

## **TABLE OF CONTENTS OF SPECIAL PROVISIONS**

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

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FEBRUARY 27, 2019  
STATE PROJECT NO.: 0170-3476

## **FACILITIES GENERATOR INSTALLATION AND REPLACEMENT**

Towns of East Haven, East Lyme, East Windsor, Haddam, Hartford, Mansfield and Rocky Hill

The State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges, Facilities and Incidental Construction, Form 817, 2016, as revised by the Supplemental Specifications dated July 2018 (otherwise referred to collectively as "ConnDOT Form 817") is hereby made part of this contract, as modified by the Special Provisions contained herein. Form 817 is available at the following DOT website link <http://www.ct.gov/dot/cwp/view.asp?a=3609&q=430362>. The current edition of the State of Connecticut Department of Transportation's "Construction Contract Bidding and Award Manual" ("Manual"), is hereby made part of this contract. If the provisions of this Manual conflict with provisions of other Department documents (not including statutes or regulations), the provisions of the Manual will govern. The Manual is available at the following DOT website link <http://www.ct.gov/dot/cwp/view.asp?a=2288&q=259258>. The Special Provisions relate in particular to the Facilities Generator Installation and Replacement in the Towns of East Haven, East Lyme, East Windsor, Haddam, Hartford, Mansfield and Rocky Hill.

## **CONTRACT TIME AND LIQUIDATED DAMAGES**

Two hundred eighty-five (285) calendar days will be allowed for completion of the work on this Contract and the liquidated damages charge to apply will be One Thousand One Hundred Dollars (\$1,100.00) per calendar day.

**NOTICE TO CONTRACTOR – POTENTIAL MODIFIED AWARD  
SCHEDULE**

The contractor is hereby given notice that this contract will not be awarded until all State and Federal funding approvals have been received. If funding approvals are not received, this Contract award may be delayed or the Contract may be withdrawn and re-advertised at the discretion of the Department, per section XIII of the Construction Contract Bidding and Award Manual. Any delay to the Contract award or failure to award shall not be the basis for any claims by any bidder.

## **NOTICE TO CONTRACTOR – PROJECT DESCRIPTION**

The Project consists of the installation of a standby generator on the site of the existing Property and Facilities Region 2 facility located at 279 Flanders Road in East Lyme and the replacement of the existing generators with new standby generators on the sites of the existing maintenance facilities located at 157 Prospect Hill Road in East Windsor, 49 Jennings Road in Hartford, 100 North Frontage Road in Mansfield and on Saybrook Road in Haddam, the existing repair facility located at 507 North High Street in East Haven, and the existing central warehouse facility located at 660 Brook Street in Rocky Hill, as shown and described in the Contract.

The work at the East Haven repair facility involves the installation of a standby diesel generator located outside on the site of the facility, which shall include a generator pad, bollards, sound attenuated standard generator enclosure with double-wall 48-hour diesel tank, generator, generator components, ground rods, automatic transfer switch, surge protective device, disconnect for surge protective device, generator remote annunciator, conduits and circuitry from the generator to the building, leveling of the grade at the generator, any necessary rewiring and rearrangement of the electrical system components existing inside the building, connection of the generator to the existing tank monitoring system, installation of (3) 20 amp branch circuit breakers in existing Panel R for power feeds to the generator battery charger, block heater and receptacle, replacement of the existing 600 amp main disconnect switch/utility cabinet with a new main disconnect switch/utility cabinet, relocation of the existing electric service current transformers to the new utility cabinet, reconnection of the existing utility meter, replacement of the existing main distribution panel with a new main distribution panel, refeeding of power to existing Panels PE, E, R and B from the new main distribution panel, providing temporary power, removal of a tree at the new generator location, removal of the existing diesel generator, generator stand-alone aboveground diesel tank and accessories located in the generator room, and removal of the existing automatic transfer switch located in the electrical room.

The work at the East Lyme Property and Facilities Region 2 facility involves the installation of a standby diesel generator located outside on the site of the facility, which shall include a generator pad, bollards, sound attenuated standard generator enclosure with double-wall 48-hour diesel tank, generator, generator components, ground rods, automatic transfer switch, surge protective device, disconnect for surge protective device, generator remote annunciator, conduits and circuitry from the generator to the building, any necessary rewiring and rearrangement of the electrical system components existing inside the building, separation of existing neutral and grounding conductors in Panel SP1, replacement of the existing main distribution panel with a new 200 amp main distribution panel, installation of (3) 20 amp branch circuit breakers in the new main distribution panel for power feeds to the generator battery charger, block heater and receptacle, refeeding of power to existing salt shed disconnect switch, water pump disconnect, Panel SP1, oil burner switch and outside temperature controller from the new main distribution panel, providing temporary power, and removal of the existing manual transfer switch.

The work at the East Windsor maintenance facility involves the installation of a standby diesel generator located outside on the site of the facility, which shall include a generator pad, sound

attenuated standard generator enclosure with double-wall 48-hour diesel tank, generator, generator components, ground rods, automatic transfer switch, surge protective device, disconnect for surge protective device, generator remote annunciator, conduits and circuitry from the generator to the building, any necessary rewiring and rearrangement of the electrical system components existing inside the building, connection of the generator to the existing tank monitoring system, separation of existing neutral and grounding conductor bonding in the combination main disconnect switch/main distribution panel, reuse of (2) 20 amp spare circuit breakers and installation of (1) 20 amp branch circuit breaker in existing Panel LP for power feeds to the generator battery charger, block heater and receptacle, refeeding of power to existing Panel EM from the existing main disconnect switch/main distribution panel, providing temporary power, removal of the existing diesel generator, automatic transfer switch and accessories located in the generator room, and removal of the existing generator stand-alone aboveground diesel tank located in the garage bay area.

The work at the Haddam maintenance facility involves the installation of a standby diesel generator located outside on the site of the facility, which shall include a generator pad, sound attenuated standard generator enclosure with double-wall 48-hour diesel tank, generator, generator components, ground rods, automatic transfer switch, surge protective device, disconnect for surge protective device, generator remote annunciator, conduits and circuitry from the generator to the building, any necessary rewiring and rearrangement of the electrical system components existing inside the building, connection of the generator to the existing tank monitoring system, reuse of (3) 20 amp spare circuit breakers in existing Panel LP for power feeds to the generator battery charger, block heater and receptacle, refeeding of power to existing Panels EM#1 and EM#2 from the existing 400 amp circuit breaker, providing temporary power, and removal of the existing diesel generator, generator stand-alone aboveground diesel tank, automatic transfer switch and accessories located in the generator room.

The work at the Hartford bridge and electrical maintenance facility involves the installation of a standby natural gas generator on an existing pad located outside on the site of the facility, which shall include a sound attenuated standard generator enclosure, generator, generator components, ground rods, generator remote annunciator, circuitry from the generator to the building, any necessary rewiring and rearrangement of the electrical system components existing inside the building, connection of the generator to the existing natural gas feed and building automation system, installation of (3) 20 amp branch circuit breakers in existing Panel PP1 for power feeds to the generator battery charger, block heater and receptacle, providing temporary power, and removal of the existing natural gas generator and accessories located outside on the site of the facility.

The work at the Mansfield maintenance facility involves the installation of a standby diesel generator located outside on the site of the facility, which shall include a generator pad, sound attenuated standard generator enclosure with double-wall 48-hour diesel tank, generator, generator components, ground rods, automatic transfer switch, surge protective device, disconnect for surge protective device, generator remote annunciator, conduits and circuitry from the generator to the building, any necessary rewiring and rearrangement of the electrical system components existing inside the building, connection of the generator to the existing tank monitoring system, separation of existing neutral and grounding conductor bonding in the panel at the jet hanger, reuse of (2) 20 amp spare circuit breakers and installation of (1) 20 amp branch circuit breaker in existing Panel MP for

power feeds to the generator battery charger, block heater and receptacle, removal of the existing electric service to the jet hanger shed, refeeding of power to the existing panel at the jet hanger from existing cold storage room Panel A, refeeding of power to existing cold storage room Panel A with a new power feed from existing Panel MP inside the building, providing temporary power, removal of the existing propane generator, generator pad, generator stand-alone aboveground propane tank and accessories located outside on the site of the facility, and removal of the existing automatic transfer switch located in the electrical room.

The work at the Rocky Hill central warehouse facility involves the installation of a standby diesel generator located outside on the site of the facility, which shall include a generator pad, sound attenuated standard generator enclosure with double-wall 48-hour diesel tank, generator, generator components, ground rods, automatic transfer switch, surge protective device, disconnect for surge protective device, generator remote annunciator, conduits and circuitry from the generator to the building, any necessary rewiring and rearrangement of the electrical system components existing inside the building, replacement of the existing tank monitoring system with a new tank monitoring system, connection of the generator to the new tank monitoring system and existing building automation system, reuse of (2) 20 amp spare circuit breakers and installation of (1) 20 amp branch circuit breaker in existing Panel EDP-1 for power feeds to the generator battery charger, block heater and receptacle, refeeding of power to existing Panel EDP from existing Panel MDP, providing temporary power, installation of a drainage pipe, removal of trees/shrubs at the existing generator location, removal of the existing diesel generator, generator pad, 2,500 gallon underground diesel tank and accessories located outside on the site of the facility, and removal of the existing automatic transfer switch located in the electrical room.

Environmental work associated with these facilities is specified in the NOTICE TO CONTRACTOR – ENVIRONMENTAL INVESTIGATIONS and NOTICE TO CONTRACTOR – HAZARDOUS MATERIALS INVESTIGATIONS.

## **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 817 Article 1.20-1.05.02. The following items have been identified:

### Generators

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 accordingly upon Award.



## **NOTICE TO CONTRACTOR – SUBMITTALS**

Unless otherwise noted, the Designer will be the “submittal reviewer.”

Any Product Samples that are to be sent to the Designer requiring review for conformance with the Contract shall be transmitted by letter and hand delivered or sent by mail directly to Mr. Christopher Bonsignore, 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.

The Engineer will be the “submittal reviewer” for the following materials:

Concrete Mix Design Certifications  
Asphalt Mix Design Certifications  
Erosion Control Plan and Materials  
Demolition Plan  
Disposal Plan  
Welding (Welder) Certificates  
Certified Test Reports, Material Certificates, etc. from Form 817 Standard Items (non “A” Items from Bid List)  
“Non-A” items, including those items in CSI-formatted Specifications  
All test reports identified in CSI-formatted Specifications

Environmental Compliance will be the “submittal reviewer” for review of work identified in the following special provisions:

1. Item No. 0020902A – Lead Compliance for Building Renovation and Demolition.
2. Item No. 0100069A – Removal of Fuel Tank(s).
3. Item No. 0100072A – Removal and Disposal of Underground Tanks.
4. Item No. 0101000A – Environmental Health and Safety.
5. Item No. 0101143A – Handling and Disposal of Regulated Items
6. Item No. 0101183A – PCB Building Materials Removal.
7. Item No. 0202317A – Disposal of Hazardous Materials.

The Contractor shall send submittals e-mail alerts to the following key personnel:

Designer (Project Engineer): Edward W. Majcherek  
Designer (Project Manager): Jon H. Andrews

Add the following for submittals where Environmental Compliance is listed in NOTICE TO CONTRACTOR – SUBMITTALS as the “submittal reviewer:”

Environmental Designer (Project Engineer): Denise A. Young  
Environmental Designer (Project Manager): Jason M. Coite

Other key construction personnel will be identified at the Pre-Construction Meeting.

## **NOTICE TO CONTRACTOR – HAZARDOUS MATERIALS INVESTIGATIONS**

Hazardous materials site investigations have been conducted at the East Haven Repair Facility, East Lyme Property and Facilities Region 2 Facility, East Windsor Maintenance Facility, Haddam Maintenance Facility, Hartford Bridge and Electrical Maintenance Facility, Mansfield Maintenance Facility and Rock Hill Central Warehouse Facility prior to the scheduled renovation project. The scope of inspections were limited to the representative components projected for impact.

Results of the survey identified lead-based-paint (LBP), potentially polychlorinated biphenyl (PCB) containing caulks and miscellaneous Universal Waste (UW) and Connecticut Regulated Waste (CRW) materials/items to be present within the subject renovation/demolition areas.

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

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

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

- Item No. 0020902A – Lead Compliance for Building Renovation & Demolition
- Item No. 0202317A – Disposal of Hazardous Materials
- Item No. 0101143A – Handling and Disposal of Regulated Items
- Item No. 0101183A – PCB Building Materials Removal

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

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

- Pre-Renovation Investigative Survey for Hazardous Building Materials, DOT Generator Installation/Replacement Projects, East Haven, East Lyme, East Windsor, Haddam, Hartford, Mansfield & Rocky Hill, CT, Project 170-3476, January, 2019.

## **NOTICE TO CONTRACTOR – ENVIRONMENTAL INVESTIGATIONS**

A Task 210 Subsurface Site Investigation was conducted at the Central Warehouse facility, which evaluated soil quality within the vicinity of the planned underground storage tank (UST) removal. Highlights of this environmental investigation, as they relate to environmental procedures and construction Plans and Specifications for this Project, are presented below.

The Project involves the removal of a 2,500-gallon diesel fuel UST associated with the facility's emergency generator. Additionally, the Project includes the emptying of emergency generator diesel aboveground storage tanks (ASTs) at the East Haven, East Windsor and Haddam Maintenance Facilities, and the propane AST located at the Mansfield Maintenance Facility. The UST contents, along with any other liquid wastes resulting from its removal, will require proper disposal at an approved treatment/recycling/disposal facility in accordance with Item No. 0101143A "Handling and Disposal of Regulated Items."

As indicated in the Task 210 report, concentrations of polycyclic aromatic hydrocarbons (PAHs) were detected in the soil samples collected in the vicinity of the UST. However, bituminous asphalt was observed in the soil cores from which the samples were collected during the soil boring program, and likely resulted in the detected PAHs. Therefore, material handling measures beyond those required for normal construction operations are not warranted.

Excavated material that is suitable for reuse shall be managed at the point of origin for use as backfill. In instances where such material cannot be reused directly at the point of origin or within several days of excavation, the material shall be managed, in a manner approved by the Engineer, to minimize generation of fugitive dust and erosion, and prevent physical interference with other Project activities. Provisions will be made for disposal should there be excavated materials that cannot be reused within the Project area.

The Connecticut Department of Energy and Environmental Protection (CTDEEP) groundwater classification beneath the Project site is "GA." During the investigation groundwater was encountered at an approximate depth of 10 feet below the surface grade. Dewatering is not anticipated during construction, therefore it was not assessed during the subsurface investigation. Should it be determined (in the opinion of the Engineer) that it is necessary for Project related activities, groundwater will need to be evaluated by the Engineer for consistency with the applicable CTDEEP discharge permit and any necessary provisions will be added.

In the event impacted groundwater is noted following the removal of the UST (e.g., visible petroleum sheen or product), the Contractor shall be prepared to dewater the excavation as directed by the Engineer, to achieve compliance with the CTDEEP UST Regulations. Wastewater generated as a result of these dewatering efforts shall be managed and disposed of in accordance with Item 0101143A "Handling and Disposal of Regulated Items."

The Contractor is hereby notified that they will be required to implement appropriate health and safety measures for all construction activities to be performed within the area of excavation within

the Project Limits. These measures shall include, but are not limited to, air monitoring, engineering controls, personal protective equipment and decontamination, equipment decontamination, and personnel training. WORKER HEALTH AND SAFETY PROTOCOLS WHICH ADDRESS POTENTIAL AND/OR ACTUAL RISK OF EXPOSURE TO SITE SPECIFIC HAZARDS ARE SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.

The Sections which shall be reviewed by the Contractor include the following:

- Item No. 0101000A – Environmental Health and Safety
- Item No. 0100069A – Removal of Fuel Tank(s)
- Item No. 0100072A – Removal and Disposal of Underground Tanks
- Item No. 0101143A - Handling and Disposal of Regulated Items

The Contractor is alerted to the fact that a Department environmental consultant will be on-site periodically during construction operations at this location to observe site conditions for the State.

Information pertaining to the results of the environmental investigation discussed above can be found in the following document. This document shall be available for review on the Project portal in ProjectWise.

- Task 210 – Subsurface Site Investigation Report, Central Warehouse, Rocky Hill, Connecticut. TRC, January 2019.

## **NOTICE TO CONTRACTOR – EPA NEW SOURCE POLLUTANT STANDARD REGULATORY REQUIREMENTS**

The Project includes the installation of new emergency generators at ConnDOT facilities. In addition to all Contract requirements, the generators must also comply with current United States Environmental Protection Agency (USEPA) regulations that pertain to Stationary Reciprocating Internal Combustion Engines (RICE), under the Compression Ignition (CI) Internal Compression Engine (ICE) category. The new generators to be installed at the ConnDOT facilities are regulated under the New Source Pollutant Standards (NSPS), as noted below.

The Contractor is hereby notified that the generators must conform to USEPA promulgated and revised federal air regulations, 40 CFR Part 63 Subpart IIII, specifically the *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*, which applies to diesel-fired engines manufactured after April 1, 2006, including those limited to emergency use. For the new emergency generators located at the ConnDOT facilities, this means that engines must be certified by the manufacturer to meet the emission standards for new, non-road engines. There is also a limit on the hours of operation for the purpose of maintenance and readiness testing, as well as for non-emergency use, and the Contractor must maintain a record of hours of operation and reason for operation until such time as the generator installation is accepted by the State.

## **NOTICE TO CONTRACTOR - PRE-BID QUESTIONS AND ANSWERS**

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

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

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

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

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

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

## **NOTICE TO CONTRACTOR – SOLE SOURCE PRODUCTS**

For operational purposes, the Department has determined the need to sole source products specified in the following Contract provisions (including specific CSI-formatted Specifications contained within a particular Special Provision):

1. Tank Monitoring System: Division 13 Section 132180, “Tank Monitoring System.”
2. Building Automation System: Division 26 Section 263600, “Transfer Switches.”

No “Or Equals” will be permitted. The Contractor shall bid the Project accordingly.



## **NOTICE TO CONTRACTOR – POTENTIAL FOR ASBESTOS CONTAINING MATERIALS**

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 26 Section 260519, “Low-Voltage Electrical Power Conductors and Cables.”
2. Division 26 Section 260544, “Sleeves and Sleeve Seals for Electrical Raceways and Cabling.”
3. Division 26 Section 263213, “Engine Generators.”

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.

## **NOTICE TO CONTRACTOR – PRE-INSTALLATION MEETINGS**

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

1. Concrete Pad
2. Tank Monitoring System
3. Generator Turnover: The Contractor shall submit for review and approval a detailed hour by hour plan on how the Contractor plans on turning over each facility from the existing generator to the new generator.

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.

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

**Operation and Maintenance Manuals:** Submit in accordance with Form 817 Article 1.20-1.08.14. The Designer and the Owner (Mr. David A. Hartley, Office of Property and Facilities Services) will review the manuals for conformance to the Contract.

**Product 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 in accordance with Form 817 Article 1.20-1.06.08. The Designer and the Owner will review the warranties for conformance to the Contract.

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

TABLE

Special Provision (including CSI-formatted Specifications)	Warranties	Spare Parts	Training	Operation and Maintenance Manuals
CSI Section 132180, "Tank Monitoring System"			X	X
CSI Section 231123, "Facility Natural-Gas Piping"				X
CSI Section 262416, "Panelboards"		X		X
CSI Section 262813, "Fuses"		X		X
CSI Section 262816, "Enclosed Switches and Circuit Breakers"		X		X
CSI Section 263213, "Engine Generators"	X	X	X	X
CSI Section 263600, "Transfer Switches"	X		X	X
CSI Section 264313, "Surge Protection for Low-Voltage Electrical Power Circuits"	X	X	X	X

## **NOTICE TO CONTRACTOR – CAD FILES**

The Contractor is hereby advised that CAD files will not be provided to construction contract bidders, the Contractor, or any subcontractor. Contract documents, including plans, are provided in Portable Document Format (PDF).

The Department AEC Applications unit has prepared technical reference materials on extending the utility of PDF contract plan sheets. See the Repurposing PDF Contract Plan Sheets web page (<http://www.ct.gov/dot/cwp/view.asp?a=2288&Q=567262&PM=1>).

The Contractor shall bid the Project accordingly.

## **NOTICE TO CONTRACTOR – UTILITY SERVICE WORK**

The existing electric services to the Project Sites require temporary disconnection and reconnection. The existing electric service to the jet hanger shed at the Mansfield maintenance facility shall be removed. The existing electric service current transformers shall be relocated to the new main disconnect switch/utility cabinet and the existing utility meter shall be reconnected at the East Haven repair facility. All electric service work is included as shown and described within the Contract.

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

Electric: Eversource for the East Lyme, East Windsor, Haddam, Hartford, Mansfield and Rocky Hill Sites

United Illuminating (UI) for the East Haven Site

Where known, utility company representatives are identified elsewhere within the Contract.

The Contractor is responsible for coordinating this work with the utility company and for administrative requirements for reimbursing the utility company. Refer to CSI Specification Section No. 262713, "Electricity Metering" for additional information.

## **NOTICE TO CONTRACTOR – SUPPLYING FUEL FOR STORAGE TANKS**

The Contractor shall fill the generator base tank with motor vehicle diesel fuel as defined in Section 22a-174-42 of the Regulations of Connecticut State Agencies. A sample from each tanker shall be tested to confirm the product's conformance to the State's requirements UNLESS the fuel is supplied by one of the Department's current fuel vendors. The sample shall be taken in the presence of the Engineer. After the performance of all testing, the Contractor shall refill the tanks with the previously described fuel immediately prior to the inspection for the issuance of the C.O.C. Refer to CSI Section 263213, titled "Engine Generators" for additional information in this regard. The fuel shall remain in the storage tanks and shall become the property of the Engineer upon the acceptance of the Project. The Contractor is responsible for the fuel, including any leaks and spills until the Engineer accepts the Project.

Allowance for purchasing fuel is included in the above referenced specification.

The Contractor shall bid the Project accordingly.

