off "the site of the work"

- Truck Drivers traveling between a prevailing wage job and a commercial supply facility while they are off the "site of the work"

- Truck drivers whose time spent on the "site of the work" is de minimus, such as under 15 minutes at a time, merely to drop off materials or supplies, including asphalt.

These guidelines are similar to U.S. Labor Department policies. The application of these guidelines may be subject to review based on factual considerations on a case by case basis.

For example:

- Material men and deliverymen are not covered under prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.
- Hauling material off site is not covered provided they are not dumping it at a location outlined above.
- Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

Any questions regarding the proper classification should be directed to:
Public Contract Compliance Unit
Wage and Workplace Standards Division
Connecticut Department of Labor
200 Folly Brook Blvd, Wethersfield, CT 06109
(860) 263-6543

Statute 31-55a

Last Updated: June 02, 2008

- Special Notice -

To All State and Political Subdivisions,Their Agents, and Contractors

Connecticut General Statute 31-55a - Annual adjustments to wage rates by contractors doing state work.

Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee, effective each July first.

- The prevailing wage rates applicable to any contract or subcontract awarded on or after October 1, 2002 are subject to annual adjustments each July 1st for the duration of any project which was originally advertised for bids on or after October 1, 2002.
- Each contractor affected by the above requirement shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.
- It is the ***contractor's*** responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's Web Site. The annual adjustments will be posted on the Department of Labor Web page: www.ctdol.state.ct.us. For those without internet access, please contact the division listed below.
- The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project. All subsequent annual adjustments will be posted on our Web Site for contractor access.

Any questions should be directed to the Contract Compliance Unit, Wage and Workplace

Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd., Wethersfield, CT 06109 at (860)263-6790.

Workplace Laws

Published by the Connecticut Department of Labor, Project Management Office

November 29, 2006

Notice

To All Mason Contractors and Interested Parties Regarding Construction Pursuant to Section 31-53 of the Connecticut General Statutes (Prevailing Wage)

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute.

Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute.

The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

Forklift Operator:

- **Laborers (Group 4) Mason Tenders** - operates forklift solely to assist a mason to a maximum height of nine feet only.

- **Power Equipment Operator (Group 9)** - operates forklift to assist any trade and to assist a mason to a height over nine feet.

The U.S. Labor Department conducted a survey of rates in Connecticut but it has not been published and the rate in effect remains as outlined in the above Occupational Bulletin.

Since this is a classification matter and not one of jurisdiction, effective January 1, 2007 the Connecticut Labor Department will enforce the rate on each schedule in accordance with our statutory authority.

Your cooperation in filing appropriate and accurate certified payrolls is appreciated.

Informational Bulletin

THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE

(applicable to public building contracts entered into *on or after July 1, 2007,* where the total cost of all work to be performed is at least $100,000)

(1) This requirement was created by Public Act No. 06-175, which is codified in Section 31-53b of the Connecticut General Statutes (pertaining to the prevailing wage statutes);

(2) The course is required for public building construction contracts (projects funded in whole or in part by the state or any political subdivision of the state) entered into on or after July 1, 2007;

(3) It is required of private employees (not state or municipal employees) and apprentices who perform manual labor for a general contractor or subcontractor on a public building project where the total cost of all work to be performed is at least $100,000;

(4) The ten-hour construction course pertains to the ten-hour Outreach Course conducted in accordance with federal OSHA Training Institute standards, and, for telecommunications workers, a ten-hour training course conducted in accordance with federal OSHA standard, 29 CFR 1910.268;

(5) The internet website for the federal OSHA Training Institute is http://www.osha.gov/fso/ote/training/edcenters/fact_sheet.html;

(6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;

(7) Within 30 days of receiving a contract award, a general contractor must furnish proof to the Labor Commissioner that all employees and apprentices performing manual labor on the project will have completed such a course;

(8) Proof of completion may be demonstrated through either: (a) the presentation of a *bona fide* student course completion card issued by the federal OSHA Training Institute; *or* (2) the presentation of documentation provided to an employee by a trainer certified by the Institute pending the actual issuance of the completion card;

(9) Any card with an issuance date more than 5 years prior to the commencement date of the construction project shall not constitute proof of compliance;

(10) Each employer shall affix a copy of the construction safety course completion card to the certified payroll submitted to the contracting agency in accordance with Conn. Gen. Stat. § 31-53(f) on which such employee's name first appears;

(11) Any employee found to be in non-compliance shall be subject to removal from the worksite if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;

(12) Any such employee who is determined to be in noncompliance may continue to work on a public building construction project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;

(13) The Labor Commissioner may make complaint to the prosecuting authorities regarding any employer or agent of the employer, or officer or agent of the corporation who files a false certified payroll with respect to the status of an employee who is performing manual labor on a public building construction project;

(14) The statute provides the minimum standards required for the completion of a safety course by manual laborers on public construction contracts; any contractor can exceed these minimum requirements; and

(15) Regulations clarifying the statute are currently in the regulatory process, and shall be posted on the CTDOL website as soon as they are adopted in final form.

(16) Any questions regarding this statute may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm; or by telephone at (860)263-6790.

THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE, AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTMATELY ARISE CONCERNIG THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.

Sec. 31-53b. **Construction safety and health course**. **Proof of completion required for employees on public building projects. Enforcement. Regulations**. (a) Each contract entered into on or after July 1, 2007, for the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public building project by the state or any of its agents, or by an political subdivision of the state or any of its agents, where the total cost of all work to be performed by all contractors and subcontractors in connection with the contract is at least one hundred thousand dollars, shall contain a provision requiring that, not later than thirty days after the date such contract is awarded, each contractor furnish proof to the Labor Commissioner that all employees performing manual labor on or in such public building, pursuant to such contract, have completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, in the case of telecommunications employees, have completed at least ten hours of training in accordance with 29 CFR 1910.268.

(b) Any employee required to complete a construction safety and health course required under subsection (a) of this section who has not completed the course shall be subject to removal from the worksite if the employee does not provide documentation of having completed such course by the fifteenth day after the date the employee is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section.

(c) Not later than January 1, 2007, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project.

(d) For the purposes of this section, "public building" means a structure, paid for in whole or in part with state funds, within a roof and within exterior walls or fire walls, designed for the housing, shelter, enclosure and support or employment of people, animals or property of any kind, including, but not limited to, sewage treatment plants and water treatment plants, "Public building" does not include site work, roads or bridges, rail lines, parking lots or underground water, sewer or drainage systems including pump houses or other utility systems.

CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION

CONTRACTORS WAGE CERTIFICATION FORM

I,_____of _____
Officer, Owner, Authorized Rep. Company Name

do hereby certify that the _____
Company Name

_____
Street

_____
City

and all of its subcontractors will pay all workers on the

_____
Project Name and Number

_____
Street and City

the wages as listed in the schedule of prevailing rates required for such project (a copy of which is attached hereto).

_____
Signed

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

_____
Notary Public

☞ Return to:

Connecticut Department of Labor
Wage & Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109