## **NOTICE TO CONTRACTOR – SALVAGE ITEMS**

Under this project, the Contractor is required to salvage items for reuse by the Owner. Salvage items are shown and/or identified on the plans.

Salvage items shall be carefully detached from existing construction in a manner to prevent damage and delivered to the designated location indicated in the contract or as directed by the Engineer for reuse by the Owner.

Comply with the following when handling salvage items:

- a. Carefully detach salvage item from existing construction, in a manner to prevent damage. Include fasteners or brackets needed for reattachment elsewhere.
- b. Clean salvaged items of dirt and demolition debris.
- c. Pack or crate items after cleaning. Identify contents of containers.
- d. Store items in a secure area until delivery to Owner.
- e. Protect items from damage during storage.

The Contractor shall bid the Project accordingly.

## **SECTION 1.07 - LEGAL RELATIONS AND RESPONSIBILITIES**

### **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 1.20 – GENERAL CLAUSES FOR FACILITIES CONSTRUCTION**

### **1.20-1.00 – Facilities Construction – General:**

*Delete the first paragraph and replace with the following:*

“The Department has determined that this Project is Facilities Construction and therefore Section 1.20 applies.”

### **1.20-1.05.02— Facilities Construction – Contractor Submittals:**

*Replace #1, #2, and #3.*

**1. General:** If the plans prepared by the Department do not show complete details, they will show the necessary dimensions and preliminary details, which when used along with the other Contract documents, will enable the Contractor to prepare submittals necessary to complete the Contract work.

The Contractor is required to prepare submittals as Portable Document Format (PDF) files using Bluebeam Revu.

The Contractor is also required to acquire and maintain access to the Department’s Bentley ProjectWise data management system portal. The minimum recommended internet speed is 25MB/sec. For reference, the Department’s internet speed is 1 GB/sec.

The Contractor shall submit a “CT DOT ProjectWise – New User Form” to request user names and passwords. The Department will permit Web-based access and no more than 2 users for the Contractor.

The entry/log-in procedure is described in Section 3.2 of the CT DOT Digital Project Development Manual.

### **2. Submittal Preparation and Processing:** The Contractor shall:

- (a) Coordinate preparation and processing of submittals with performance of construction activities;
- (b) Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay;
- (c) Coordinate each submittal with fabrication, purchasing, testing, delivery, and other submittals and related activities that require sequential activity;
- (d) Provide complete submittal packages as multi-page PDF’s (Working Drawings, Shop Drawings, Product Data, Product Samples, and Quality Assurance Submittals, as applicable) for related elements of Project work for a concurrent review of all information. Incomplete submittal packages will be returned to the Contractor without being reviewed. Electronic PDF packages shall be limited to 75 MB unzipped; larger PDF packages will need to be broken up.

The Contractor shall allow at least 21 calendar days for initial submittal review by the submittal

reviewer, and allow additional time for such review if processing must be delayed to permit coordination with subsequent submittals. If a subsequent submittal is necessary, the Contractor shall allow at least 21 additional calendar days for processing each subsequent submittal. The submittal reviewer reserves the right to withhold action on a submittal if coordination with other submittals is necessary, until all related submittals are received. The submittal reviewer will promptly inform the Contractor when a submittal being processed must be delayed for such coordination.

The Contractor shall allow at least 28 calendar days for outside agency review of any submittal requiring their approval, including but not limited to the following: any utility, FTA, any railroad, DEEP, U.S. Coast Guard, Army Corps of Engineers, FM Global, and any Commissioning Authority.

The Engineer will not authorize an extension of Contract time because of the Contractor's failure to transmit submittals to the submittal reviewer or outside agencies sufficiently in advance of the work to permit processing.

The Contractor shall be limited to one acceptable submittal per product. Once a product has been accepted either as originally specified, or as an "Or Equal" to the product specified, the Contractor may elect to submit a subsequent product for consideration, but the Contractor shall be required to reimburse the Department for all costs associated with reviewing the subsequent request.

The Contractor shall attach a Submittal Transmittal Form to the beginning of each PDF submittal package. A blank Submittal Transmittal Form is located in ProjectWise "01.0 – Projects-Active" under the subfolder "120\_Contractor\_Submittals (PDF)" under the project number main folder. This form will be used for the Contractor to digitally certify that "Having reviewed this submittal, I certify that it is complete, accurate, coordinated in all aspects of the item being submitted and conforms to the requirements of the Contract in all respects, including all Federal requirements such as "Buy America", except as otherwise noted." The digital certification process is detailed in Section 2 of the CT DOT Digital Project Development Manual.

**3. Transmittal of Submittals:** The digitally certified PDF submittal package shall be uploaded into ProjectWise "01.0 – Projects-Active" under the subfolder "120\_Contractor\_Submittals (PDF)" under the project number main folder. The upload process is detailed in Section 3.2.1-3 of the CT DOT Digital Project Development Manual. The submittal reviewer will not act on submittals received in any other manner.

The Contractor shall attribute the submittal packages in ProjectWise using the following the following attributes and naming conventions:

- a) Discipline: CTR
- b) Main Category: CONTRACTOR
- c) Sub Category: SUBMITTAL
- d) Label: "XXX-Spec Reference-##"

1. “XXX” is the chronological submittal number created by the Contractor starting at 001.
2. “Spec Reference” is the 7-digit Contract Item No. (no “A” shall be included) for individual Contract items or is the 6-digit CSI Section number preceded by a “C” (making it a total of 7 digits) for the MLSI.
3. “##” is the submission attempt (01, 02, 03, etc.) of the submittal.

- e) Description: Brief description of submittal content labeled “Submittal – *submittal content*.”

The first submission for a particular item is the “01” submittal. Subsequent resubmittals (02, 03, etc.) are transmitted as described above only for those submittals or portions thereof returned to the Contractor with a “Revise and Resubmit” or “Rejected” disposition. The chronological submittal number shall not be revised on a resubmittal.

After uploading an initial or subsequent submittal, the Contractor shall provide e-mail notification to submittal reviewers and other key personnel at their business e-mail address that the submittals have been uploaded and are available for review. The Contractor shall provide a web link to the PDF submittal within their e-mail notification. The Contractor shall include the following information in the notification e-mail subject line in this order: *Project Number - “XXX-Spec Reference-##” – “Description.”* The submittal review time begins when the submittal reviewer is notified by e-mail.

*In the 4th paragraph of subsection e, insert “color” between the phrase “2 copies” in each location.*

## **7. Coordination Drawings:**

*Add the following sentence before the last paragraph:*

“The Contractor shall ensure the Coordination Drawings are signed by each installer indicating their approval prior to their submission.”

## **11. Submittal Reviewer’s Action:**

*Delete the next to last paragraph “The Contractor shall mark up one set ... as a “Record Document.” and replace it with:*

“The Contractor shall mark up one set of Working Drawings (including any related calculations), Shop Drawings, and Coordination Drawings and retain them as a “Record Document.”

## **1.20-1.05.07—Facilities Construction – Coordination with Work by Other Parties:**

*Add the following after the last paragraph:*

“The Contractor is hereby advised of the Engineer’s and the Department personnel’s intent to occupy the Project Site during the entire construction period. The Contractor shall cooperate with the Engineer during construction operations to minimize conflicts and facilitate Engineer and Department personnel usage. The Contractor, the Engineer, and the Department personnel will coordinate construction operations and Department operations on a daily basis, if necessary.”

**1.20-1.05.08— Facilities Construction – Schedules and Reports:**

*Delete the first sentence and replace with the following:*

“Transmittals of Schedules: The schedule package shall be uploaded into ProjectWise “01.0 – Projects-Active” under the subfolder “115\_Contractor\_Schedules” under the project number main folder. The specific work flow to do so will be distributed at the Preconstruction Meeting.

The Contractor shall attribute the submittal packages in ProjectWise using the following the following attributes and naming conventions:

- a) Discipline: CTR
- b) Main Category: CONTRACTOR
- c) Sub Category: SCHEDULE
- d) Label: “Project Number - Schedule #XX - Date”
- e) Description: “Schedule #XX – Date”

After uploading a schedule (baseline bar chart, monthly update, biweekly, or recovery), the Contractor shall provide e-mail notification to submittal reviewers and other key personnel at their business e-mail address that the submittals have been uploaded and are available for review. The Contractor shall provide a web link to the schedule within their e-mail notification. The Contractor shall include the following information in the notification e-mail subject line in this order: “*Project Number - Schedule #XX - Date*”

When a project coordinator is not required by the Contract the following shall apply:”

**1.20-1.05.23 – Facilities Construction – Requests for Information (RFI’s) and Requests for Change (RFC’s):**

*Delete the first paragraph and replace with the following:*

“The Contractor shall upload all RFIs and RFCs into ProjectWise “01.0 – Projects-Active” under the subfolder “121\_Contractor RFIs and RFCs” under the project number main folder. The specific work flow to do so will be distributed at the Preconstruction Meeting. The Contractor shall attribute the RFIs and RFCs in ProjectWise using the following the following attributes and naming conventions:

Discipline: CTR  
Main Category: CONTRACTOR

Sub Category: RFI or RFC

Label: "Project Number – RFI #XX - Date" or "Project Number – RFC #XX - Date"

Description: "RFI #XX - Date" or "RFC #XX - Date"

After uploading the RFIs and RFCs, the Contractor shall provide e-mail notification to the Engineer at their business e-mail address that the submittals have been uploaded and are available for review. The Contractor shall provide a web link to the RFI or RFC within their e-mail notification. The Contractor shall include the following information in the notification e-mail subject line in this order: "*Project Number - RFI #XX - Date*" or "*Project Number - RFC #XX - Date*."

The Engineer will forward the RFI or RFC to the Designer for review. Upon receipt of an RFI or RFC, the Designer will attempt to determine if additional information is required from the Contractor to respond to the RFI or RFC and request said information from the Engineer."

#### **1.20-1.06.03 – Facilities Construction – Storage**

*Delete the last sentence of paragraph 4 starting "Payment for off-site staging..."*

#### **1.20-1.06.08 – Facilities Construction – Warranties**

*Delete paragraph 8 starting "Prior to the date for the Substantial Completion Inspection to the end of the Article.*

"Prior to the date of the Substantial Completion Inspection, the Contractor shall compile each required warranty, properly executed by the Contractor or any other required party. The warranties shall be uploaded into ProjectWise "01.0 – Projects-Active" under the subfolder "122\_Contractor Closeout Documents" under the project number main folder. The specific work flow to do so will be distributed at the Preconstruction Meeting. The Contractor shall attribute the warranties in ProjectWise using the following the following attributes and naming conventions:

Discipline: CTR

Main Category: CONTRACTOR

Sub Category: WARRANTIES

Label: "Project Number – Warranties"

Description: "Warranties"

After uploading the warranties, the Contractor shall provide e-mail notification to submittal reviewers and other key personnel at their business e-mail address that the warranties have been uploaded and are available for review. The Contractor shall provide a web link to the zipped folder within their e-mail notification. The Contractor shall include the following information in the notification e-mail subject line in this order: "*Project Number - Warranties*."

The Contractor shall submit warranties in PDF format, assembling the complete warranty submittal package into a single electronic PDF file with bookmarks enabling navigation to each item and providing a bookmarked table of contents at beginning of document. The Contractor

shall place the warranty documents in an orderly sequence based on the organization of the Contract provisions (including specific CSI-formatted specifications contained within a particular Special Provision). Electronic PDF packages shall be limited to 75 MB unzipped; larger PDF packages will need to be broken up.

The Contractor shall include a 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.

The Contractor shall furnish to the Department a written warranty for all Project work accompanied by a cover letter with the following contents:

<p>[Addressed to:]</p> <p>Commissioner of Transportation  Department of Transportation  P.O. Box 317546  Newington, Connecticut 06131-7546</p> <p>Project Title and Number</p> <p>[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.</p> <p>[Signature:] [Name of authorized signatory]  [Title]</p>
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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.

When Project work covered by a warranty has failed and been corrected by replacement or rebuilding, the Contractor shall reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the time that remains on the original warranty period at the time of the failure."

#### **1.20-1.08.02—Facilities Construction – Establishment of Construction Field Office:**

*Delete the second paragraph.*

**1.20-1.08.03—Facilities Construction – Prosecution of Work:**

*Add the following as a new section 6:*

**“6. Project Phasing:** The Contractor shall work on two sites concurrently with the exception of the East Haven site, which shall be worked on separately. The Contractor shall not commence work on the next sites until all work has been completed on the previous sites. The Contractor shall follow the following construction sequence, unless otherwise directed by the Engineer:

1. Mansfield Maintenance Facility
2. East Windsor Maintenance Facility
3. Hartford Bridge and Electrical Maintenance Facility
4. Rocky Hill Central Warehouse Facility
5. Haddam Maintenance Facility
6. East Lyme Property and Facilities Region 2 Facility
7. East Haven Repair Facility

The Contractor shall submit a sequence of operations plan to the Engineer for approval 14 days before work is to begin at each site. Plan shall include utility contacts, areas/rooms requiring access, anticipated work time, mobilization of equipment, equipment/furniture requiring removal by facility personnel, detailed breakdown of how transfer of systems will occur and any additional information considered necessary by the Engineer.

The Contractor shall perform turnovers of facilities from existing generators to new generators on the weekend, unless otherwise approved by the Engineer.

The Contractor should anticipate continued work hours from 4 p.m. on Friday to 6 a.m. on the following Monday.

**1.20-1.08.04—Facilities Construction – Limitation of Operations:**

*Add following the last paragraph.*

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

Department personnel will occupy the facilities and the existing sites weekdays between the hours of 7 a.m. and 4 p.m. as well as at all times during winter storms. The Contractor shall not interfere with the Department’s employee’s performance of their assigned work.

The Contractor shall notify the Engineer when access to the facilities is required. The Engineer shall make all necessary arrangements with the facility supervisor to gain access to the facility.

During all times that the Project Site is occupied by state personnel, the Contractor shall maintain the following systems to the extent described to permit Department operations:

1. Electric Service: Electric service shall be maintained to the facilities and sites weekdays between the hours of 7 a.m. and 4 p.m. as well as at all times during winter storms. When shutdown of the electric service is required during all other times, the Contractor shall provide temporary power using a portable generator and/or existing generator and temporary panels to supply power to the existing emergency panels and critical loads at all sites in a manner submitted and approved by the Engineer.
2. Heat: Heat shall be maintained to the facilities at all times in a manner submitted and approved by the Engineer.
3. Water: Hot and cold water shall be maintained to the facilities at all times in a manner submitted and approved by the Engineer.

#### **1.20-1.08.14 – Facilities Construction – Acceptance of Project**

*Delete 4. Operation and Maintenance Manuals down to “Product Maintenance Manual” and replace with the following:*

**“4. Operation and Maintenance Manuals:** Prior to the date of the Semi-Final Inspection, the Contractor shall compile operation and maintenance manuals in the form of instructional manuals for use by the Owner. The operation and maintenance manuals shall be uploaded into ProjectWise “01.0 – Projects-Active” under the subfolder “122\_Contractor Closeout Documents” under the project number main folder. The specific work flow to do so will be distributed at the Preconstruction Meeting. The Contractor shall attribute the operational and maintenance manual packages in ProjectWise using the following the following attributes and naming conventions:

Discipline: CTR

Main Category: CONTRACTOR

Sub Category: OPERATION AND MAINTENANCE MANUALS

Label: “Project Number – Operation and Maintenance Manuals - Description”

Description: “Operation and Maintenance Manuals - Description”

After uploading the manuals, the Contractor shall provide e-mail notification to submittal reviewers and other key personnel at their business e-mail address that the submittals have been uploaded and are available for review. The Contractor shall provide a web link to the zipped folder manuals within their e-mail notification. The Contractor shall include the following information in the notification e-mail subject line in this order: “*Project Number - Operation and Maintenance Manuals – Description.*”

The Contractor shall submit manuals in the form of a multiple file composite electronic PDF file for each manual type required using electronic files prepared by manufacturer where



available. Where scanning of paper documents is required, configure scanned file for minimum readable file size. Electronic PDF packages shall be limited to 75 MB unzipped; larger PDF packages will need to be broken up.

For each manual, the Contractor shall:

- (a) Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- (b) Provide a title page as the first page of each manual with the following information: subject matter covered by the manual; Contract number and title; date of submittal; name, address, and telephone number of the Contractor; and cross-reference to related systems in other sections.
- (c) Provide a table of contents, arranged systematically according to the organization of the Contract provisions (including specific CSI-formatted specifications within a particular Special Provision).
- (d) Provide a general information section immediately following the table of contents, listing each product included in the manual, identified by product name. The Contractor shall list the name, address, and telephone number of the subcontractor, the maintenance contractor, and the local source for replacement parts and equipment for each product.
- (e) Include manufacturer's standard data and mark each sheet to identify each part or product included in the Project, identify each product using appropriate references from the Contract, and delete references to information that is not applicable. The use of project record documents as part of operation and maintenance manuals is not permitted.
- (f) Prepare supplementary text to provide operation and maintenance information when the manufacturer's standard data is not available or the data is insufficient and the information is necessary for proper operation and maintenance of equipment or systems, organize text in a consistent format under separate headings for each procedure, and provide a logical sequence of instruction for each operation or maintenance procedure.
- (g) Provide drawings where necessary in order to supplement manufacturer's data to illustrate the relationship of component parts of equipment or systems or to provide control or flow diagrams. The Contractor shall coordinate these drawings with information contained in project record drawings to ensure correct illustration of the completed installation. The use of Project record documents as part of operation and maintenance manuals is not permitted.
- (h) Provide estimated life cycle costs to maintain each product included in the manual to reach maximum useful life (i.e. annual, mid-life overhaul, end of life overhaul, or programmed interval replacement)."

*Delete the last 2 paragraphs of 5. Training ("The Contractor shall submit ... owner for unlimited reproduction.") and replace with the following:*

"The Contractor shall video record each training session."

## **SECTION M.04 - BITUMINOUS CONCRETE MATERIALS**

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

### **M.04.01—Bituminous Concrete Materials and Facilities**

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

### **M.04.03—Production Requirements**

**M.04.01—Bituminous Concrete Materials and Facilities:** Each source of material, Plant, and laboratory used to produce and test bituminous concrete must be qualified on an annual basis by the Engineer. AASHTO or ASTM Standards noted with an (M) have been modified and are detailed in Table M.04.03-5.

Aggregates from multiple sources of supply must not be blended or stored in the same stockpile.

**1. Coarse Aggregate:** All coarse aggregate shall meet the requirements listed in M.01.

**2. Fine Aggregate:** All fine aggregate shall meet the requirements listed in M.01.

**3. Mineral Filler:** Mineral filler shall conform to the requirements of AASHTO M 17.

#### **4. Performance Graded (PG) Asphalt Binder:**

##### **(a) General:**

- i. PG asphalt binder shall be uniformly mixed and blended and be free of contaminants such as fuel oils and other solvents. Binder shall be properly heated and stored to prevent damage or separation.
- ii. The binder shall meet the requirements of AASHTO M 332 and shall be graded or verified in accordance with AASHTO R 29. 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. 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 is accompanied by a statement certifying that the transport vehicle was inspected before loading was found acceptable for the material shipped and that the binder is free of contamination from any residual material, along with 2 copies of the bill of lading.
- iv. The blending or combining of PG binders in 1 storage tank at the Plant from different suppliers, grades, or additive percentages is prohibited.

**(b) 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) may supply PG binders to Department projects.

##### **(c) Standard Performance Grade (PG) Binder:**

- i. Standard PG binder shall be defined as “Neat.” Neat PG binders shall be free from modification with: fillers, extenders, reinforcing agents, adhesion promoters,

thermoplastic polymers, acid modification and other additives such as re-refined motor oil, and shall indicate such information on each bill of lading and Certified Test Report.

- ii. The standard asphalt binder shall be PG 64S-22.

**(d) Modified Performance Grade (PG) Binder:** The modified asphalt binder shall be Performance Grade PG 64E-22 asphalt modified solely with a Styrene-Butadiene-Styrene (SBS) polymer. The polymer modifier shall be added at either the refinery or terminal and delivered to the bituminous concrete production facility as homogenous blend. The stability of the modified binder shall be verified in accordance with ASTM D7173 using the Dynamic Shear Rheometer (DSR). The DSR  $G^*/\sin(\delta)$  results from the top and bottom sections of the ASTM D7173 test shall not differ by more than 10%. The results of ASTM D7173 shall be included on the Certified Test Report. The binder shall meet the requirements of AASHTO M 332 (including Appendix X1) and AASHTO R 29.

**(e) Warm Mix Additive or Technology:**

- i. The warm mix additive or technology must be listed on the North East Asphalt User Producer Group (NEAUPG) Qualified Warm Mix Asphalt (WMA) Technologies List at the time of bid, which may be accessed online at <http://www.neaupg.uconn.edu>.
- ii. The warm mix additive shall be blended with the asphalt binder in accordance with the manufacturer's recommendations.
- iii. The blended binder shall meet the requirements of AASHTO M 332 and shall be graded or verified in accordance with AASHTO R 29 for the specified binder grade. The Contractor shall submit a Certified Test Report showing the results of the testing demonstrating the binder grade. In addition, it must include the grade of the virgin binder, the brand name of the warm mix additive, the manufacturer's suggested rate for the WMA additive, the water injection rate (when applicable), and the WMA Technology manufacturer's recommended mixing and compaction temperature ranges.

**5. Emulsified Asphalts:**

**(a) General:**

- i. The emulsified asphalt shall meet the requirements of AASHTO M 140(M) or AASHTO M 208 as applicable.
- ii. The emulsified asphalts shall be free of contaminants such as fuel oils and other solvents.
- iii. The blending at mixing Plants of emulsified asphalts from different suppliers is prohibited.

**(b) Basis of Approval:**

- i. The request for approval of the source of supply shall list the location where the material is manufactured, the handling and storage methods, and certifications in accordance with AASHTO R 77. Only suppliers that have an approved "Quality Control Plan for Emulsified Asphalt" formatted in accordance with AASHTO R 77 and that submit monthly split samples per grade to the Engineer may supply emulsified asphalt to Department projects.
- ii. Each shipment of emulsified asphalt delivered to the Project site shall be accompanied with the corresponding Certified Test Report listing Saybolt viscosity, residue by evaporation, penetration of residue, and weight per gallon at 77°F and Material Certificate.
- iii. Anionic emulsified asphalts shall meet the requirements of AASHTO M-140. Materials

used for tack coat shall not be diluted and meet grade RS-1 or RS-1h. When ambient temperatures are 80°F and rising, grade SS-1 or SS-1h may be substituted if permitted by the Engineer.

- iv. Cationic emulsified asphalt shall meet the requirements of AASHTO M-208. Materials used for tack coat shall not be diluted and meet grade CRS-1. The settlement and demulsibility test will not be performed unless deemed necessary by the Engineer. When ambient temperatures are 80°F and rising, grade CSS-1 or CSS-1h may be substituted if permitted by the Engineer.

#### **6. Reclaimed Asphalt Pavement (RAP):**

(a) General: RAP is a material obtained from the cold milling or removal and processing of bituminous concrete pavement. RAP material shall be crushed to 100% passing the 1/2 inch sieve and free from contaminants such as joint compound, wood, plastic, and metals.

(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 request approval from the Engineer at least 30 calendar days prior to the start of the paving operation. The request shall include a Material Certificate and applicable test results stating that the RAP consists of aggregates that meet the specification requirements of M.04.01-1 through M.04.01-3 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-lb. sample of the RAP to be incorporated into the recycled mixture.
  - 2. A 25-lb. sample of the extracted aggregate from the RAP.

#### **7. 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 conforms to the following gradation:

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

The Contractor shall submit a Material Certificate to the Engineer stating that the CRCG complies with all the applicable requirements in this Section.

**8. Joint Seal Material:** Joint seal material must meet the requirements of ASTM D6690 - Type 2. The Contractor shall submit a Material Certificate in accordance with 1.06.07 certifying that the joint seal material meets the requirements of this Section.

**9. Recycled Asphalt Shingles (RAS):** RAS shall consist of processed asphalt roofing shingles from post-consumer asphalt shingles or from manufactured shingle waste. The RAS material under consideration for use in bituminous concrete mixtures must be certified as being asbestos-free and shall be entirely free of whole, intact nails. The RAS material shall meet the requirements of AASHTO MP 23.

The Producer shall test the RAS material to determine the asphalt content and the gradation of the RAS material. The Producer shall take necessary action to prevent contamination of RAS stockpiles.

The Contractor shall submit a Material Certificate to the Engineer stating that the RAS complies with all the applicable requirements in this Section.

**10. Plant Requirements:**

(a) General: The Plant producing bituminous concrete shall comply with AASHTO M 156.

(b) Storage Silos: The Contractor may use silos for short-term storage with the approval of the Engineer. A storage silo must have heated cones and an unheated silo cylinder if it does not contain a separate internal heating system. When multiple silos are filled, the Contractor shall discharge 1 silo at a time. Simultaneous discharge of multiple silos for the same Project is not permitted.

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

\*Not to exceed HMA limits

(c) Documentation System: The mixing Plant documentation system shall include equipment for accurately proportioning the components of the mixture by weight and in the proper order, controlling the cycle sequence, and timing the mixing operations. Recording equipment shall monitor the batching sequence of each component of the mixture and produce a printed record of these operations on each Plant ticket, as specified herein.

If recycled materials are used, the Plant tickets shall include their dry weight, percentage, and daily moisture content.

If a WMA Technology is added at the Plant, the Plant tickets shall include the actual dosage rate.

For drum Plants, the Plant ticket shall be produced at 5 minute intervals and maintained by the vendor for a period of 3 years after the completion of the Project.

For batch Plants, the Plant ticket shall be produced for each batch and maintained by the vendor for a period of 3 years after the completion of the Project. In addition, an asterisk (\*)

shall be automatically printed next to any individual batch weight(s) exceeding the following tolerances:

Each Aggregate Component	$\pm 1.5\%$ of individual or cumulative target weight for each bin
Mineral Filler	$\pm 0.5\%$ of the total batch
Bituminous Material	$\pm 0.1\%$ of the total batch
Zero Return (Aggregate)	$\pm 0.5\%$ of the total batch
Zero Return (Bituminous Material)	$\pm 0.1\%$ of the total batch

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.

The scales shall not be 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.

(d) Aggregates: Aggregate stockpiles shall be managed to prevent segregation and cross contamination. For drum Plants only, the percent moisture content, at a minimum prior to production and half way through production, shall be determined.

(e) Mixture: The dry and wet mix times shall be sufficient to provide a uniform mixture and a minimum particle coating of 95% as determined by AASTO T 195(M).

Bituminous concrete mixtures shall contain no more than 0.5% moisture when tested in accordance with AASHTO T 329.

(f) RAP: RAP moisture content shall be determined a minimum of twice daily (prior to production and halfway through production).

(g) Asphalt Binder: A binder log shall be submitted to the Department's Central Lab on a monthly basis.

(h) Warm mix additive: For mechanically foamed WMA, the water injection rate shall be monitored during production and not exceed 2.0% by total weight of binder. For additive added at the Plant, the dosage rate shall be monitored during production.

(i) Testing Laboratory: The Contractor shall maintain a laboratory to test bituminous concrete mixtures during production. The laboratory shall have a minimum of 300 s.f., have a potable water source and drainage in accordance with the CT Department of Public Health Drinking Water Division, and 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 and a functioning web browser with unrestricted access to <https://ctmail.ct.gov>. This equipment shall be maintained in working order at all times and be made available for use by the Engineer.

The laboratory shall be equipped with a 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. Sufficient light and ventilation must be provided. During summer months

adequate cooling or ventilation must be provided so the indoor air temperature shall not exceed the ambient outdoor temperature.

The laboratory testing apparatus, supplies, and safety equipment shall be capable of performing all the applicable tests in their entirety that are referenced in AASHTO R 35 and AASHTO M 323. The Contractor shall ensure that the Laboratory is adequately supplied at all times during the course of the Project with all necessary testing materials and equipment.

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

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

##### **1. Curb Mix:**

(a) Requirements: The Contractor shall use bituminous concrete that meets the requirements of Table M.04.02-1. RAP may be used in 5% increments by weight up to 30%.

(b) Basis of Approval: Annually, an approved JMF based on a mix design for curb mix must be on file with the Engineer prior to use.

The Contractor shall test the 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. 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.

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.

Any change in component source of supply or consensus properties must be approved by the Engineer. A revised JMF shall be submitted prior to use.

**TABLE M.04.02-1:  
Control Points for Curb Mix Mixtures**

Mix	Curb Mix	Production Tolerances from JMF Target
Grade of PG Binder content %	PG 64S-22 6.5 - 9.0	0.4
Sieve Size		
No. 200	3.0 - 8.0 (b)	2.0
No. 50	10 - 30	4
No. 30	20 - 40	5
No. 8	40 - 70	6
No. 4	65 - 87	7
1/4 inch		
3/8 inch	95 - 100	8
1/2 inch	100	8
3/4 inch		8
1 inch		
2 inch		
Additionally, the fraction of material retained between any 2 consecutive sieves shall not be less than 4%.		
Mixture Temperature		
Binder	325°F maximum	
Aggregate	280-350°F	
Mixtures	265-325°F	
Mixture Properties		
Air Voids (VA) %	0 – 4.0 (a)	
Notes: (a) Compaction Parameter 50 gyrations (N <sub>des</sub> ) (b) The percent passing the No. 200 sieve shall not exceed the percentage of bituminous asphalt binder.		

## **2. Superpave Design Method – S0.25, S0.375, S0.5, and S1:**

(a) **Requirements:** All designated mixes shall be designed using the Superpave mix design method in accordance with AASHTO R 35. A JMF based on the mix design shall meet the requirements of Tables M.04.02-2 to M.04.02-5. Each JMF and component samples must be submitted no less than 7 days prior to production and must be approved by the Engineer prior to use. All JMFs expire at the end of the calendar year.

All aggregate component consensus properties and tensile strength ratio (TSR) specimens shall be tested at an AASHTO Materials Reference Laboratory (AMRL) by NETTCP Certified Technicians.

All bituminous concrete mixes shall be tested for stripping susceptibility by performing the TSR test procedure in accordance with AASHTO T 283(M) at a minimum every 36 months. The compacted specimens may be fabricated at the Plant and then tested at an AMRL accredited facility. A minimum of 45000 grams of laboratory or plant blended mixture and the



corresponding complete Form MAT-412s shall be submitted to the Division of Material Testing (DMT) for design TSR testing verification. The mixture submitted shall be representative of the corresponding mix design as determined by the Engineer.

- i. Superpave Mixtures with RAP: RAP may be used 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. The JMF shall be accompanied by a blending chart and supporting test results in accordance with AASHTO M 323 Appendix X1, or by testing that shows the combined binder (recovered binder from the RAP, virgin binder at the mix design proportions, warm mix asphalt additive and any other modifier if used) meets the requirements of the specified binder grade.
  - Two (2) representative samples of RAP shall be obtained. Each sample shall be split, and 1 split sample shall be tested for binder content in accordance with AASHTO T 164 and the other in accordance with AASHTO T 308.
  - RAP material shall not be used with any other recycling option.
- ii. Superpave Mixtures with RAS: RAS may be used solely in HMA S1 mixtures with the following conditions:
  - RAS amounts up to 3% may be used.
  - RAS total binder replacement up to 15% may be used with no binder grade modification.
  - RAS total binder replacement 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. The JMF shall be accompanied by a blending chart and supporting test results in accordance with AASHTO M 323 Appendix X1, or by testing that shows the combined binder (recovered binder from the RAP, virgin binder at the mix design proportions, warm mix asphalt additive and any other modifier if used) meets the requirements of the specified binder grade.
  - Superpave Mixtures with RAS shall meet AASHTO PP 78 design considerations.
- iii. Superpave Mixtures with CRCG: CRCG may be used solely in HMA S1 mixtures. One percent (1%) of 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.
- (b) Basis of Approval: The following information must be included in the JMF submittal:
  - i. Gradation, consensus properties and specific gravities of the aggregate, RAP or RAS.
  - ii. Average asphalt content of the RAP or RAS by AASHTO T 164.
  - iii. Source of RAP or RAS and percentage to be used.
  - iv. Warm mix Technology, manufacturer's recommended additive rate and tolerances, and manufacturer recommended mixing and compaction temperatures.
  - v. TSR test report and anti-strip manufacturer and recommended dosage rate if applicable.
  - vi. Mixing and compaction temperature ranges for the mix with and without the warm-mix technology incorporated.
  - vii. JMF ignition oven correction factor by AASHTO T 308.

With each JMF submittal, the following samples shall be submitted to the Division of Materials Testing:

- 4 - one (1) quart cans of PG binder, with corresponding Safety Data Sheet (SDS)
- 1 - 50 lbs. bag of RAP
- 2 - 50 lbs. bags of Plant-blended virgin aggregate

A JMF may not be approved if any of the properties of the aggregate components or mix do not meet the verification tolerances as described in the Department's current QA Program for Materials, Acceptance and Assurance Testing Policies and Procedures.

Any material based on a JMF, once approved, shall only be acceptable for use when it is produced by the designated Plant, it utilizes the same components, and the production of material continues to meet all criteria as specified in Tables M.04.02-2, M.04.02-3 and M.04.02-4. A new JMF must be submitted to the Engineer for approval whenever a new component source is proposed.

Only 1 mix with 1 JMF will be approved for production at a time. Switching between approved JMF mixes with different component percentages or sources of supply is prohibited.

**TABLE M.04.02-2: Superpave Master Range for Bituminous Concrete Mixture Design Criteria**

	S0.25		S0.375		S0.5		S1	
Sieve	Control Points		Control Points		Control Points		Control Points	
inches	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	-	-
No. 4	72	90	-	72	-	-	-	-
No. 8	32	67	32	67	28	58	19	45
No. 16	-	-	-	-	-	-	-	-
No. 30	-	-	-	-	-	-	-	-
No. 50	-	-	-	-	-	-	-	-
No. 100	-	-	-	-	-	-	-	-
No. 200	2.0	10.0	2.0	10.0	2.0	10.0	1.0	7.0
VMA (%)	16.5 ± 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 / effective binder	0.6 - 1.2		0.6 - 1.2		0.6 - 1.2		0.6 - 1.2	
TSR	≥ 80%		≥ 80%		≥ 80%		≥ 80%	
T-283 Stripping	Minimal as determined by the Engineer							

(c) Mix Status: Each facility will have each type of bituminous concrete mixture rated based on the results of the previous year of production. Mix status will be provided to each bituminous concrete Producer prior to the beginning of the paving season.

The rating criteria are based on compliance with Air Voids and Voids in Mineral Aggregate (VMA) as indicated in Table M.04.03-4 and are calculated as follows:

Criteria A: Percentage of acceptance test results with compliant air voids.

Criteria B: The average of the percentage of acceptance results with compliant VMA and the percentage of acceptance results with compliant air voids.

The final rating assigned will be the lower of the rating obtained with Criteria A or Criteria B. Mix status is defined as:

“A” – Approved: Assigned to each mixture type from a production facility with a current rating of 70% or greater, or to each mixture type completing a successful PPT.

“PPT” – Pre-Production Trial: Temporarily assigned to each mixture type from a production facility when:

1. there are no compliant acceptance production test results submitted to the Department from the previous year;
2. there is a source change in one or more aggregate components;
3. there is a component percentage change of more than 5% by weight;
4. there is a change in RAP percentage;
5. the mixture has a rating of less than 70% from the previous season;
6. it is a new JMF not previously submitted; or
7. the average of 10 consecutive acceptance results for VFA, Density to  $N_{ini}$  or dust to effective binder ratio does not meet the criteria in tables M.04.02-2 and M.04.02-4.

Bituminous concrete mixtures rated with a “PPT” status cannot be used on Department projects. Testing shall be performed by the Producer with NETTCP certified personnel on material under this status. Test results must confirm that specification requirements in Tables M.04.02-2 through M.04.02-4 are met and the binder content (Pb) meets the requirements in Table M.04.03-2 before material can be used. One of the following methods must be used to verify the test results:

Option A: Schedule a day when a Department Inspector can be at the facility to witness testing

Option B: When the Contractor or their representative performs testing without being witnessed by an Inspector, the Contractor shall submit the test results and a split sample including 2 gyratory molds, 5,000 grams of boxed bituminous concrete, and 5,000 grams of cooled loose bituminous concrete for verification testing and approval

Option C: When the Contractor or their representative performs testing without being witnessed by a Department Inspector, the Engineer may verify the mix in the Contractor’s laboratory

Witnessing or verifying by the Department of compliant test results will change the mix’s status to “A”

The differences between the Department’s test results and the Contractor’s must be within the “C” tolerances included in the [Department’s QA Program for Materials, Acceptance and Assurance Testing Policies and Procedures](#) in order to be verified.

“U” – Not Approved: Status assigned to a type of mixture that does not have an approved JMF. Bituminous concrete mixtures with a “U” status cannot be used on Department projects.

**TABLE M.04.02-3:  
Superpave Consensus Properties Requirements for Combined Aggregate**

<b>Traffic Level</b>	<b>Design ESALs (80kN) Millions</b>	<b>Coarse Aggregate Angularity<sup>(1)</sup> ASTM D5821, Minimum %</b>	<b>Fine Aggregate Angularity AASHTO T 304, Method A Minimum %</b>	<b>Flat and Elongated Particles<sup>(2)</sup> ASTM D4791, Maximum %</b>	<b>Sand Equivalent AASHTO T 176, Minimum %</b>
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
<b>Notes:</b> <sup>(1)</sup> 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. <sup>(2)</sup> Criteria presented as maximum Percent by mass of flat and elongated particles of materials retained on the No. 4 sieve, determined at 5:1 ratio.					

**TABLE M.04.02-4: Superpave Traffic Levels and Design Volumetric Properties**

<b>Traffic Level</b>	<b>Design ESALs</b>	<b>Number of Gyration by Superpave Gyratory Compactor</b>			<b>Percent Density of Gmm from HMA/ WMA Specimen</b>			<b>Voids Filled with Asphalt (VFA) Based on Nominal Mix Size - Inch</b>			
		<b>N<sub>ini</sub></b>	<b>N<sub>des</sub></b>	<b>N<sub>max</sub></b>	<b>N<sub>ini</sub></b>	<b>N<sub>des</sub></b>	<b>N<sub>max</sub></b>	<b>0.25</b>	<b>0.375</b>	<b>0.5</b>	<b>1</b>
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	7	75	115	≤90.0	96.0	≤98.0	65-77	65-76	65-75	65-75

**TABLE M.04.02-5:  
Superpave Minimum Binder Content by Mix Type and Level**

<b>Mix Type</b>	<b>Level</b>	<b>Binder Content Minimum</b>
S0.25	1	5.80
S0.25	2	5.70
S0.25	3	5.70
S0.375	1	5.70
S0.375	2	5.60
S0.375	3	5.60
S0.5	1	5.10
S0.5	2	5.00
S0.5	3	5.00
S1	1	4.60
S1	2	4.50
S1	3	4.50

**M.04.03—Production Requirements:**

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

Control Chart(s) shall be developed and maintained for critical aspect(s) of the production process as determined by the Contractor. The control chart(s) shall identify the material property, applicable upper and lower control limits, and be updated with current test data. As a minimum, the following quality characteristics shall be included in the control charts:

- percent passing No. 4 sieve
- percent passing No. 200 sieve
- binder content
- air voids
- Gmm
- Gse
- VMA

The control chart(s) shall be used as part of the quality control system to document variability of the bituminous concrete production process. The control chart(s) shall be submitted to the Engineer the first day of each month.

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 Contractor shall submit complete production testing records to the Engineer within 24 hours in a manner acceptable to the Engineer.

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

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

## **2. Acceptance Requirements:**

### **(a) General:**

A NETTCP HMA Paving Inspector certified Contractor representative shall obtain a field sample of the material placed at the project site in accordance with AASHTO T 168 using the procedure indicated in Section 5.2.3 or an alternate procedure approved by the Engineer. The field sample shall be quartered by the Contractor in accordance with AASHTO R 47 and placed in an approved container. The container shall be sealed with a security tape provided by the Department and labelled to include the project number, date of paving, mix type, lot and subplot numbers and daily tonnage. The minimum weight of each quartered sample shall be 14000 grams. The Contractor shall transport one of the containers to the Departments Central Laboratory in Rocky Hill, retain one of the containers for potential use in dispute resolution and test the remaining material for acceptance.

The Contractor shall submit all acceptance tests results to the Engineer within 24 hours or prior to the next day's production. All acceptance test specimens and supporting documentation must be retained by the Contractor and may be disposed of with the approval of the Engineer. All quality control specimens shall be clearly labeled and separated from the acceptance specimens.

Contractor personnel performing QC and acceptance testing must be present at the facility prior to, during, and until completion of production, and be certified as a NETTCP HMA Plant Technician or Interim HMA Plant Technician and be in good standing. Production of material for use on State projects must be suspended by the Contractor if such personnel are not present. Technicians found by the Engineer to be non-compliant with NETTCP policies and procedures or Department policies may be removed by the Engineer from participating in the acceptance testing process for Department projects until their actions can be reviewed.

Verification and dispute resolution testing will be performed by the Engineer in accordance with the Department's QA Program for Materials.

Should the Department be unable to validate the Contractor's acceptance test result(s) for a lot of material, the Engineer will use results from verification testing and re-calculate the pay adjustment for that lot. The Contractor may request to initiate the dispute resolution process in writing within 24 hours of receiving the adjustment and must include supporting documentation or test results to justify the request.

**(b) Curb Mix Acceptance Sampling and Testing Procedures:** Curb Mixes shall be tested by the Contractor at a frequency of 1 test per every 250 tons of cumulative production, regardless of the day of production.

When these mix designs are specified, the following acceptance procedures and AASHTO test methods shall be used:

**TABLE M.04.03-1: Curb Mix Acceptance Test Procedures**

<b>Protocol</b>	<b>Reference</b>	<b>Description</b>
<b>1</b>	<b>AASHTO T 30(M)</b>	Mechanical Analysis of Extracted Aggregate
<b>2</b>	<b>AASHTO T 168</b>	Sampling of Bituminous Concrete
<b>3</b>	<b>AASHTO T 308</b>	Binder Content by Ignition Oven Method (adjusted for aggregate correction factor)
<b>4</b>	<b>AASHTO T 209(M)<sup>(2)</sup></b>	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
<b>5</b>	<b>AASHTO T 312<sup>(2)</sup></b>	<sup>(1)</sup> Superpave Gyrotory Molds Compacted to N <sub>des</sub>
<b>6</b>	<b>AASHTO T 329</b>	Moisture Content of Hot-Mix Asphalt (HMA) by Oven Method

**Notes:** <sup>(1)</sup> One (1) set equals 2 each of 6-inch molds. Molds to be compacted to 50 gyrations.  
<sup>(2)</sup> Once per year or when requested by the Engineer.

i. Determination of Off-Test Status:

1. Curb Mix is considered “off test” 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 mixture. If the mix is “off test,” the Contractor must take immediate actions to correct the deficiency and a new acceptance sample shall be tested on the same day or the following day of production.
2. When multiple silos are located at 1 site, mixture supplied to 1 project is considered as coming from 1 source for the purpose of applying the “off test” status.
3. The Engineer may cease supply from the Plant when test results from 3 consecutive samples are not within the JMF tolerances or the test results from 2 consecutive samples not within the control points indicated in Table M.04.02-1 regardless of production date.

ii. JMF Revisions

1. If a test indicates that the bitumen content or gradation are outside the tolerances, the Contractor may make a single JMF revision as allowed by the Engineer prior to any additional testing. Consecutive test results outside the requirements of Table M.04.02-1 JMF tolerances may result in rejection of the mixture.
2. 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.

(c) Superpave Mix Acceptance:

i. Sampling and Testing Procedures

Production Lot: The lot will be defined as one of the following types:

- Non-PWL Production Lot for total estimated Project quantities per mixture less than 3500 tons: All mixture placed during a single continuous paving operation.
- PWL Production Lot for total estimated Project quantities per mixture of 3500 tons or more: Each 3500 tons of mixture produced within 30 calendar days.

Production Sub Lot:

- For Non-PWL: As defined in Table M.04.03-2
- For PWL: 500 tons (The last sub lot may be less than 500 tons.)



Partial Production Lots (For PWL only): A Lot with less than 3500 tons due to:

- completion of the course;
- a Job Mix Formula revision due to changes in:
  - o cold feed percentages over 5%,
  - o target combined gradation over 5%,
  - o target binder over 0.15%,
  - o any component specific gravity; or
- a lot spanning 30 calendar days.

The acceptance sample(s) location(s) shall be selected using stratified - random sampling in accordance with ASTM D3665 based on:

- the total daily estimated tons of production for non-PWL lots, or
- the total size for PWL lots.

One (1) acceptance sample shall be obtained and tested per sub lot with quantities over 125 tons. The Engineer may direct that additional acceptance samples be obtained. For non-PWL lots, one (1) acceptance test shall always be performed in the last sub lot based on actual tons of material produced.

For non-PWL lots, quantities of the same mixture per Plant may be combined daily for multiple State projects to determine the number of sub lots.

The payment adjustment will be calculated as described in 4.06.

**TABLE M.04.03-2:**

**Superpave Acceptance Testing Frequency per Type/Level/Plant for Non-PWL Lots**

<b>Daily Quantity Produced in Tons (Lot)</b>	<b>Number of Sub Lots/Tests</b>
0 to 125	0, Unless requested by the Engineer
126 to 500	1
501 to 1,000	2
1,001 to 1,500	3
1,500 or greater	1 per 500 tons or portions thereof

The following test procedures shall be used for acceptance:

**TABLE M.04.03-3: Superpave Acceptance Testing Procedures**

Protocol	Procedure	Description
1	AASHTO T 168	Sampling of bituminous concrete
2	AASHTO R 47	Reducing samples to testing size
3	AASHTO T 308	Binder content by ignition oven method (adjusted for aggregate correction factor)
4	AASHTO T 30(M)	Gradation of extracted aggregate for bituminous concrete mixture
5	AASHTO T 312	<sup>(1)</sup> Superpave gyratory molds compacted to N <sub>des</sub>
6	AASHTO T 166	<sup>(2)</sup> Bulk specific gravity of bituminous concrete
7	AASHTO R 35	<sup>(2)</sup> Air voids, VMA
8	AASHTO T 209(M)	Maximum specific gravity of bituminous concrete (average of 2 tests)
9	AASHTO T 329	Moisture content of bituminous concrete

**Notes:** <sup>(1)</sup> One (1) set equals 2 each of 6-inch molds. Molds to be compacted to N<sub>max</sub> for PPTs and to N<sub>des</sub> for production testing. The first sub lot of the year shall be compacted to N<sub>max</sub>.

<sup>(2)</sup> Average value of 1 set of 6-inch molds.

If the average ignition oven corrected binder content differs by 0.3% or more from the average of the Plant ticket binder content in 5 consecutive tests regardless of the production date (moving average), the Contractor shall immediately investigate, determine an assignable cause, and correct the issue. When 2 consecutive moving average differences are 0.3% or more and no assignable cause has been established, the Engineer may require a new ignition oven aggregate correction factor to be performed or to adjust the current factor by the average of the differences between the corrected binder content and production Plant ticket for the last 5 acceptance results.

The Contractor shall perform TSR testing within 30 days after the start of production for all design levels of HMA- and PMA- S0.5 Plant-produced mixtures, in accordance with AASHTO T 283(M). The TSR test shall be performed at an AMRL certified laboratory by NETTCP certified technicians. The compacted specimens may be fabricated at the Plant and then tested at an AMRL accredited facility. A minimum of 45000 grams of plant blended mixture and the corresponding complete Form MAT-412s shall be submitted to the DMT for production TSR testing verification. The mixture submitted shall be representative of the corresponding mix design as determined by the Engineer. Additionally, the TSR test report and tested specimens shall be submitted to the Engineer for review. Superpave mixtures that require anti-strip additives (either liquid or mineral) shall continue to meet all requirements specified herein for binder and bituminous concrete. The Contractor shall submit the name, manufacturer, percent used, technical datasheet and SDS for the anti-strip additive (if applicable) to the Engineer.

i. Determination of Off-Test Status:

1. Superpave mixes shall be considered “*off test*” when any control point sieve, binder content, VA, VMA, and Gmm value is outside of the limits specified in Table M.04.03-4 or the target binder content at the Plant is below the minimum binder

content stated in Table M.04.02-5. Note that further testing of samples or portions of samples not initially tested for this purpose cannot be used to change the status.

2. Any time the bituminous concrete mixture is considered off-test:
  - A. The Contractor shall notify the Engineer when the Plant is “*off test*” for any mix design that is delivered to the Project in any production day. When multiple silos are located at 1 site, mixture supplied to 1 project is considered as coming from 1 source for the purpose of applying the “*off test*” determination.
  - B. 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 with 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.

ii. Cessation of Supply for Superpave Mixtures in Non-PWL Lots:

A mixture **shall not be used** on Department projects when it is “off test” for:

1. four (4) consecutive tests in any combination of VA, VMA or Gmm, regardless of date of production, or
2. two (2) consecutive tests in the control point sieves in 1 production shift.

As a result of cessation of supply, the mix status will be changed to PPT

iii. JMF revisions:

JMF revisions are only permitted prior to or after a production shift. A JMF revision is effective from the time it was submitted and is not retroactive to the previous test(s).

JMF revisions shall be justified by a documented trend of test results.

Revisions to aggregate or RAP specific gravities are only permitted when testing is performed at an AMRL certified laboratory by NETTCP certified technicians.

A JMF revision is required when the Plant target RAP or bin percentage deviates by more than 5% or the Plant target binder content deviates by more than 0.15% from the active JMF.

**TABLE M.04.03-4: Superpave Mixture Production Requirements**

	<b>S0.25</b>		<b>S0.375</b>		<b>S0.5</b>		<b>S1</b>		Tolerances
Sieve	Control Points		Control Points		Control Points		Control Points		From JMF Targets <sup>(2)</sup>
inches	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	+/- Tolerance
1.5	-	-	-	-	-	-	100	-	
1.0	-	-	-	-	-	-	90	100	
3/4	-	-	-	-	100	-	-	90	
1/2	100	-	100	-	90	100	-	-	
3/8	97	100	90	100	-	90	-	-	
No. 4	72	90	-	72	-	-	-	-	
No. 8	32	67	32	67	28	58	19	45	
No. 16	-	-	-	-	-	-	-	-	
No. 200	2.0	10.0	2.0	10.0	2.0	10.0	1.0	7.0	
Pb	JMF value		JMF value		JMF value		JMF value		0.3 <sup>(3)</sup>
VMA (%)	16.5		16.0		15.0		13.0		1.0 <sup>(4)</sup>
VA (%)	4.0		4.0		4.0		4.0		1.0 <sup>(5)</sup>
Gmm	JMF value		JMF value		JMF value		JMF value		0.030
Mix Temp. – HMA <sup>(6)</sup>	265-325°F <sup>(1)</sup>		265-325°F <sup>(1)</sup>		265-325°F <sup>(1)</sup>		265-325°F <sup>(1)</sup>		
Mix Temp. – PMA <sup>(6)</sup>	285-335°F <sup>(1)</sup>		285-335°F <sup>(1)</sup>		285-335°F <sup>(1)</sup>		285-335°F <sup>(1)</sup>		
Prod. TSR	N/A		N/A		≥80%		N/A		
T-283 Stripping	N/A		N/A		Minimal TBD by the Engineer		N/A		

**Notes:** <sup>(1)</sup> 300°F minimum after October 15.

<sup>(2)</sup> JMF tolerances shall be defined as the limits for production compliance.

<sup>(3)</sup> 0.4 for PWL lots

<sup>(4)</sup> 1.3 for all PWL lots except S/P 0.25 mixes. 1.1 for S/P 0.25 Non-PWL lots. 1.4 for S/P 0.25 PWL lots

<sup>(5)</sup> 1.2 for PWL lots

<sup>(6)</sup> Also applies to placement

**Table M.04.03-5:  
Modifications to Standard AASHTO and ASTM Test Specifications and Procedures**

<b>AASHTO Standard Method of Test</b>	
<b>Reference</b>	<b>Modification</b>
<b>T 30</b>	Section 7.2 through 7.4 Samples are not routinely washed for production testing
<b>T 209</b>	Section 7.2 The average of 2 bowls is used proportionally in order to satisfy minimum mass requirements. 8.3 Omit Pycnometer method.
<b>T 283</b>	When foaming technology is used, the material used for the fabrication of the specimens shall be cooled to room temperature, and then reheated to the manufacturer's recommended compaction temperature prior to fabrication of the specimens.
<b>AASHTO Standard Recommended Practices</b>	
<b>Reference</b>	<b>Modification</b>
<b>R 26</b>	<p>All laboratory technician(s) responsible for testing PG binders shall be certified or Interim Qualified by NETTCP as a PG Asphalt Binder Lab Technician.</p> <p>All laboratories testing binders for the Department are required to be accredited by the AMRL.</p> <p>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.</p> <p>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 or limitations required.</p> <p>All AASHTO M 320 references shall be replaced with AASHTO M 332.</p> <p>Once a month, 1 split sample and test results for each asphalt binder grade and each lot shall be submitted by the PG binder supplier to the Department's Central Lab. Material remaining in a certified lot shall be re-certified no later than 30 days after initial certification. Each April and September, the PG binder supplier shall submit test results for 2 BBR tests at 2 different temperatures in accordance with AASHTO R 29.</p>

## **ON-THE-JOB TRAINING (OJT) WORKFORCE DEVELOPMENT PILOT:**

### **Description**

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

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

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

### **Funding**

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

### **Minorities and Women**

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

### **Assigning Training Goals**

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

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

The dollar thresholds for training assignments are as follows:

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

### **Training Classifications**

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

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

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

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

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

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

## **Records and Reports**

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

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

## **Trainee Interviews**

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

## **Trainee Wages**

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

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

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

## **Achieving or Failing to Meet Training Goals**

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

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



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

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

### **Measurement and Payment**

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

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

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

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

[www.ct.gov/dot](http://www.ct.gov/dot)

The completed form must be submitted to the Office of Contract Compliance for approval. The form is due on the 15<sup>th</sup> 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](http://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 **Twenty Five (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.



Mar. 01

( \* Delete if not Applicable)  
SET-ASIDE PROGRAM  
(QUALIFICATION AFFIDAVIT)

COUNTY OF \_\_\_\_\_

PERSON FIRM OR ORGANIZATION

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

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

\* Delete if not applicable

CONTRACTOR \_\_\_\_\_

ADDRESS \_\_\_\_\_

ADDRESS \_\_\_\_\_

TOWN \_\_\_\_\_ PROJECT NO. \_\_\_\_\_

DESCRIPTION OF PROJECT \_\_\_\_\_

CONTRACT BID AMOUNT \$ \_\_\_\_\_

DATE \_\_\_\_\_

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



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

Contractor/Small Contractor MBE person, firm, association or corporation) is a certified Small Contractor/Small

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 #0000191A – NON-DESTRUCTIVE UTILITY INVESTIGATION** **(ESTIMATED COST)**

**Description:** This item shall consist of investigating and locating utilities using non-destructive methods, using the services of a professional utility locating company in accordance with this specification, within construction limits shown on the plans or as directed by the Engineer. This item shall include the field survey/location, field paint/stake marking, and color marking on plans. All utility investigation locations and services shall be preapproved by the Engineer.

**Materials:** The Contractor shall provide all necessary equipment and materials needed to identify underground utilities through the use of non-destructive methods such as ground penetrating radar, magnetic or electrical detectors, and other such scanning methods.

### **Construction Methods:**

- 1. General:** The locations of utilities present shall first be reviewed on the plans and in the field, reconciling all surface evidence of utilities (such as gate valves, manholes, handholes, etc.) with what is depicted on the plans. The professional utility location company shall use this information to conduct the non-destructive locating, using the method appropriate to the utility being investigated. Types of utilities which will require locating shall include, but not be limited to gas lines, water lines sewer lines, drainage lines, electrical conduits/wires/cables/duct banks and fiber optic cables, including related structures like valves, handholes and manholes.
- 2. Marking and Labelling:** All located utilities shall be tagged, marked, or labeled in the field using standard industrial/engineering/construction methods such as spray paint, stakes, vertical markers, labels, ribbons identification tapes, etc.
- 3. Marking Plans:** All located utilities shall be marked on plans. The colors, patterns and/or symbols shall comply with current industrial/engineering/construction design standards. A copy of the plans showing the located utilities shall be provided to the Engineer.
- 4. Site Access:** This work will be performed within ConnDOT-owned facilities. These facilities may often need to remain in operation during the investigation. Many of these sites are restricted in access due to security concerns. The Contractor must coordinate the professional utility locating subcontractor's activities and access with the Engineer.

**Method of Measurement:** Utility investigation will not be measured for payment. The extent of the utility investigation required shall be as depicted on the plans or as directed by the Engineer.

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

“Non-Destructive Utility Investigation (Estimated Cost)” will be paid for at the actual rate charged for the utility investigation services (receipted bills) by the entity which actually provided the services which have been approved by the Engineer plus a five-percent (5%) markup.

<u>Pay Item</u>	<u>Pay Unit</u>
Non-Destructive Utility Investigation (Estimated Cost)	est.

## **ITEM #0020902A – LEAD COMPLIANCE FOR BUILDING RENOVATION AND DEMOLITION**

### **Description:**

The work shall be conducted at the East Haven Repair Facility, East Lyme Property and Facilities Region 2 Facility, East Windsor Maintenance Facility, Haddam Maintenance Facility, Hartford Bridge and Electrical Maintenance Facility, Mansfield Maintenance Facility and Rock Hill Central Warehouse Facility in Connecticut.

Work under this item shall include activities impacting various materials containing or covered by lead paint and associated work by persons who are knowledgeable, qualified, and trained in the removal, treatment and handling of lead contaminated materials, including the transportation and disposal of non-hazardous lead construction and demolition solid waste containing or contaminated with lead, the recycling of metallic components covered with lead paint, and the subsequent cleaning of the affected environment. 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, but not limited to, the current revision of 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 (22a-209-1 and 22a-449(c)).

The lead paint activity shall include the demolition/renovation, removal and/or disposal of building components coated with lead painted surfaces as identified on the Contract Plans and Specifications.

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

### **Materials:**

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

No damaged or deteriorating materials shall be used. If material becomes contaminated with 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.

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.

The cleaning agent detergent shall be lead specific, such as TriSodium Phosphate (TSP).

Any chemical stripper and chemical neutralizer to be utilized shall be compatible with the substrate as well as with each other.

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

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. Prior to the start of any work that will generate hazardous lead waste above conditionally exempt small quantities, the Contractor shall obtain from the Engineer a temporary EPA Hazardous Waste Generators ID number, in accordance with Item 0202317A – Disposal of Hazardous Materials, 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. 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.
2. Documentation from the Contractor, typed on company letterhead and signed by the Contractor, certifying that all employees listed therein have received the following:
  - a. medical monitoring within the previous twelve (12) months, as required in 29 CFR 1926.62;
  - b. biological monitoring within the previous six (6) months, as required in 29 CFR 1926.62;

- c. respirator fit testing within the previous twelve (12) months, as required in 29 CFR 1910.134 (for those who don a tight-fitting face piece respirator).
- 3. Copies of state-approved certificates for the proposed non-hazardous construction and demolition (C&D) lead debris disposal facility and any concrete/wood or scrap metal recycling facilities.

No activity 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 of all required paperwork 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.

All labor, materials, tools, equipment, services, testing, insurance (with specific coverage for work on lead), 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 particulate 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.

Ladders and/or scaffolds to be utilized throughout this project 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.

Electrical service may not be available at the site. Costs for supplying electrical service shall be the responsibility of the Contractor.

Water service may not be available at the site. 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.

Data for random lead testing conducted on surfaces throughout the buildings as well as hazardous waste characterization results are available from the Engineer for informational purposes only. 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.

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 Engineer will provide a Project Monitor to oversee the activities of the Contractor. 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/or dust wipe sampling, shall be conducted throughout the project as deemed necessary.

#### (b) Set-Up

The Contractor shall prepare a Regulated Area as follows:

In all areas where airborne exposures may exceed the OSHA PEL, post warning signs meeting the requirements of OSHA 29 CFR 1926.62 at each regulated area.

In addition, signs shall be posted at all approaches to regulated areas so that an employee may read the sign and take the necessary protective steps before entering the area. These signs shall read:

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

Establish a Regulated Area, through the use of appropriate barrier tape, etc. and control unauthorized access into the area throughout the lead paint related activity.

Implement appropriate engineering controls such as critical barriers, poly drop cloths, negative pressure, local exhaust ventilation, wet dust suppression methods, etc. to prevent the spread of lead contamination from the Regulated Area.

For exterior work areas, the Contractor shall use a High Efficiency Particulate Air (HEPA) filtered vacuum dust collection system to remove any visible existing paint chips from the ground to a distance of 20' out from the base of the exterior surface scheduled for lead paint activity prior to commencement of work and extend a 6 mil polyethylene sheet drop cloth on the ground adjacent to the exterior surface scheduled for lead paint activity to contain debris/contamination.

The Contractor shall provide handwash facilities in compliance with 29 CFR 1926.51(f) and 29 CFR 1926.62 regardless of airborne lead exposure. This wash facility will consist, at least, of potable water, towels, soap, and a HEPA vacuum.

If air monitoring data by the Contractor or Project Monitor shows that employee exposure to airborne lead exceeds the OSHA PEL ( $50 \mu\text{g}/\text{m}^3$ ), shower rooms must be utilized. 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. 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.

(c) 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 micrograms per cubic meter ( $30 \mu\text{g}/\text{m}^3$ ). Assessments shall be based on initial air monitoring results as well as other relevant information. The Contractor may rely on historical air monitoring data obtained within the past 12 months under workplace conditions closely resembling the process, type of

material, control methods, work practices and environmental conditions used and prevailing in the Contractors current operations to satisfy the exposure assessment requirements. Monitoring shall continue as specified in the OSHA standard until a negative exposure assessment is developed.

Until a negative exposure assessment is developed for the required tasks 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 30 CFR Part 11, 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.

#### (d) Lead Abatement Procedures

Ensure that the Competent Person is on the job at all times.

Do not begin abatement work until authorized by the Engineer, following a pre-abatement visual inspection by the Project Monitor.

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. Do not remove lead chips or dust 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.

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

### **EAST HAVEN REPAIR FACILITY**

#### **Phase 1 – Non-metallic Components To Be Impacted**

- No lead paint has been identified on any non-metallic components. The Engineer has therefore characterized the projected non-metallic waste stream as non-hazardous construction and demolition (C&D) solid waste. Building structures waste stream characterized as non-hazardous shall be disposed of as non-hazardous construction and demolition (C&D) solid waste at an approved CTDEEP Solid Waste landfill.
- No lead paint was identified on the concrete CMU block walls in the Generator and Electrical Rooms, and as such, those materials shall be recycled as CTDEEP “Clean Fill”.

#### **Phase 2 – Metal Components To Be Impacted**

- Lead paint was identified on the generator itself in the Generator Room and the electrical boxes in the Electrical Room. All demolition work impacting those materials shall be conducted within an established lead control (regulated) area with a remote handwash facility/decontamination system in accordance with OSHA Lead in Construction Standards. Engineering controls and work practices shall be utilized to prevent the spread of lead dust and debris beyond the work area and limit the generation of airborne lead. All steel and metal generated from the demolition/renovation of the structure shall be segregated and recycled as scrap metal at an approved facility. The recycling of scrap metal (regardless of lead paint concentration) is exempt from USEPA RCRA and CTDEEP Hazardous Waste Regulation.

### **EAST LYME PROPERTY AND FACILITIES REGION 2 FACILITY**

#### **Phase 1 – Non-metallic Components To Be Impacted**

- Lead paint has been identified on CMU block walls in the Boiler Room. Any renovation/demolition work impacting those materials shall be conducted within an established lead control (regulated) area with a remote handwash facility/decontamination system in accordance with OSHA Lead in Construction Standards. Engineering controls and work practices shall be utilized to prevent the spread of lead dust and debris beyond the work area and limit the generation of airborne lead. 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. The Engineer will conduct TCLP testing or mass balance calculations on a representative sample of the stored waste materials to determine if the materials shall be disposed of as hazardous or non-hazardous construction waste. Should the waste material be determined to be hazardous, it shall be handled and disposed of in accordance with USEPA/CTDEEP Hazardous Waste Regulations, these Specifications and Item 0020317A – Disposal of Hazardous Materials. Building structures waste stream characterized as non-hazardous shall be disposed of as non-hazardous construction and demolition (C&D) solid waste at an approved CTDEEP Solid Waste landfill.

- All steel and metal generated from the demolition/renovation of the structure shall be segregated and recycled as scrap metal at an approved facility. The recycling of scrap metal (regardless of lead paint concentration) is exempt from USEPA RCRA and CTDEEP Hazardous Waste Regulation.

## **EAST WINDSOR MAINTENANCE FACILITY**

### **Phase 1 – Non-metallic Components To Be Impacted**

- No lead paint has been identified on any non-metallic components. The Engineer has therefore characterized the projected non-metallic waste stream as non-hazardous construction and demolition (C&D) solid waste. Building structures waste stream characterized as non-hazardous shall be disposed of as non-hazardous construction and demolition (C&D) solid waste at an approved CTDEEP Solid Waste landfill.
- No lead paint was identified on the concrete CMU block walls in the Generator Room, and as such, those materials shall be recycled as CTDEEP “Clean Fill”.

### **Phase 2 – Metal Components To Be Impacted**

- Lead paint was identified on the generator exhaust pipe in the Generator Room. All demolition work impacting those materials shall be conducted within an established lead control (regulated) area with a remote handwash facility/decontamination system in accordance with OSHA Lead in Construction Standards. Engineering controls and work practices shall be utilized to prevent the spread of lead dust and debris beyond the work area and limit the generation of airborne lead. All steel and metal generated from the demolition of the structure shall be segregated and recycled as scrap metal at an approved facility. The recycling of scrap metal (regardless of lead paint concentration) is exempt from USEPA RCRA and CTDEEP Hazardous Waste Regulation.

## **HADDAM MAINTENANCE FACILITY**

### **Phase 1 – Non-metallic Components To Be Impacted**

- No lead paint has been identified on any non-metallic components. The Engineer has therefore characterized the projected non-metallic waste stream as non-hazardous construction and demolition (C&D) solid waste. Building structures waste stream characterized as non-hazardous shall be disposed of as non-hazardous construction and demolition (C&D) solid waste at an approved CTDEEP Solid Waste landfill.
- No lead paint was identified on the concrete CMU block walls in the Generator Room, and as such, those materials shall be recycled as CTDEEP “Clean Fill”.

- All steel and metal generated from the demolition/renovation of the structure shall be segregated and recycled as scrap metal at an approved facility. The recycling of scrap metal (regardless of lead paint concentration) is exempt from USEPA RCRA and CTDEEP Hazardous Waste Regulation.

## **HARTFORD BRIDGE & ELECTRICAL MAINTENANCE FACILITY**

### **Phase 1 – Non-metallic Components To Be Impacted**

- No lead paint has been identified on any non-metallic components. The Engineer has therefore characterized the projected non-metallic waste stream as non-hazardous construction and demolition (C&D) solid waste. Building structures waste stream characterized as non-hazardous shall be disposed of as non-hazardous construction and demolition (C&D) solid waste at an approved CTDEEP Solid Waste landfill.
- No lead paint was identified on the concrete CMU block walls on the exterior of the Generator Room, and as such, those materials shall be recycled as CTDEEP “Clean Fill”.

### **Phase 2 – Metal Components To Be Impacted**

- Lead paint was identified on metal pipes in the Generator Room. All demolition work impacting those materials shall be conducted within an established lead control (regulated) area with a remote handwash facility/decontamination system in accordance with OSHA Lead in Construction Standards. Engineering controls and work practices shall be utilized to prevent the spread of lead dust and debris beyond the work area and limit the generation of airborne lead. All steel and metal generated from the demolition of the structure shall be segregated and recycled as scrap metal at an approved facility. The recycling of scrap metal (regardless of lead paint concentration) is exempt from USEPA RCRA and CTDEEP Hazardous Waste Regulation.

## **MANSFIELD MAINTENANCE FACILITY**

### **Phase 1 – Non-metallic Components To Be Impacted**

- No lead paint has been identified on any non-metallic components. The Engineer has therefore characterized the projected non-metallic waste stream as non-hazardous construction and demolition (C&D) solid waste. Building structures waste stream characterized as non-hazardous shall be disposed of as non-hazardous construction and demolition (C&D) solid waste at an approved CTDEEP Solid Waste landfill.



- No lead paint was identified on the concrete CMU block walls in the Generator Room, and as such, those materials shall be recycled as CTDEEP “Clean Fill”.
- All steel and metal generated from the demolition/renovation of the structure shall be segregated and recycled as scrap metal at an approved facility. The recycling of scrap metal (regardless of lead paint concentration) is exempt from USEPA RCRA and CTDEEP Hazardous Waste Regulation.

## **ROCKY HILL CENTRAL WAREHOUSE FACILITY**

### **Phase 1 – Non-metallic Components To Be Impacted**

- No lead paint has been identified on any non-metallic components. The Engineer has therefore characterized the projected non-metallic waste stream as non-hazardous construction and demolition (C&D) solid waste. Building structures waste stream characterized as non-hazardous shall be disposed of as non-hazardous construction and demolition (C&D) solid waste at an approved CTDEEP Solid Waste landfill.
- All steel and metal generated from the demolition/renovation of the structure shall be segregated and recycled as scrap metal at an approved facility. The recycling of scrap metal (regardless of lead paint concentration) is exempt from USEPA RCRA and CTDEEP Hazardous Waste Regulation.

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

Utilize appropriate engineering controls (e.g. wet methods) as directed by 29 CFR 1926.62 to control lead emissions and contamination.

Properly contain wastes containing lead paint for appropriate transport/disposal.

Stop all work in the regulated area and take steps to decontaminate non-work areas and eliminate causes of such contamination should lead contamination be discovered in areas outside of the regulated area.

### **Special Requirements:**

#### **1. Demolition:**

- a. Demolish in a manner which minimizes the spread of lead contamination and generation of lead dust.

- b. Implement dust suppression controls, such as misters, local exhausts ventilation, etc. to minimize the generation of airborne lead dust.
- c. Segregate work areas from non-work areas through the use of barrier tape, poly criticals, etc.
- d. Clean up immediately after renovation/demolition has been completed

(e) 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, water, air, CO<sub>2</sub>, 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 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, pre-remove the lead paint in the area affected.

Use of chemical strippers containing Methylene Chloride is prohibited.

Compressed air shall not be utilized to remove lead paint.

(f) 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 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.
- c. 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.

2. The Project Monitor will:

- a. Collect air samples in accordance with the current revision of the NIOSH 7082 or 7702 Method of Air Sampling for Airborne Lead while overseeing the activities of the Contractor. Frequency and duration of the air sampling during abatement will be representative of the actual conditions at the site. The size and configuration of the project will be a factor in the number of samples required to monitor the activities and shall be determined by the Project Monitor.

As determined by AAS, XRF, or equivalent analysis, if air samples collected outside of the Regulated Area during abatement activities indicate airborne lead concentrations greater than original background levels or greater than  $30 \text{ ug/m}^3$ , 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.

Abatement outside the initial designated work area(s) will not be paid for by the Engineer. The Contractor will be responsible for all costs incurred from these abatement activities.

(g) Clean-up and Visual Inspection:

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 OSHA 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.

(h) Post-Abatement Work Area Deregulation:

Following the visual inspection, (and clearance testing if appropriate,) any engineering controls implemented may be removed and the Work Area deregulated.

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.

(I) Waste Disposal/Recycling:

Non-metallic building debris waste materials tested and found to be non-hazardous Construction and Demolition (C&D) solid 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. The Contractor shall submit to the Engineer all documentation necessary to demonstrate the selected recycling facility is able to accept lead-painted scrap metal.

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 CT RSR standards as “clean fill”. Only CTDEEP defined “clean fill” can be recycled on-site or sent to a recycling facility.

Hazardous lead debris shall be disposed of in accordance with Item 0202317A “Disposal of Hazardous Material”.

(j) Project Closeout Data:

1. 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:
  - a. Competent persons (supervisor) job log;
  - b. OSHA-compliant personnel air sampling data;
  - c. Completed waste shipment papers for non-hazardous lead construction and demolition (C&D) solid waste and/or concrete/wood/scrap metal recycling.

**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 price bid for this item shall include: services, materials, equipment, insurance, 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) solid waste.

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

<u>Pay Item</u>	<u>Pay Unit</u>
Lead Compliance for Building Renovation and Demolition	Lump Sum

END OF SECTION

## **ITEM #0100069A – REMOVAL OF FUEL TANK(S)**

### **Description:**

Work under this item shall include all activities related to the removal and disposal of a 1,000-gallon propane above-ground storage tank (AST) servicing the emergency generator at the Mansfield Maintenance Facility, and the 200-gallon diesel AST associated with the emergency generator at the Haddam Maintenance Facility. All of the associated AST equipment and piping shall also be removed as shown on the Contract Plans. Prior to the removal of the diesel AST, the Contractor shall remove and transfer the salvageable fuel contents of the tank to another location designated by ConnDOT within a 50-mile radius of the Haddam facility.

The work shall be performed by an experienced firm that has successfully completed tank removal and disposal work similar to that indicated herein.

All activities shall be performed in accordance with USEPA 40 CFR Parts 260-268, 280 and 281, OSHA 29 CFR 1926, OSHA 29 CFR 1910.120, CTDEEP 22a-449(d)-1 and 22a-449(c), NFPA 30, NFPA 327, API 1604, API 2015, and all other applicable state and federal regulations and codes.

### **Materials:**

All abandoned floor and wall penetrations not scheduled for demolition shall be filled with cement grout, or hydraulic cement in wet locations.

### **Construction Methods:**

#### **(1) Pre-Removal Submittals:**

At least fifteen (15) working days prior to the start of any tank removal and disposal work, the Contractor shall submit the following to the Engineer for review and approval:

1. Proposed removal procedures to be utilized, including vapor purging and tank atmosphere testing.
2. Proposed protective/safety measures to be implemented.
3. Proposed C&D bulky waste disposal facility.
4. Proposed steel/scrap metal recycling facility.

#### **(2) General Provisions:**

The Contractor shall remove and dispose of one 1,000 gallon propane AST located at 100 North Frontage Road Mansfield, and clean (remove sludges and residuals), remove, and dispose of one 200-gallon diesel fuel AST located at 1640 Saybrook Road, Haddam, CT

Removal and disposal shall include the removal of all appurtenances associated with the tank (e.g., fuel piping, vent piping, conduits, tank and piping monitoring devices, etc.), as well as any necessary vapor purging, cleaning, etc.

Disposal of petroleum products and other fluids from within the tank and piping structures shall be performed by the Contractor in accordance with Item 0101143A – Handling and Disposal of Regulated Items.

The Contractor shall exercise all necessary precautions for fire prevention. Acceptable fire extinguishers shall be made available at all times. Flame/torch cutting is prohibited.

The Contractor shall prevent damage to any existing utilities, structures, equipment and appurtenances that are to remain in service.

### **(3) Vapor Purging:**

#### **(a) Propane AST**

Following the removal of the liquid contents of the tank by a State of Connecticut licensed LP Gas vendor, the tank will be allowed to vent to the atmosphere, following appropriate precautions (i.e., eliminating all sources of ignition, air monitoring, etc.), to enable all remaining propane vapor to be vented. Following sufficient time for ventilation, the Contractor shall conduct testing within the tank with a properly calibrated combustible gas indicator. Readings must be zero percent of the lower explosive limit (LEL), indicating that the tank is “gas-free,” before it is considered safe for removal/relocation.

#### **(b) Diesel Fuel AST**

After removing all of the combustible contents, the atmosphere of the tank shall be tested as indicated in the following section. If tank atmosphere testing indicates greater than 20 percent LEL, the tank atmosphere shall be purged following the stated method below.

Vapor remaining in the AST shall be displaced by adding solid carbon dioxide (dry ice) to the tank in the amount of at least 0.25 ounces per gallon of tank capacity. The dry ice shall be crushed and distributed evenly over the greatest possible area in the tank to promote rapid evaporation. With the exception of the tank vent, the Contractor shall plug as many tank openings as possible after introducing the dry ice and ensure that vapors are vented to the outside. As the dry ice evaporates, combustible vapors will flow out of the tank and may surround the area. Therefore, the Contractor shall conduct air monitoring around the tank as indicated below. The Contractor shall verify that the dry ice has rendered the internal atmosphere of the tank inert before proceeding with its removal. Alternate vapor purging methods will not be permitted without prior approval from the Engineer.

**(4) Atmosphere Testing:**

The atmosphere inside and surrounding the AST shall be regularly tested by the Contractor for flammable or combustible vapor concentrations until the source of the vapors has been eliminated. Such tests are to be made with a combustible gas indicator provided by the Contractor which is properly calibrated and maintained according to the manufacturer's instructions. Contractor personnel responsible for testing must be thoroughly familiar with the use of the instrument and the interpretation of the instrument's readings.

Following ventilation, the Contractor shall test the atmosphere within the AST with a properly calibrated combustible gas indicator. For the propane tank, measurements must be zero percent of the LEL, indicating that the tank is "gas-free," before it is considered safe for removal/relocation. The atmosphere within the diesel AST shall be tested by placing the combustible gas indicator probe through one of the tank's removable bung openings. Measurements shall be taken at the bottom, middle and upper portions of the tank, and the instrument shall be cleared after each reading. Liquid product must not enter the probe. All readings must be 20 percent or less of the LEL before the tank is considered safe for removal. The Contractor shall also use an oxygen indicator to monitor the oxygen concentration in the tank.

**(5) Removal Provisions:**

Removal practices shall be acceptable to the Engineer, and shall ensure the safety of personnel, equipment and structures, and shall provide adequate protection of the environment. The Contractor shall schedule removal activities to minimize delays and construction activities on-site.

The Contractor shall furnish and employ any such equipment as may be necessary for the protection of property, proper completion of the work and the safety of the public and employees of the Contractor and the Department.

For structures not scheduled for demolition, any holes resulting from the removal of product and/or vent piping, pipe brackets, or other conduits removed or abandoned as a part of removal activities shall be plugged with cement masonry.

Following removal of the diesel AST, the Contractor shall clean all residual product from any impacted surface associated with the AST. Waste products generated from the cleanup efforts of any residual product, shall be managed in accordance to Item 0101143A - Handling and Disposal of Regulated Items.

**(6) Disposal Procedures:**

Scrap metal (tanks, piping, etc) generated during the demolition process shall be recycled as scrap metal at an approved scrap metal recycling facility following cleaning. Non-hazardous, non-metallic waste shall be recycled off-site or disposed of as construction and demolition



(C&D) bulky waste in accordance with the Connecticut Department of Energy and Environmental Protection (CTDEEP) Solid Waste management standards. The Contractor shall recycle as much C&D bulky waste as practicable.

Removed items shall not be reused or salvaged by the Contractor.

**(7) Post-Removal Submittals:**

The Contractor shall provide the Engineer, within 30 days of completion of the tank removal work, a compliance package, which shall include, at a minimum:

1. Shipping papers from the approved bulky waste disposal/recycling facility indicating receipt and acceptance of C&D bulky waste debris.
2. Shipping papers and Certificates of Destruction/Recycling from the approved scrap metal recycling facility indicating receipt and acceptance of scrap metal debris.

**Method of Measurement:**

This item will be paid for at the contract lump sum price for “Removal of Fuel Tank(s),” complete.

**Basis of Payment:**

The Contract price lump sum shall include all related necessary work and material associated with the removal and disposal of the ASTs, including, but not limited to the transfer of salvageable fuel to to other designated locations, permits, equipment, material recycling and disposal, air monitoring, floor and wall patching, and lighting. No additional payment will be made for other material or equipment necessary for the satisfactory completion of the work.

Removal and disposal of residual liquid product from the ASTs will be in accordance with Item 0101143A – Handling and Disposal of Regulated Items.

Pay Item

Pay Unit

Removal of Fuel Tank(s)

LS

## **ITEM #0100072A – REMOVAL AND DISPOSAL OF UNDERGROUND TANKS**

### **Description:**

Work under this item shall include all activities related to the excavation, removal and disposal of a 2,500-gallon diesel fuel underground storage tank (UST) and its associated equipment and piping as shown on the Contract Plans. Prior to the removal of the UST, the Contractor shall remove and transfer the salvageable fuel contents of the UST and the generator's associated day tank, to another ConnDOT facility designated by ConnDOT within a 50-mile radius of the Rocky Hill facility.

Work under this item shall include all activities related to the excavation, removal and disposal of the USTs and their associated equipment and piping, as shown on the Contract Plans.

The work shall be performed by an experienced firm that has successfully completed UST excavation, removal and disposal work similar to that indicated herein.

All activities shall be performed in accordance with USEPA 40 CFR Parts 260-268, 280 and 281, OSHA 29 CFR 1926, OSHA 29 CFR 1910.120, CTDEEP 22a-449(d)-1 and 22a-449(c), NFPA 30, NFPA 327, API 1604, API 2015, and all other applicable state and federal regulations and codes.

### **Materials:**

Backfill material shall conform to the requirements of Section 2.13 of the Specifications.

### **Construction Methods:**

#### **(1) Pre-Excavation and Removal Submittals:**

- (a) At least fifteen (15) working days prior to the start of any excavation, removal and disposal work, the Contractor shall submit the following to the Engineer for review and approval:
  - 1. Proposed excavation and removal procedures to be utilized, including vapor purging and atmosphere testing.
  - 2. Proposed protective/safety measures to be implemented.
  - 3. Proposed C&D bulky waste disposal facility.
  - 4. Proposed steel/scrap metal recycling facility.
- (b) The Contractor shall notify the Department's UST Class A/B Operator, currently David Hartley, ConnDOT Office of Properties and Facilities, via email ([David.Hartley@ct.gov](mailto:David.Hartley@ct.gov)) **45 days prior to the projected date** of the UST removal(s).

(c) Seventy-two (72) hours prior to the start of any excavation/removal activity, the Contractor shall notify the following:

1. Office of the State Fire Marshal, Fire and Life Safety Specialist.
2. Town of Rocky Hill Fire Marshal.

Prior to the start of on-site activity, the Contractor shall provide the Engineer with written confirmation that the above contacts have been appropriately notified.

## **(2) General Provisions:**

The Contractor shall clean (removal of sludges and residuals), remove and dispose of: one 2,500-gallon diesel fuel UST located at 660 Brook Street in Rocky Hill, Connecticut, as indicated on the Plans.

Removal and disposal shall include the removal of all appurtenances associated with the tank (manways, fuel piping, vent piping, conduits, tank and piping monitoring devices, etc.). Removal shall also include all necessary vapor purging, cleaning, etc.

Disposal of remaining petroleum products, wastewaters and sediment/sludge from within the tank and piping structures shall be performed by the Contractor in accordance with Item 0101143A – Handling and Disposal of Regulated Items.

Handling of contaminated groundwater is not anticipated. However, in the event impacted groundwater (as evidenced by visible petroleum sheen or product) is encountered following the removal of the UST from the ground, the Contractor shall be prepared to dewater the excavation as directed by the Engineer to achieve compliance with the Connecticut Department of Energy and Environmental Protection (CTDEEP) UST Regulations. Wastewater generated as a result of these dewatering efforts shall be managed and disposed of in accordance with Item 0101143A “Handling and Disposal of Regulated Items.”

The Contractor shall exercise all necessary precautions for fire prevention. Acceptable fire extinguishers shall be made available at all times. Flame/torch cutting is prohibited.

The Contractor shall prevent damage to any existing utilities, structures, equipment and appurtenances that are to remain in service.

## **(3) Vapor Purging:**

After removing any combustible contents (i.e., diesel fuel), the atmosphere of the tank shall be tested as indicated in the following section. If the tank atmosphere testing indicates greater than 20% lower explosive limit (LEL), the tank atmosphere shall be purged following the stated method below.

Vapor remaining in the UST shall be displaced by adding solid carbon dioxide (dry ice) to the tank in the amount of at least 0.25 ounces per gallon of tank capacity. The dry ice shall be crushed and distributed evenly over the greatest possible area in the tank to promote rapid evaporation. With the exception of the tank vent, the Contractor shall plug as many tank openings as possible after introducing the dry ice and ensure that vapors are vented to the outside. As the dry ice evaporates, combustible vapors will flow out of the tank and may surround the area. Therefore, the Contractor shall conduct air monitoring around the tank as indicated below. The Contractor shall verify that the dry ice has rendered the internal atmosphere of the tank inert before proceeding with its removal. Alternate vapor purging methods will not be permitted without prior approval from the Engineer.

#### **(4) Atmosphere Testing:**

The atmosphere inside the UST and around the excavation area shall be regularly tested by the Contractor for flammable or combustible vapor concentrations until the tank is removed from both the excavation area and the site. Such tests are to be made with a combustible gas indicator provided by the Contractor which is properly calibrated and maintained according to the manufacturer's instructions. Contractor personnel responsible for testing must be completely familiar with the use of the instrument and the interpretation of the instrument's readings.

The atmosphere inside the UST shall be tested by placing the combustible gas indicator probe into the fill opening after the drop tube has been removed. If the tank is equipped with a non-removable fill tube, readings shall be taken through another opening. Readings shall be taken at the bottom, middle and upper portions of the tank, and the instrument shall be cleared after each reading. Liquid product must not enter the probe. All readings must be 20 percent or less of the lower explosive limit (LEL) before the tank is considered safe for removal from the ground. The Contractor shall also use an oxygen indicator to monitor the oxygen concentration in the tank(s).

#### **(5) Excavation and Removal Provisions:**

Excavation and removal practices shall be acceptable to the Engineer, shall assure the safety of persons, equipment and structures that are to remain, and shall provide adequate protection of the environment. The Contractor shall schedule excavation and removal activities to minimize delays and construction traffic on-site.

The Contractor shall furnish and employ such shores, braces, pumps, etc., as may be necessary for the protection of property, proper completion of the work and the safety of the public and employees of the Contractor and the Department.

Excavation by machinery shall be discontinued when excavation approaches pipes, conduits or other underground structures. The work shall be completed in these areas by use of hand tools.

The Contractor shall excavate test pits when necessary to determine the exact location of the tank, pipe(s) or other underground structure.

For structures not scheduled for demolition, any holes resulting from the removal of vent pipe brackets, return and supply pipes, or other conduits removed or abandoned as a part of excavation and removal activities shall be plugged with cement masonry.

The Contractor shall saw cut pavement in a neat and workman-like manner anywhere partial pavement removal is necessary to complete the work.

The Contractor shall prevent surface waters from entering the tank excavation area(s) at all times.

The Contractor shall assist in tank grave confirmation sampling by providing equipment and an operator to collect excavation bottom and side-wall soil. After collection of samples, the Contractor shall allow the excavations to remain open pending the receipt of laboratory analytical results by the Engineer. The Contractor shall backfill the excavations immediately upon notification in writing by the Engineer. Any additional excavation beyond that necessary for UST removal shall be as directed by the Engineer. Any tank grave that cannot be backfilled before the end of the day shall be adequately protected by the Contractor. This includes the use of safety fencing or other appropriate barricade to prevent individuals or vehicles from falling into excavations, orange flashing hazard lighting along the fencing, or other lighting considered necessary by the Engineer.

Excavation areas (tank grave areas, piping removal areas, soil removal areas, etc.) shall be backfilled to grade with any surplus suitable excavated "clean fill" materials from the project. Any additional fill material required to bring the subsurface area to grade shall conform to Article 2.13 of the Standard Specifications. Prior to placement of fill materials, areas to be filled shall be free of standing water, frost, frozen material, trash and debris.

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.

For excavations conducted in areas where bituminous concrete or asphalt were cut/removed to facilitate access to the UST, the Contractor shall restore the paved surfaces to equal or better quality than before disturbance. All pavement markings disturbed during construction shall be restored.

#### **(6) Disposal Procedures:**

Scrap metal (tanks, piping, etc) generated during the demolition process shall be recycled as scrap metal at an approved scrap metal recycling facility following cleaning.

Non-hazardous, non-metallic waste shall be recycled off site or disposed of at a landfill. The Contractor shall transport materials, including but not limited to concrete and asphalt waste, resulting from the UST removal, and dispose/recycle off site as C&D bulky waste in accordance

with the Connecticut Department of Energy and Environmental Protection (CTDEEP) solid waste management standards. The Contractor shall recycle as much C&D bulky waste as practicable.

Excavated underground items shall not be reused or salvaged by the Contractor.

**(7) Post-Excavation and Removal Submittals:**

The Contractor shall provide the Engineer, within 30 days of completion of the excavation and removal work, a compliance package, which shall include, but not be limited to, the following:

1. Shipping papers from the approved solid waste bulky waste disposal/recycling facility indicating receipt and acceptance of C&D bulky waste debris.
2. Shipping papers and Certificates of Destruction/Recycling from the approved scrap metal recycling facility indicating receipt and acceptance of scrap metal debris (tank, piping, etc).

**Method of Measurement:**

This item will be paid for at the contract lump sum price for “Removal and Disposal of Underground Tanks,” complete.

**Basis of Payment:**

The Contract lump sum price shall include all related necessary work and material associated with the excavation, removal and disposal of the USTs, including but not limited to: transfer of salvageable fuel, permits, equipment, material recycling and disposal, air monitoring, backfill, fencing, barricades, and lighting. No additional payment will be made for shoring, bracing, pumping (i.e., dewatering) or for material or equipment necessary for the satisfactory completion of the work.

Removal and disposal of residual liquid product from the UST (i.e., other than the salvageable fuel) will be in accordance with Item 0101143A – Handling and Disposal of Regulated Items.

<u>Pay Item</u>	<u>Pay Unit</u>
Removal and Disposal of Underground Tanks	LS

**ITEM #0101000A - ENVIRONMENTAL HEALTH AND SAFETY****Description**

Under this Item, the Contractor shall establish protocols and provide procedures to protect the health and safety of its employees and subcontractors as related to the proposed construction activities performed within the Project Limits. Work under this Item consists of the development and implementation of a written Health and Safety Plan (HASP) that addresses the relative risk of exposure to potential hazards present within Project areas. 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 HASP, which is compatible with the Contractor's HASP 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****A. 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 materials/items 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" and "Notice to Contractor - Hazardous Material Investigations."

**B. General**

The requirements set forth herein pertain to the provision of workers' health and safety as it relates to proposed Project activities when performed in the presence of hazardous or regulated materials or otherwise environmentally sensitive conditions. THE PROVISION OF WORKER HEALTH AND SAFETY PROTOCOLS, WHICH ADDRESS POTENTIAL AND/OR ACTUAL RISK OF EXPOSURE TO SITE SPECIFIC HAZARDS POSED TO CONTRACTOR EMPLOYEES, IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.

The Contractor shall be responsible for the development, implementation and oversight of the HASP throughout the performance of work within the Project Limits where handling regulated material/items is required, as identified in the Contract Documents, and in other areas identified by the Engineer or by the HASP where site conditions may pose a risk to worker health and safety and/or the environment. **No physical aspects of the work within the Project areas where exposure to regulated materials/items exists 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.**

#### C. Regulatory Requirements

All construction related activities performed by the Contractor within the 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.

#### D. 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 areas where conditions may pose a risk to worker health and safety, whichever is first, but not before the Award of the Contract.

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

The Engineer will review the HASP within four (4) weeks of submittal and provide written comments as to deficiencies in and/or exceptions to the plan, 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 areas where handling of regulated materials/items is required, 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 determined to conform to the requirements of this specification 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.**

## E. HASP Provisions

### 1. 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 to that topic.**

### 2. Elements

#### a. 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.

#### b. 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.

c. 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, Project Manager, Health and Safety Manager, Site Safety 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, including current 8-hour refresher training, and OSHA 8-hour HAZWOPER Supervisor training; a minimum of one year of working experience with the regulated compounds that have been documented to exist within the Project Limits; a working knowledge of federal and state safety regulations; specialized training or documented experience (one year minimum) in personal and respiratory protective equipment program implementation; the proper use of air monitoring instruments, air sampling methods and procedures; and certification training in first aid and CPR by a recognized, approved organization such as the American Red Cross.

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

- i. Directing and implementing the HASP;
  - ii. 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;
  - iii. Authorizing Stop Work Orders, which shall be executed upon the determination of an imminent health and safety concern;
  - iv. 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;
  - v. Authorizing work to resume, upon approval from the Contractor's HSM;
  - vi. Directing activities, as defined in the Contractor's written HASP, during emergency situations; and
  - vii. Providing personal monitoring where applicable, and as identified in the HASP.
- d. 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.

e. 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 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.

f. 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.

g. 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.

h. 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).

i. Communications

Written procedures for routine and emergency communications procedures shall be included in the Contractor's HASP.

j. Personal Hygiene, Personal Decontamination and Equipment Decontamination

Decontamination facilities and procedures for PPE, sampling equipment, and heavy equipment shall be discussed in detail in the HASP.

k. 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.

l. 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(s) as well as a map(s) showing the route to the hospital from the Project locations.

m. 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 an accident report to the Engineer.

n. Confined Space Entry Procedures

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

o. Pre-Entry Briefings

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

p. 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.

#### F. 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 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.) that 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 a secure area of the Project, to be approved by the Engineer, for management by others.

#### G. 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

- A. 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:

1. The development costs associated with preparing the HASP in accordance with these Specifications.
  2. The cost per month for the duration of the Project to implement the HASP and provide the services of the HSM and the HSO.
- B. If the lump sum bid price breakdown is unacceptable to the Engineer, substantiation showing that the submitted costs are reasonable shall be required.
- C. Upon acceptance of the payment schedule by the Engineer, payments for work performed will be made as follows:
1. The lump sum development cost will be certified for payment.
  2. 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.
  3. 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.
  4. Failure of the Contractor to implement the HASP in accordance with this Specification shall result in the withholding of all Contract payments.

### **Basis of Payment**

This work shall be paid for at the Contract lump sum price for “ENVIRONMENTAL HEALTH AND SAFETY,” which 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, CPC, 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

Environmental Health and Safety

#### Pay Unit

Lump Sum

## **ITEM #0101143A - HANDLING AND DISPOSAL OF REGULATED ITEMS**

### **Description:**

Work under this Item shall include the management of regulated items and all associated work by persons who are knowledgeable, qualified and trained in the handling and disposal of these materials/items and the subsequent cleaning of the affected environment. 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 within the underground storage tank (UST), above-ground storage tanks (ASTs), day tank(s), and generator systems and structures associated with the "Facilities Generator Replacement Project." . 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 or contaminated soils.

Activities shall be performed in accordance with, but not limited to, the current revision of the United States Environmental Protection Agency (USEPA) and Connecticut Department of Energy and Environmental Protection (CTDEEP) Hazardous Waste Regulations (40 CFR 260-282, 22a-209 and 22a-449(c)), USEPA Polychlorinated Biphenyl (PCB) Regulations (40 CFR 761), USEPA Protection of Stratospheric Ozone (40 CFR 82), Occupational Safety and Health Administration (OSHA) Hazard Communication (29 CFR 1910.1200), OSHA Hazardous Waste & Emergency Response Regulations (29 CFR 1910.120), United States Department of Transportation (USDOT) Hazardous Materials Regulation (49 CFR 171-180), the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Clean Air Act (CAA), the Toxic Substances Control Act (TSCA), and all other laws and regulations.

The required work activities include the removal, handling, packing, labeling, transport, manifesting and recycling or disposal of liquids and/or sludges contained in the diesel fuel UST and day tank scheduled for removal at the Rocky Hill Central Warehouse facility, the diesel fuel ASTs and day tanks at the East Haven, East Windsor and Haddam facilities, and the propane AST at the Mansfield facility.

This Item also includes the handling and disposal of wastewaters generated in the event dewatering activities directed by the Engineer in efforts to achieve compliance with the UST Regulations. However, it excludes any wastewaters generated during general construction activities or otherwise conducted under a CTDEEP General Discharge Permit.

In addition, there may be materials containing regulated or hazardous waste associated with the demolition and replacement of the generators. Such potential items include: mercury gauges and switches, circuit boards, fluorescent lamps and ballasts, and caulking/sealants.

The Contractor is responsible for verifying actual locations and quantities of the regulated 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 UST, AST or generator removal or other demolition 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:****A. Allowable Disposal/Recycling Facilities**

Disposal facilities for RCRA-hazardous, TSCA-hazardous, Connecticut Regulated Waste (CRW), and Universal wastes shall be selected from among those listed below. No other facility shall be used for these types of wastes without the written approval of the Engineer.

<p>Advanced Disposal Services Greentree Landfill* 635 Toby Road Kersey, PA 15846 Phone: (814) 265-1744 Fax: (814) 265-8745</p> <p>MSW, C&amp;D, asbestos, PCB remediation waste &lt;50 ppm, petroleum contaminated soils, nonhazardous solid wastes</p>	<p>Advanced Disposal (Managed by Interstate Waste Services) 7095 Glades Pike Summerset, PA 15501 Phone: (814) 444-0112 Fax: (814) 444-0127</p> <p>MSW, C&amp;D debris, residual waste, sewage sludge, incinerator ash, asbestos</p>
<p>Allied Waste Niagara Falls Landfill, LLC 5600 Niagara Falls Blvd. Niagara, NY 14304 Phone: (716) 285-3344 Fax: (716) 285-3398</p> <p>Non-hazardous waste, industrial solid waste, municipal sewage treatment sludge, contaminated soil &amp; debris, asbestos waste, C&amp;D debris, industrial process sludge</p>	<p>American Lamp Recycling, LLC 26 Industrial Way Wappingers Falls, NY 12590 Phone: (845) 896-0058 Fax: (845) 236-9277</p> <p>Mercury containing devices, universal waste</p>
<p>AVC (aka Cycle Chem) 217 South First Street Elizabeth, NJ 07206 Phone: (908) 354-0210 Fax: (908) 355-0562</p> <p>RCRA, TSCA liquid and solid</p>	<p>Clean Earth of Carteret 24 Middlesex Avenue Carteret, NJ 07008 Phone: (732) 541-8909 Fax: (732) 541-8105</p> <p>Concrete, brick, block, street sweepings, stone, rock, asphalt and petroleum contaminated soil</p>

<p>Clean Earth of North Jersey, Inc. (aka CENJ) 115 Jacobus Avenue South Kearny, NJ 07105 Phone: (732) 541-8909 Fax: (973) 344-8652</p> <p>RCRA liquid and solid, asbestos</p>	<p>Clean Harbors of Braintree, Inc. 1 Hill Avenue Braintree, MA 02184 Phone: (781) 380-7100 Fax: (781) 380-7193</p> <p>RCRA, TSCA &amp; CRW Gas, Liquid, Solid, Sludge</p>
<p>Clean Harbors of Connecticut, Inc. 51 Broderick Road Bristol, CT 06010 Phone: (860) 583-8917 Fax: (860) 585-1740</p> <p>RCRA TSCA &amp; CRW Gas, Liquid, Solid, Sludge</p>	<p>Clean Harbors Environmental Services, Inc. Cleveland Facility 2900 Rockefeller Avenue Cleveland, OH 44115 Phone: (216) 429-2401 Fax: (216) 429-1713</p> <p>RCRA liquid: aqueous organic &amp; inorganic wastewater</p>
<p>Clean Harbors Environmental Services, Inc. 2247 South Hwy. 71 Kimball, NE 69145 Phone: (308) 235-4012 Fax: (308) 235-4307</p> <p>RCRA liquid, solid &amp; sludge</p>	<p>Clean Harbors of Baltimore, Inc. 1910 Russell Street Baltimore, MD 21230 Phone: (410) 244-8200 Fax: (410) 752-2647</p> <p>RCRA liquid: aqueous organic &amp; inorganic wastewater</p>
<p>Clean Harbors of Woburn (Murphy's Waste Oil Serv., Inc.) 252 Salem Street Woburn, MA 01801 Phone: (781) 935-9066 Fax: (781) 935-8615</p> <p>RCRA, CRW: Oil, Oil/Water Mixtures, Oil Filters, Oily Soil and Debris, F001/F002 Contaminated Oils, Antifreeze</p>	<p>Clinton Landfill 242 Church Street Clinton, MA 01510 Phone: (978) 365-4110 Fax: (978) 365-4106</p> <p>Comm-97 soils and other materials subject to a BUD and additional review by MADEP (*2-week lead time for review by MADEP)</p>
<p>Colonie Landfill (Waste Connections, Inc.) 1319 Loudon Rd, Cohoes, New York 12047 Phone: (518) 783-2827 Fax: (518) 786-7331</p> <p>Non-haz. wastes, special wastes, contaminated soil</p>	<p>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</p> <p>Municipal solid waste, non-hazardous waste</p>

<p>Envirite of PA 730 Vogelsong Road York, PA 17404 Phone: (717) 846-1900 Fax: (717) 854-6757</p> <p>RCRA hazardous wastes</p>	<p>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</p> <p>RCRA &amp; TSCA liquid and solid</p>
<p>Environmental Quality Detroit Inc. 1923 Frederick Street Detroit, MI 48211 Phone: (734) 329-8017 Fax: (313) 923-0217</p> <p>RCRA &amp; CRW liquid wastewater</p>	<p>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</p> <p>Petroleum contaminated soil</p>
<p>Environmental Soil Management of NH 67 International Dr. Loudon, NH 03307 Phone: (603) 783-0228 Fax: (603) 783-0104</p> <p>Petroleum contaminated soil</p>	<p>Hazelton Creek Properties, LLC* (Hazelton Mine Reclamation Project) 280 South Church Street Hazelton, PA 18201 Phone: (570) 501-5050 Fax: (570) 457-3395</p> <p>Fresh, brackish or marine dredge material, coal ash, cement kiln dust, lime kiln dust, co-generator ash, regulated fill</p>
<p>Heritage Hazardous Waste Landfill (Heritage Environmental Services, LLC) 4370 W County Road 1275 N Roachdale, IN 46172 Phone: (315) 406-9342 Fax: NA</p> <p>Hazardous Wastes, Asbestos</p>	<p>Manchester Landfill 311 Olcott St., Manchester, CT 06040 Phone: (860) 647-3248 Fax: (860) 647-3238</p> <p>Municipal solid waste, non-hazardous waste, contaminated soil</p>
<p>Northeast Lamp Recycling, Inc. 250 Main Street East Windsor, CT 06088 Phone: (860) 292-1992 Fax: (860) 292-1114</p> <p>CRW solid waste, mercury containing devices &amp; universal waste</p>	<p>Ontario County Landfill (Managed by Casella Waste) 3555 Post Farm Road Stanley, NY 14561 Phone: (585) 526-4420 Fax: (585) 526-5459</p> <p>MSW, non-hazardous waste solid, special wastes including asbestos, ash from boilers/incinerators, contaminated soil, demo debris</p>

<p>Paradise Heating Oil, Inc.  Quimby Street  Ossining, NY 10562  Phone: (631) 926-2576 Fax: (718) 294-2226</p> <p>CRW waste oil liquid</p>	<p>Red Technologies Soil  232 Airline Avenue  Portland, CT 06980  Phone: (860) 342-1022 Fax: (860) 342-1042</p> <p>Temporary storage and transfer of contaminated soil</p>
<p>Republic Services Conestoga Landfill*  420 Quarry Road  Morgantown, PA 19543  Phone: (610) 286 – 6844 Fax: (610) 286-7048</p> <p>MSW, C&amp;D debris, residual waste, contaminated soil, asbestos</p>	<p>Soil Safe, Inc.  378 Route 130, Logan Township  Bridgeport, NJ 08085  Phone: (410) 872-3990 Fax: (410) 872-9082</p> <p>Soil contaminated with petroleum or metals, some industrial waste solids</p>
<p>The Southbridge Recycling &amp; Disposal Park  165 Barefoot Rd.  Southbridge, MA 01550  Phone: (508) 765-9723, (603) 235-3597  Fax: (508) 765-6812</p> <p>MSW, non-hazardous C &amp; D waste, contaminated soil for cover</p>	<p>Stablex Canada, Inc.  760 Industrial Blvd.  Blainville, Quebec J7C 3V4  Phone: (450) 430-9230 Fax: (450) 430-4642</p> <p>RCRA liquid and solid, industrial wastes</p>
<p>Stericycle (aka PSC Environmental Syst)  275 Allens Avenue  Providence, RI 02905  Phone: (401) 781-6340 Fax: (401) 781-9710</p> <p>RCRA Liquid and Solid Organics, Oils, Solvents, Pesticides, Chlorinated Hydrocarbons, empty drums</p>	<p>Stericycle (Republic Environmental Systems)*  2869 Sandstone Drive  Hatfield, PA 19440  Phone: (215) 822-2676 Fax: (215) 822-1293</p> <p>RCRA &amp; TSCA industrial solid &amp; sludge, aqueous waste, contaminated soil, PCB waste, oil &amp; petroleum waste, organic waste</p>
<p>Ted Ondrick Company, LLC  58 Industrial Road,  Chicopee, MA 01020  Phone: (413) 592-2566 Fax: (413) 592-7451</p> <p>Petroleum contaminated soil</p>	<p>Tradebe Environmental Services, Inc.  136 Gracey Avenue  Meriden, CT 06451  Phone: (888) 276-0887 Fax: (203)238-6772</p> <p>RCRA, CRW Waste Oil, Fuel, Wastewater</p>

Tradebe Environmental Services, Inc. 50 Cross Street Bridgeport, CT 06610 Phone: (888) 276-0887 Fax: (203)238-6772  RCRA and CRW Waste Oil, Fuel, Wastewater	Triumvirate 263 Howard Street Lowell, MA 01852 Phone: (978) 453-7772 Fax: (978) 453-7775  RCRA & TSCA liquid and solid
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	US Ecology (Environmental Quality Detroit Inc.) 1923 Frederick Street, Detroit MI 48211 Phone: (734) 329-8017 Fax: (313) 923-3375  RCRA & CRW liquid wastewater
Waste Management RCI Fitchburg Landfill Fitchburg Princeton Road, Westminister, MA 01473 Phone: (978) 355-6821 Fax: (978) 355-6317  Solid: MSW, non-hazardous waste, C&D, contaminated soil for use as cover material under MADEP COMM-97 policy	Waste Management of New Hampshire (Turnkey Landfill) P.O. Box 7065 90 Rochester Neck Road Rochester, NH 03839 Phone: (603) 330-2170 Fax: (603) 330-2130  MSW, C&D, PCB remediation waste (<50 ppm), virgin petroleum contaminated soil, CRW solid waste
CRW – Connecticut Regulated Waste; C&D – Construction and Demolition; MSW - Municipal Solid Waste	

\* - Please note that if this facility is to be used, each waste determination letter will require an additional 10 day (or more) waiting period in addition to the 15 day lab period designated in the Specifications to allow for Pennsylvania Department of Environmental Protection (PADEP) review.

Note that 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.

## B. 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 current Spill Contractor Permit registration issued by the CTDEEP.
2. Hazard communication training for all employees performing this work.
3. Names of the treatment facilities, recycling facilities and/or disposal facilities the Contractor intends to use to receive each type of regulated item.

4. Names of the Hazardous Material Transporter(s) the Contractor intends to use to transport hazardous materials from this Project.
5. Copy of current Hazardous Material Transporter USDOT Certificate of Registration for each transporter.
6. Copy of current Hazardous Waste Transporter Permit for the State of Connecticut, the destination state(s), and all other applicable states for each transporter.

One (1) week prior to the start of work that will generate RCRA hazardous waste above conditionally exempt small quantities, the Contractor shall obtain from the Engineer a temporary EPA Hazardous Waste Generator ID number, for use in manifesting the waste.

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

### **C. Regulated Item Management Provisions**

#### **1. General Requirements**

The Contractor's OSHA Competent Person shall be in control on the Project 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 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.

## 2. Personnel Protection

Prior to commencing work, the Contractor shall provide hazard communication training to all subject employees as necessary in accordance with OSHA 29 CFR 1926.59 and 29 CFR 1910.1200, and instruct all such 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 for its affected workers 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 that workers are afforded appropriate respiratory protection.

The Contractor shall provide and require all workers to wear appropriate personal 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 waste.

## 3. Regulated Item Management Work Procedures

Prior to transportation arrangements, 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 on behalf of ConnDOT. Upon approval, the Contractor shall forward such forms to the appropriate disposal facilities for acceptance.

The Contractor shall utilize appropriate engineering controls and safety and protective equipment while performing the work in accordance with ConnDOT, OSHA, USEPA, USDOT, CTDEEP and Connecticut Department of Public Health (DPH) regulations.

The Contractor shall employ work practices so as to prevent breakage and spills of regulated material. 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 affected areas decontaminated, to the acceptance of the Engineer, by personnel trained in hazardous waste operations and 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 ConnDOT, USEPA, OSHA, CTDEEP and USDOT labels and markings shall be affixed to the waste containers, placards on vehicles (when required), and hazardous materials shipping papers, such as waste manifests and bills of lading, shall be completed.

**Prior to construction activity which would disturb such materials, properly remove, handle, pack, label, transport, manifest and recycle or dispose of the regulated items from those listed below:**

**The following hazardous/ regulated materials, wastes and items have been identified.**

#### **EAST HAVEN REPAIR FACILITY**

- **Connecticut Regulated Waste (CRW)**

#### **EAST WINDSOR MAINTENANCE FACILITY**

- **Connecticut Regulated Waste (CRW)**

#### **HADDAM MAINTENANCE FACILITY**

- **Connecticut Regulated Waste (CRW)**

#### **HARTFORD BRIDGE & ELECTRICAL MAINTENANCE FACILITY**

- **Connecticut Regulated Waste (CRW) – PCB/DEHP ballasts, oil from generator**
- **Universal Waste (UW) – Electronic ballasts, Hg lamps, Printed Circuit Boards/generator control panels/motion/heat sensors**

**See Table 6 from the Pre-Demolition Investigative Survey for the Inventory of HAZMAT Regulated item.**

#### **MANSFIELD MAINTENANCE FACILITY**

- **Universal Waste (UW) – Printed Circuit Boards from control panels associated with generator**
- **Hazardous material Class/Division 2.1 (propane)**

**See Table 6 from the Pre-Demolition Investigative Survey for the Inventory of HAZMAT Regulated item.**



#### 4. 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 requirements 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.

#### 5. Project Closeout Documents:

Within thirty (30) days of completion of the on-site project work, the Contractor shall submit to the Engineer copies of the following completed documents:

- a. Hazardous Waste Manifests
- b. Waste Shipment Records/Bills of Lading
- c. Recycling Receipts

**All of these documents must include the signature of an authorized disposal facility representative acknowledging receipt of the 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 removal at the project sites, and all equipment, materials, tools and labor incidental to the work.

Final payment will not be made until completed copies of all Manifest(s), Waste Shipment Records, Bills of Lading and/or Recycling Receipts 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.

<u>Pay Item</u>	<u>Pay Unit</u>
Handling and Disposal of Regulated Items	Est.

## **ITEM #0101183A – PCB BUILDING MATERIALS REMOVAL**

### **Description:**

This work shall be conducted at East Haven Repair Facility and Haddam Maintenance Facility in Connecticut.

Work under this item shall include the abatement of: PCB-containing caulk and glazing (Federally-regulated and/or non-federally/state regulated PCB) and removal of abutting building materials (e.g. concrete/block, brick, metal door/window framing, window pane glass, wood, etc.) as identified in the Contract Plans and PCB Site Remedial Plan, that are coated with or impacted by PCB-containing caulk and/or glazing (“PCB Waste”).

The work shall be performed by persons who are knowledgeable, qualified, trained and licensed in the removal, treatment, handling, and disposal of PCB contaminated wastes and the subsequent cleaning of the affected environment. Where areas to be abated contain materials with PCBs and asbestos the workers shall also have all the required asbestos licensing/training as required in Specification Section 0020801A.

These Specifications govern all work activities that disturb PCB-containing caulk and glazing and associated building material. All activities shall be performed in accordance with, but not limited to, OSHA Regulation 29 CFR 1926, EPA PCB Regulation 40 CFR Part 761, CTDEEP PCB Statutes 22a-463 through 22a-469 inclusive, and CTDEEP Remediation Standards Regulations 22a-133k-1 through 3, where applicable.

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to this work.

**This Specification will be utilizing the *PCB Bulk Product Waste Reinterpretation Memorandum* issued October 24, 2012 to designate building material (i.e. substrate) “coated or serviced” with PCB Bulk Product Waste at the time of designation for disposal to be managed as a PCB Bulk Product Waste. Therefore, any PCB Remediation Waste (>1 ppm) generated during this abatement (brick, concrete, CMU, metal door/window framing, wood, etc) will be disposed of as PCB Bulk Product Waste (>50 ppm) as these building materials are still “coated or serviced” with the PCB Bulk Product Waste.**

Abatement work shall include the removal, transportation, and disposal of all PCB Wastes as identified on the Contract Documents, the PCB Site Remedial Plan and Specifications prior to any phased or planned renovation/demolition work involving the subject PCB areas. All PCB abatement material shall be disposed of by the Contractor as PCB Bulk Product Waste and/or CTDEEP State Regulated waste in accordance with 40 CFR Part 761 and/or 22a-463 through 469 as applicable.

Deviations from these Specifications require the written approval from the Owner.

## **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 PCBs, the material shall be disposed of as PCB waste material. The cost to 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 six (6) mil thickness.

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.

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

Labels and warning signs shall conform to OSHA 29 CFR 1926, USEPA 40 CFR Part 761, CTDEEP 22a-463 through 469, and USDOT 49 CFR Part 172 as appropriate.

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.

The Contractor shall deliver and store materials in a manner to prevent contamination, segregation, freezing, and other damage.

## **Construction Methods:**

### **(1) Pre-Abatement Submittals and Notices**

Submit the following documentation to ensure compliance with the applicable regulations. An up to date copy shall be retained at the job site at all times. Submission must be made prior to the Pre-abatement Meeting, which will be held prior to the start of abatement at the Engineers direction. The Abatement Contractor, PCB Engineer, and Owner's Representatives shall be present at the meeting.

- (a) The following must be provided to the Owner, Construction Administrator, and the PCB Engineer seven (7) days prior to starting work.
1. As related to the PCB abatement work, site-specific Health and Safety Plan including the Emergency Response Plan and provisions for decontamination and a contingency plan for unforeseen emergencies. The Owner or PCB Engineer shall review such a plan only to determine if the plan meets basic regulatory requirements and the minimum requirements of these Specifications. The review will not determine the adequacy of the plan to address all potential hazards, as that remains the sole responsibility of the Contractor.
  2. A Contractor Site PCB Work Plan describing the containment and air monitoring that will be employed during abatement activities. This work plan should also include information on how and where wastes will be stored and disposed of, and on how field equipment will be decontaminated.
  3. Current certification of employee's OSHA health and safety training (HAZWOPER).
  4. Certification of additional required health and safety training for Supervisors.
  5. Qualifications and experience of the Site Safety Officer (SSO)
- (b) Seven (7) days prior to any worker accessing the site to perform the work described in this Section, the Contractor shall provide documentation, typed on company letterhead and signed by the Contractor, certifying that all employees assigned to the PCB abatement work listed therein have received the following:
1. Medical monitoring within the previous twelve (12) months, as required in 29 CFR 1910.120.
  2. 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).
- (c) At least seven (7) days prior to performing any abatement work that shall generate PCB wastes, the Contractor shall submit copies of the EPA/State-approved permits for the proposed Solid Waste, Chemical Waste, or Hazardous Waste landfills and/or high temperature incinerator and a waste profile approved by the proposed landfill/incinerator indicating that the waste materials to be generated are acceptable to the facility.
- (d) Seven (7) days prior to the start of abatement work, material information for any proposed encapsulant indicating that these materials conform to the specifications contained within, if applicable.

- (e) No abatement shall commence until a copy of all required submittals have been received and found acceptable to the Owner and the PCB Engineer. Those employees added to the Contractor's original list will be allowed to perform work only upon submittal, and receipt of, all the above required paperwork to the Owner and PCB Engineer.
- (f) Copies of all permits, licenses, certifications, including but not limited to, manifests and/or bill of lading for the removal, transport, and disposal of PCB waste material shall be submitted to the Owner and PCB Engineer no later than seven (7) business days after the Contractor receives such documents.
- (g) Notice shall be provided to the Owner and the PCB Engineer at least seven (7) business days prior to the start of work under this Specification. Such notice shall include an estimated completion date. If this work is phased over the duration of the project, then such notification requirements shall apply to each phase.

## **(2) PCB Abatement Provisions:**

### **(a) General Requirements for PCB Building Materials Removal**

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. The Contractor shall be prepared to work all shifts and weekends throughout the course of this work.

Prior to beginning work per these Specifications, the PCB 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 work.

Prior to the performance of any abatement work, the Contractor shall perform the following tasks.

Shutdown and isolate heating, cooling, and ventilating air systems to prevent contamination to the other areas of the buildings.

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 work in operation throughout the duration of the work.

Negative pressure must be maintained in each active interior work area, until the area achieves satisfactory verification and reoccupancy criteria and is approved by the Project Monitor to be deregulated.

Water service may not be available at the site. Contractor shall supply sufficient water for each shift to operate the decontamination 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.

The Contractor shall protect adjacent structures and surfaces from traffic or any other damage. The Contractor shall repair and reestablish damaged building materials that are to remain in place prior to acceptance of the work.

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

The PCB Engineer will provide a Project Monitor to oversee the activities of the Contractor. No PCB abatement work shall be performed until the Project Monitor is on-site.

## (b) Definitions

### Contaminant Zones

Contaminant zones are those areas of active abatement and the waste storage area.

### Abatement

The removal of PCB contaminated caulks/glazes and associated building materials in the manner specified in this section.

#### Federally-Regulated PCB Bulk Product Wastes

Federally-regulated PCB Bulk Product Waste, as defined in §761.3, means waste derived from manufactured products containing PCBs in a non-liquid state, at any concentration where the concentration at the time of designation for disposal is  $\geq 50$  ppm PCBs.

#### Non-federally or State Regulated PCB Waste

Non-federally or state regulated PCB waste means waste derived from manufactured products containing PCBs in a non-liquid state, at any concentration where the concentration at the time of designation for disposal is  $>1$  ppm and  $< 50$  ppm PCBs.

#### PCB Waste

PCB waste means PCB-containing caulk and glazing (Federally-regulated and non-federally or state regulated PCB) and impacted abutting building materials to the subject caulk and glazing.

#### PCB Site Remedial Plan

Item 0101183 – PCB Building Materials Removal

#### Remedial Action Level

Concentration to which PCB contaminated building materials must be removed to verify completion of the abatement work.

#### PCB Contaminated Building Materials

Consists of those caulks and glazings identified as PCB Bulk Product Wastes and/or non-federally/state regulated materials. Also may include the building materials in which the caulks and glazings are in contact with which may include, but not limited to, window/door frames, glass, brick, concrete, CMU, mortar, metal, wood, etc.

#### Suitable Waste Storage Container

A container in which PCB wastes are placed for storage prior to transport offsite for disposal that is water tight, lined, and equipped with a cover that prevents the infiltration of rainwater into the container.

#### Verification and Reoccupancy Sampling



Sampling performed by the Project Monitor to determine the completion of abatement activities as per the PCB Site Remedial Plan.

#### Waste Storage Area

The secured location in which the Contractor shall store PCB wastes prior to offsite transport for disposal. The Contractor shall consult with the Owner and the PCB Engineer to identify the location of Waste Storage Areas prior to generating any wastes. This area shall be secured and signed by the Contractor.

#### PCB Engineer

Responsible for overseeing PCB abatement work and for performing and evaluating verification and reoccupancy sample data on behalf of the Owner. The PCB Engineer shall be represented daily onsite by the Project Monitor.

#### Owner

The Owner is the Connecticut Department of Transportation (ConnDOT), as further defined in the General Conditions.

#### Project Monitor

The onsite representative for the PCB Engineer responsible for overseeing daily work activities. The Project Monitor shall approve all containments prior to performance of abatement work; perform sampling during and after abatement activities, and for verifying that abatement has been successfully performed and allowing containments to be removed for reoccupancy.

#### (c) Set-Up

All interior and exterior abatement areas are to be established in largely the same manner.

The abatement Contractor shall establish a Control Area around each area where removal actions are being performed. Only properly trained personnel associated with the removal or abatement will be allowed within the Control Areas that will be established by placing barriers with signs indicating that access to the area is restricted. The Contractor's site supervisor will maintain the Control Areas and escort unauthorized personnel from the area promptly. Only those personnel actively working on the removal or abatement, will be allowed within the Regulated/Containment Area and they shall be equipped with appropriate Personal Protective Equipment (PPE).

The Contractor shall pre-clean the work areas using HEPA filtered equipment (vacuum) and/or wet methods as appropriate, collecting and properly containing all dust and debris identified as PCB 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 PCB 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.

The Contractor shall establish remote to the Regulated Area but within the Control Area, a Worker Decontamination Enclosure System consisting of Equipment Room, Shower Room and Clean Room in series.

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.

The Contractor shall ensure that no personnel or equipment be permitted to leave the Control Area until proper decontamination procedures (including HEPA vacuuming, wet wiping and showering) to remove all PCB debris have occurred. No PCB-contaminated materials or persons shall enter the Clean Room.

The Contractor shall 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.

For exterior work areas where federally regulated and/or state regulated PCB caulks are being removed and uncontaminated building substrates are remaining (i.e. no contaminated substrate removal), a Regulated Area will be established and ground surfaces will be covered with 2 layers of 6 mil polyethylene sheeting to capture/collect any debris generated, and secured to prevent movement. The sheeting will extend a minimum of ten feet beyond the building area to be remediated and will be adhered to the building to prevent it from moving during the course of abatement. Barrier tape will be used to delineate this as the regulated area.

For exterior work areas where federally regulated and/or state regulated PCB caulks AND contaminated building substrates are being removed, a Containment Enclosure shall be constructed by the Contractor 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 walls with a layer of six (6) 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. Contiguous to the containment, construct a single chamber airlock from six (6) mil polyethylene sheeting for entry/exit purposes into the regulated area. Where no walls exist (such as exterior work spaces) or a room is to be divided in half, the polyethylene sheeting itself shall comprise the containment structure and shall be supported with materials which will form the containment structure and which shall maintain such integrity throughout the duration of use.

For interior work areas involving federally regulated and/or state regulated PCB caulks/glazes, a Containment Enclosure as described above shall be constructed, AND the Contractor shall also create a negative pressure differential within the containment 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 to establish a Negative Pressure Enclosure (NPE). 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.

Conspicuously label and maintain emergency and fire exits from the Regulated Area satisfactory to fire officials.

The Contractor shall post warning signs to deter unauthorized personnel from entry. Additional signs may require posting following construction of workplace enclosure barriers.

#### (d) Personnel Protection

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

The Contractor shall provide and require all workers to wear protective clothing in the Regulated Areas where PCB contamination exists or is likely to exist. Protective clothing shall include impervious coveralls with elastic wrists and ankles, head covering, gloves and foot coverings.

Respiratory protection shall be provided and selection shall conform to the requirements of OSHA 29 CFR 1910.134 and 42 CFR Part 84. A formal respiratory protection program must be implemented in accordance with 29 CFR 1910.134.

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

All other qualified and authorized persons by the Owner and/or Contractor entering into a Regulated Area shall be required to adhere to the requirements of personnel protection as stated in this section and all other applicable provisions of the Contract. All unqualified and unauthorized persons shall be escorted outside of the Regulated Area and if due to other provisions of the Contract, escorted outside of the project site during the PCB work.

#### (e) PCB Abatement Procedures

The Contractor's Site Supervisor, as the OSHA Competent Person shall be at the site at all times during the performance of abatement work.

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

The Owner shall hire a PCB Engineer for the duration of the PCB abatement work. The PCB Engineer shall provide a Project Monitor to oversee the activities of the Contractor. After removal, verification sampling and reoccupancy wipe testing shall be performed by the Project Monitor. The area shall be considered cleaned when no visible caulk/dust residue remains and any required substrate verification/reoccupancy wipe samples are <1 ppm.

All workers and authorized persons shall enter and leave the Regulated Area through the contiguous airlock, leaving contaminated protective clothing in the airlock for disposal of as PCB contaminated waste. No one shall eat, drink, smoke, chew gum or tobacco, or apply cosmetics while in a Regulated Area.

Phasing of the work areas is to be coordinated with the Construction Manager. Phase areas may be combined or divided at the direction of the PCB Engineer/CM. Proceed through the sequencing of the work phases under the direction of the Engineer/CM.

### **EAST HAVEN REPAIR FACILITY**

**Federally-regulated PCB-containing caulk (classified as PCB Bulk Product Waste) are defined as any building material manufactured with total PCB concentrations  $\geq 50$  ppm by weight. All Federally-regulated caulk and glazing shall be removed by the Contractor. In addition associated porous building materials in contact with the subject caulks and glazes and to be generated as demolition waste shall also be removed to a depth as specified and managed as EPA Bulk Product Waste by the Contractor.**

- Remove and dispose of caulks/glazes presumed to potentially be  $\geq 50$  ppm including:
  - C1 – Clear Rubbery Caulk – Generator Room Louvers

**NOTES:**

- No verification sampling of remaining adjoining porous substrate surfaces associated with the subject caulks shall be required as there is “no knowledge” that the caulks are actually EPA PCB Bulk Product Wastes. With no direct knowledge of the caulks PCB content the caulks are simply being managed as PCB Bulk Product Waste for handling/disposal purposes.
- The *PCB Bulk Product Waste Reinterpretation Memorandum* issued October 24, 2012 is being utilized for waste management and disposal.
- PCB Bulk Product Waste (caulk) shall be disposed of in a “performance based” manner in accordance with 40 CFR 761.62(a), 62(b) and the October 24, 2012 Waste Reinterpretation Memo, and may be disposed of in a State permitted solid waste landfill, PCB TSCA Chemical Waste Landfill, RCRA Hazardous Waste Landfill, or high temperature incinerator.
- Components abutting and coated with the subject caulk/glaze shall also be removed and disposed of as EPA PCB Bulk Product Waste or the caulk/glazing will be removed to visual standards consistent with NACE Standard No.2, Near-White Blast Cleaned Surface Finish, for unrestricted use, in accordance with 40 CFR 761.79.

Non-federally/State regulated PCB-containing caulk, glazing and/or building product is defined as any building material manufactured with total PCB concentrations  $>1$  ppm and  $< 50$  ppm. All non-federally/state regulated caulk and glazing shall be removed by the Contractor.

- No caulks/glazes  $>1 < 50$  ppm were identified at East Haven Repair Facility.

**HADDAM MAINTENANCE FACILITY**

Federally-regulated PCB-containing caulk (classified as PCB Bulk Product Waste) are defined as any building material manufactured with total PCB concentrations  $\geq 50$  ppm by weight. All Federally-regulated caulk and glazing shall be removed by the Contractor. In addition associated porous building materials in contact with the subject caulks and glazes and to be generated as demolition waste shall also be removed to a depth as specified and managed as EPA Bulk Product Waste by the Contractor.

- Remove and dispose of caulks/glazes presumed to potentially be  $\geq 50$  ppm including:
  - C1 – Tan Rubbery Caulk – Generator Room Louvers (exterior)

**NOTES:**

- **No verification sampling of remaining adjoining porous substrate surfaces associated with the subject caulks shall be required as there is “no knowledge” that the caulks are actually EPA PCB Bulk Product Wastes. With no direct knowledge of the caulks PCB content the caulks are simply being managed as PCB Bulk Product Waste for handling/disposal purposes.**
- **The *PCB Bulk Product Waste Reinterpretation Memorandum* issued October 24, 2012 is being utilized for waste management and disposal.**
- **PCB Bulk Product Waste (caulk) shall be disposed of in a “performance based” manner in accordance with 40 CFR 761.62(a), 62(b) and the October 24, 2012 Waste Reinterpretation Memo, and may be disposed of in a State permitted solid waste landfill, PCB TSCA Chemical Waste Landfill, RCRA Hazardous Waste Landfill, or high temperature incinerator.**
- **Components abutting and coated with the subject caulk/glaze shall also be removed and disposed of as EPA PCB Bulk Product Waste or the caulk/glazing will be removed to visual standards consistent with NACE Standard No.2, Near-White Blast Cleaned Surface Finish, for unrestricted use, in accordance with 40 CFR 761.79.**

**Non-federally/State regulated PCB-containing caulk, glazing and/or building product is defined as any building material manufactured with total PCB concentrations >1 ppm and < 50 ppm. All non-federally/state regulated caulk and glazing shall be removed by the Contractor.**

- **No caulks/glazes >1<50 ppm were identified at Haddam Maintenance Facility.**

The Owner shall hire a PCB Engineer for the duration of the PCB abatement work. The PCB Engineer shall provide a Project Monitor to oversee the activities of the Contractor. After removal, verification sampling and reoccupancy wipe testing shall be performed by the Project Monitor. The area shall be considered cleaned when no visible caulk/dust residue remains and substrate verification samples are <1ppm and reoccupancy wipe samples are <10ppm.

During removal, the Contractor shall spray PCB containing building materials with water using airless spray equipment capable of providing a "mist" application to reduce airborne dust. 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 employ mechanical methods such as cutting, grinding, and pneumatic hammers to remove PCB contaminated wastes. The methods employed must not damage the integrity of the containment structure and shall not create a breach through which contaminated dust may escape. The Contractor shall be responsible for all costs associated with decontamination and remediation in the case of a containment breach.

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

The Contractor shall promptly place the PCB Waste material in disposal containers (six (6) mil polyethylene bags/ poly-lined dumpsters, etc.) as it is removed. Large components removed intact may be wrapped in one (1) layer 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 airlock. Bags shall be securely sealed to prevent accidental opening and leakage by taping in gooseneck fashion. Small components and PCB Waste material 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. Drums may not be placed intact into final waste disposal containers intact and may be reused by the Contractor after the contents have been emptied. However, any drums use to handle wastes must be broken down and disposed of properly with other PCB wastes.

All waste containers shall be leak-tight. Containers shall be decontaminated by wet cleaning and HEPA vacuuming within the airlock prior to exiting the regulated area. Wet clean each container thoroughly before moving to a Waste Holding Area.

If at any time during PCB Waste 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.

After completion of abatement work, all surfaces from which PCB Waste 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. Cleaning shall also include the use of HEPA filtered vacuum equipment.

The Contractor shall also remove and containerize all visible accumulations of PCB Waste and/or PCB 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 airlock 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

Once the Regulated Area surfaces have dried, the Project Monitor shall perform a thorough post abatement visual inspection. The Project Monitor will visually inspect the Regulated Area and the surrounding Control Area to determine that the Contractor has sufficiently decontaminated and removed any dust that might contain PCBs. All surfaces within the Regulated Area, including but not limited to ledges, beams, and hidden locations shall be inspected for visible residue. Evidence of dust contamination that would be indicative of PCB 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.

(f) Phased PCB Abatement Procedures

Should the potential exist for an unsafe condition to be produced by removing PCB contaminated building materials prior to removing clean materials, then the Contractor shall notify the Owner and the PCB Engineer and Project Monitor of such concerns and mitigate potentially unsafe conditions.

Should PCB contaminated building material need to remain to prevent an unsafe situation, the PCB Engineer shall collect the required verification samples prior to the performance of any demolition in the area. The Contractor shall then physically demark the line of clean building materials as determined by the verification sampling on the structure by painting or otherwise marking the structure so that it is clearly visible.

Once the area is marked, the Contractor may remove clean building materials as described elsewhere in the Contract Document. After the clean building materials have been removed to the marked line, PCB Contaminated building materials shall be abated according to the procedures stated in section 3.12 of this specification.

(g) Post-Abatement Verification/Reoccupancy Procedures (where applicable)

Federally-Regulated PCB-Containing Materials

In work areas where federally regulated PCB caulks/glazes have been removed and no associated building materials substrate impact has been identified, such that all of the associated building material substrates are to remain in place, or all associated impacted substrates are to be removed, the remedial standard to be achieved is appropriate cleaning of the substrate such no visible caulking/glazing/paint residue remains. The Project Monitor shall perform the visual inspection to verify appropriate cleaning.



In all areas where federally-regulated PCB Wastes have been removed along with some portion of associated porous building material substrates, the remedial standard to be achieved by all verification samples of the remaining building substrate is <1 ppm total PCBs. If this standard is achieved then additional reoccupancy testing will be performed as described below. If the remedial standard is exceeded, the Contractor shall be instructed to remove additional building materials as instructed by the PCB Engineer.

Where required, the PCB Engineer shall collect verification samples as per the EPA Region 1 Standard Operating Procedure for Sampling Concrete at the frequency specified in the approved PCB Site Remedial Plan. **Verification samples shall be collected every five (5) feet around any opening left behind by the removal.** The verification samples will be analyzed for PCBs using EPA Methods 3540 and 8082. Analysis of verification samples will be expedited but the Contractor shall expect 48 to 72 hours (these hours do not include weekend and/or holiday hours) delay until analytical results are available.

In all interior work areas and exterior work areas where an enclosure was used, following completion of the visual inspections and the collection and analysis of verification samples indicating that remediation goals have been achieved, the PCB Engineer shall collect one or two reoccupancy wipe samples of horizontal surfaces within the containment area where dust would be expected to accumulate within each containment. The PCB Engineer shall obtain expedited analyses of these samples from an outside laboratory, but the Contractor shall expect 48 to 72 hours (these hours do not include weekend and/or holiday hours) delay until analytical results are available. The PCB Engineer shall instruct the Contractor to perform additional decontamination if wipe sample results are  $\geq 10.0 \mu\text{g}/100 \text{ cm}^2$ . 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 wipe testing. When the Regulated Area passes the re-occupancy clearance, controls established by these Specifications may be removed.

Wipe sampling will not begin until after the area has received an acceptable post abatement visual inspection and verification sample results indicate compliance with remedial standards.

Analysis shall follow the requirements of EPA Methods 3540 and 8082.

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 for interior containment areas). New samples shall be collected in the Regulated Area. The process shall be repeated until the Regulated Area passes the test, with the cost of repeat sampling being borne entirely by the Contractor.

For a PCB Waste abatement project with more than one homogeneous Regulated Area, the release criterion shall be applied independently to each Regulated Area.

### Non-Federally/State Regulated PCB-Containing Materials

In work areas where Non-Federally/State Regulated PCB caulks/glazes have been removed and no associated building materials substrate impact has been identified, such that all of the associated building material substrates are to remain in place, or all associated impacted substrates are to be removed, the remedial standard to be achieved is appropriate cleaning of the substrate such no visible caulking/glazing/paint residue remains. The Project Monitor shall perform the visual inspection to verify appropriate cleaning.

In all areas where Non-Federally/State Regulated PCB Wastes have been removed along with some portion of associated porous building material substrates, or the potential impact to the porous substrate is as of yet unknown, verification sampling shall be conducted and the remedial standard to be achieved by all verification samples of the remaining building substrate is <1 ppm total PCBs. If this standard is achieved then additional reoccupancy testing will be performed as described below. If the remedial standard is exceeded, the Contractor shall be instructed to remove additional building materials as instructed by the PCB Engineer.

The PCB Engineer shall collect verification samples as per the EPA Region 1 Standard Operating Procedure for Sampling Concrete at the frequency specified in the approved PCB Site Remedial Plan. **Verification samples shall be collected every five (5) feet around any opening left behind by the removal.** The verification samples will be analyzed for PCBs using EPA Methods 3540 and 8082. Analysis of verification samples will be expedited but the Contractor shall expect 48 to 72 hours (these hours do not include weekend and/or holiday hours) delay until analytical results are available.

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 for interior containment areas). The Project Monitor will then perform a final visual to verify appropriate cleaning. The process shall be repeated until the Regulated Area passes the final visual, with the cost of repeat cleaning being borne entirely by the Contractor.

For a PCB Waste abatement project with more than one homogeneous Regulated Area, the release criterion shall be applied independently to each Regulated Area.

#### (h) Post Abatement Work Area Deregulation

The Contractor shall remove all remaining polyethylene, including critical barriers and airlocks with the 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 PCB Bulk Product Waste.

A final visual inspection of the work area shall be conducted by the Contractors Site Supervisor and the Project Monitor to ensure that all visible accumulations of PCB Waste materials have been removed and that no equipment or materials associated with the abatement work 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 Owner.

(i) Encapsulation Procedures (where applicable)

As applicable, the Contractor shall encapsulate building materials located in areas where renovation/demolition is not being performed as indicated (if any) on the Contract Drawings and these Specifications with an elastomeric, crack bridging, anti-carbonation, protective coating to be applied as the encapsulant.

The Contractor shall install materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Material Safety Data Sheets for complete handling recommendations.

All encapsulant materials shall be delivered in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged material shall be removed from the site immediately. All materials shall be stored off the ground and protect from rain, freezing or excessive heat until ready for use.

The Contractor shall not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature are 45°F (7°C) and rising. Precautions shall be taken by the Contractor to avoid damage to any surface near the work zone due to mixing and handling of the specified material.

The encapsulant shall be Sikagard 670W Clear, as manufactured by Sika Corporation, 1682 Marion Williamsport Road, Marion, Ohio, or equivalent. The Contractor shall provide submittals for the encapsulant to be used prior to bringing the materials onsite for use.

Elastomeric Acrylic Coating shall be one hundred percent (100%) Acrylic Emulsion with the following properties:

1. Water vapor permeable
2. Can bridge dynamically moving cracks
3. Crack bridging properties maintained at low temperatures
4. The material shall be resistant to dirt pick-up and mildew
5. Pot Life: indefinite
6. Tack Free Time 6 Hours @ 73°F, 50% Relative Humidity. Final Cure < 24 Hours

7. Carbon Dioxide Diffusion:  $\mu\text{CO}_2$  214,000 Carbon Dioxide Diffusion Resistance at 16 mils (400 microns)
8.  $\text{SdCO}_2 = 299$  ft. (equivalent air thickness) i.e. Approx. 9-in. of standard concrete cover.
9. Water Vapor Diffusion:  $\mu\text{H}_2\text{O}$  2,146 Water Vapor Diffusion Resistance at 16 mils  $\text{SdH}_2\text{O} = 2.6$  ft. (0.8m)
10. Moisture Vapor permeability (ASTM E96) 14.5 perms
11. Tensile Properties (ASTM D-412 Modified)
12. 7 day-Tensile strength 190 psi (1.3 MPa) - Elongation at break 820% - 340% @ 0°F (-18°C)
13. Crack Bridging (at 16 mils = 400 microns DFT)
14. Static (at -4°F/-20°C) 30 mils (0.75mm)
15. Dynamic >1000 cycles (at -4°F/-20°C) 12 mils (0.30mm)
16. Resistance to wind driven rain (TT-C-555B): No passage of water through coating
17. Weathering (ASTM G-23) 10,000 hours excellent, no chalking or cracking.
18. Solids Content: by weight – 62% by volume – 55%
19. Flame Spread and Smoke Development (ASTM E-84-94)
20. Flame Spread 5 Smoke Development 5 Class Rating A

Note: Tests above were performed with the material and curing conditions @ 71°F – 75°F and 45-55% relative humidity.

Building substrate to which the encapsulant coating is to be applied must be clean, sound, and free of surface contaminants. Remove dust, laitance, grease, oils, curing compounds, form release agents and all foreign particles by mechanical means. Substrate shall be in accordance with ICRI Guideline No. 03732 for coatings and fall within CSP1 to CSP3.

The Contractor shall stir materials to ensure uniformity using a low speed (400-600 rpm) drill and paddle. To minimize color variation, blend two batches of material. For small defects and cracks the Contractor shall apply Surface Filler by “Brush Grade” encapsulant generously over the center of the cracks. The Contractor shall feather material over a two-inch wide area and allow a minimum 24 hours to cure before overcoating. For large defects and cracks (cracks >20mils) the Contractor shall blow out the cut with oil-free compressed air and fill the crack with joint sealant conforming to specifications allowing for a small crest to remain as this will compensate for any shrinkage that might occur. The Contractor shall allow 24 hours-minimum cure before over coating with encapsulant.

For the final coating application, the Contractor shall apply by brush or roller over the entire area to be encapsulated by moving in one direction. The Contractor shall apply a minimum of two coats. Each coat should be applied at a rate not to exceed 100 sq. ft. per gallon. The total dry film thickness shall be minimum 8 - 10 dry mils per coat. Allow a minimum of 2 hours prior to

re-coating. When applying the coating, never stop the application until the entire surface has been coated. Always stop application at an edge, corner, or joint.

(j) Waste Disposal

If the Contractor chooses to store PCB Waste onsite prior to transport offsite for disposal, the Contractor shall construct a secured Waste Storage Area at a location agreed to by the Contractor and the PCB Engineer within contract limit lines. The contract limit lines are to be secured as described elsewhere in these Specifications and entry shall be limited to Contractor Personnel only. The Waste Storage Area shall enclose all Suitable Waste Storage Containers actively in use with temporary fencing. The fence shall be marked with a Large M<sub>L</sub> mark as specified in 40 CFR Part 761 Subpart C.

Unless otherwise specified by the Owner, all removed materials and debris resulting from execution of this work 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.

All abatement and decontamination wastes are to be handled and stored in accordance with the provision of 40 CFR Part 761 Subpart D. The Contractor shall be responsible for all costs associated with investigation and remediation of any releases due to their failure to handle abatement wastes in accordance with the regulatory 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. A single liner may be employed as long as it entirely covers the interior of the waste container.

All containers used to transport PCB Waste for disposal must be marked with a Large M<sub>L</sub> mark as specified in 40 CFR Part 761 Subpart C. The signs must be posted so that they are plainly visible.

Ensure all waste containers (bags, etc.) are properly packed, sealed and labeled with USEPA and USDOT shipping labels. For each shipment of PCB Waste, the Contractor shall complete a PCB waste shipment manifest.

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 PCB Waste shall have appropriate USDOT placards visible on all four (4) sides of the vehicle.

The Contractor shall dispose of federally regulated PCB Waste as performance based removal of PCB Bulk Product Waste per 40 CFR 761.62 and the *PCB Bulk Product Waste Reinterpretation Memorandum* issued October 24, 2012 at a solid waste landfill permitted under RCRA Title D or at a landfill permitted to receive such wastes (ex. RCRA hazardous landfill, facilities permitted to manage non-hazardous waste subject to 40 CFR 257.5-257.30 & a TSCA approved landfill). PCB waste (>50 ppm) shall be managed and profiled as such. Any further waste characterization sampling to satisfy contractors selected landfill shall be paid for by Contractor.

State regulated PCB Waste (>1 but <50 ppm) will be disposed of at a landfill that is permitted to receive such wastes (ex. solid waste landfill permitted under RCRA Title D, RCRA hazardous landfill & facilities permitted to manage non-hazardous waste subject to 40 CFR 257.5-257.30.) State regulated PCB waste shall be managed and profiled as such. Any further waste characterization sampling to satisfy contractors selected landfill shall be paid for by Contractor.

Any PCB Waste materials which also contain other hazardous contaminants shall be disposed of in accordance with the EPA's Resource Conservation and Recovery Act (RCRA), Toxic Substance Control Act (TSCA), and CTDEEP requirements. Materials may be required to be stored on-site and tested by the Project Monitor to determine proper waste disposal requirements.

#### (k) Decontamination

The Contractor shall decontaminate all moveable equipment that contacts PCB Wastes in accordance with the procedures specified in §761.79(c). The Contractor shall not remove any equipment from the Contaminant Zone until it has been properly decontaminated.

Specifically, the Contractor shall employ double wash/rinse procedures as specified in 40 CFR Part 761 Subpart S or swab non-porous surfaces that have contacted PCB wastes with a solvent as specified in §761.79(c)(2)(i). The Contractor shall segregate all liquid waste streams and be responsible for characterizing these wastes for disposal purposes. Solid wastes generated during decontamination shall be stored for disposal with the other PCB wastes generated during remediation activities.

The PCB Engineer shall be responsible for ensuring that decontamination procedures are followed and that wastes are appropriately characterized and disposed of properly.

#### (l) Project Closeout Data:

Provide the Owner and PCB Engineer, within 30 days after PCB Waste has been disposed of, a compliance package; which shall include, but not be limited to, the following:

1. Site Supervisor job log;
2. Completed waste shipment records.

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

**(m) Remedial Action Report**

The Remedial Action Report (RAR) will be prepared upon receipt of all analytical data confirming that the removal action was complete and receipt of certifications of treatment/disposal from the treatment/disposal facility. The RAR report will be prepared by the PCB Engineer and will include the following.

1. Site description
2. A description of field procedures
3. Verification and Reoccupancy sample locations and analytical results
4. Waste characterization sample data
5. Waste transport and treatment disposal information
6. Copies of waste manifests and bills of lading

**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 PCB Building Materials Removal shall include the specialty services of the PCB 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 of PCB Wastes, including close out documentation, providing adequate containers for storage of PCB wastes until they are removed from the site and the transport and disposal of these materials at an appropriate facility. Payment for the removal and disposal of PCBs shall not be made until the Contractor submits manifests with the mass of waste disposed and signed by the receiving facility and the Certificates of Disposal provided by the waste disposal facility for each manifested load to the Engineer. Once the manifest and Certificate of Disposal has been received, the Engineer shall make payment to the Contractor.

<u>Pay Item</u>	<u>Pay Unit</u>
PCB Building Materials Removal	Lump Sum

END OF SECTION

## **ITEM 0202317A – DISPOSAL OF HAZARDOUS MATERIALS**

### **Description:**

Work under this item shall include the loading, transportation and final off-site disposal of hazardous lead painted debris which has been generated in conjunction with work conducted under Item 0020902A – Lead Compliance for Building Demolition and Renovation.

### **EAST LYME PROPERTY AND FACILITIES REGION 2 FACILITY**

**After Toxicity Characteristic Leaching Procedure (TCLP) testing is conducted by the Engineer for proper waste characterization, if the debris is characterized as hazardous waste, this material shall be transported from the Project by a licensed hazardous waste transporter approved by the Department and disposed of at an EPA-permitted and Department-approved hazardous waste landfill within 90 days from the date of generation. Exact dimensions of lead painted materials to be demolished/removed should be confirmed by the Contractor to obtain accurate volumes and tonnage of potentially hazardous material to be generated for the purpose of calculating potential disposal costs.**

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

Clean Earth of North Jersey, Inc., (CENJ) 115 Jacobus Avenue, South Kearny, NJ 07105 Phone: (973) 344-4004; Fax: (973) 344-8652	Clean Harbors Environmental Services, Inc. 2247 South Highway 71, Kimball, NE 69145 Phone: (308) 235-8212; Fax: (308) 235-4307
Clean Harbors of Braintree, Inc. 1 Hill Avenue, Braintree, MA 02184 Phone: (781) 380-7134; Fax: (781) 380-7193	ACV Enviro(CycleChem)(General Chem Co) 217 South First Street, Elizabeth, NJ 07206 Phone: (908) 355-5800; Fax (908) 355-0562
Triumverate (EnviroSafe Corp Northeast) (Jones Environmental Services (NE), Inc.) 263 Howard Street, Lowell, MA 01852 Phone: (978) 453-7772; Fax: (978) 453-7775	US Ecology Environmental Quality Detroit, Inc. 1923 Frederick Street, Detroit, MI 48211 Phone: (800) 495-6059; Fax: (313) 923-3375
Stericycle (Republic Environmental Systems) 2869 Sandstone Drive, Hatfield, PA 19440 Phone: (215) 822-8995; Fax: (215) 997-1293	Clean Harbors – Spring Grove Facility 4879 Spring Grove Ave, Cincinnati OH 45322 Phone: (513) 681-6242; Fax: (513) 681-0869



Envirite of PA (US Ecology) 730 Vogelsong Road, York, PA 17404 Phone: (717) 846-1900; Fax: (717) 854-6757	Stablex, Canada, Inc. 760 Industrial Bl, Blainville Quebec J7C3V4 Phone: (451) 430-9230; Fax: (451) 430-4642
Environmental Quality Company: Wayne Disposal Facility 49350 North I-94 Service Drive Belleville, MI 48111 Phone: (800) 592-5489; Fax: (800) 592-5329	Stericycle (Northland Environmental, Inc.) (PSC Environmental Systems) 275 Allens Avenue, Providence, RI 02905 Phone: (401) 781-6340; Fax: (401) 781-9710

**Materials:**

Not used

**Construction Methods:****A. Submittals**

The apparent low bidder shall submit in writing, within fourteen (14) days after Bid opening the following documentation:

1. List of the names of the hazardous waste disposal facilities (from the above list) that the bidder, if it is awarded the Contract, will use to receive hazardous material from this Project;
2. Copies of the attached "Disposal Facility Material Acceptance Certification" form from each facility, which shall be signed by an authorized representative of each disposal facility;
3. Copies of each facility's acceptance criteria and sampling frequency requirements.

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.

**Prior the generation any hazardous waste**, the Contractor shall notify the Engineer of its selected hazardous waste transporter and disposal facility. The Contractor must submit to the Engineer the following documentation:

1. Transporter's current US DOT Certificate of Registration;
2. Transporter's current Hazardous Waste Transporter Permits for the State of Connecticut, the hazardous waste destination state and any other applicable states.

The Engineer will then obtain an EPA ID number that he will forward to the Contractor. Any changes in transporter or facility shall be immediately forwarded to the Engineer for review.

B. General:

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

The Engineer will sample materials of lead painted waste stream debris for final waste characterization at a frequency established by the selected 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 has completed generating the building material debris with lead paint and notifies the Engineer which facility it intends to use and that the material ready for sampling. The turnaround time ends with the Contractor's receipt of the laboratory analytical results. Any change of intended 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, including disposal facility waste profile sheets. It is solely the Contractor's responsibility to co-ordinate the disposal of hazardous materials with its selected treatment/recycling/disposal facility(s). Upon receipt of the final approval from the facility, the Contractor shall arrange for the loading, transport and treatment/recycling/disposal of the materials in accordance with all Federal and State regulations. **No claim will be considered based on the failure of the Contractor's disposal facility(s) to meet the Contractor's production rate or for the Contractor's failure to select sufficient facilities to meet its production rate.**

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

Hazardous waste materials are to be properly packed and labeled for transport by the Contractor in accordance with EPA, CTDEEP and USDOT regulations.

All hazardous waste manifests utilized to accompany the transportation of the waste material shall be prepared by the Contractor and signed by an authorized agent representing ConnDOT, as Generator, for each load of material that is packed to leave the site. The Contractor shall forward the appropriate original copies of all manifests to the Engineer the same day the material leaves the Project site.

A load-specific certificate of disposal (i.e. completed uniform hazardous waste manifest) signed by the authorized agent representing the waste disposal facility, shall be obtained by the Contractor and promptly delivered to the Engineer for each load.

### C. Material Transportation

Materials determined to be hazardous shall be transported in compliance with the applicable federal/state regulations. Transport vehicles shall not have any indentations or damage and must be free from leaks, and discharge openings must be securely closed during transportation.

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

- All vehicles departing the site are to be properly logged to show the vehicle identification, driver's name, time of departure, destination, and approximate volume, and contents of materials carried. Vehicles shall display the proper USDOT placards for the type and quantity of waste;
- No materials shall leave the site unless a disposal facility willing to accept all of the material being transported has agreed to accept the type and quantity of waste;
- Documentation must be maintained indicating that all applicable laws have been satisfied and that the materials have been successfully transported and received at the disposal facility; and,
- The Contractor shall segregate the waste streams (i.e. concrete, wood, etc.) as directed by the receiving disposal facility.

**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 Hazardous 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 Hazardous 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.

**E. Project Closeout Documents:**

The Contractor shall provide the Engineer, within 30 days of completion of the work, a compliance package; which shall include, but not be limited to, the following:

1. Completed Hazardous Waste Manifests (signed by authorized disposal facility representative)
2. Completed Waste Shipment Records/Bills of Lading (signed by authorized disposal facility representative)
3. Completed Weigh Bills (indicating each loads net weight).

**Method of Measurement:**

The work of "DISPOSAL OF HAZARDOUS MATERIALS" shall be measured for payment as the actual net weight in tons of material delivered to the treatment/disposal facility. Such determinations shall be made by measuring each hauling vehicle on the certified permanent scales at the treatment/recycling facility. Total weight shall be the summation of weigh bills issued by the facility specific to this project and waste stream.

The disposal of lead painted debris, originally anticipated to be hazardous, but determined by characterization sampling not to contain hazardous concentrations of lead will not be measured for payment under this Item. Disposal of these materials will be handled in accordance with the provisions of Item 0020902A – Lead Compliance for Building Demolition and Renovation.

The collection and treatment/disposal of materials and liquids generated during equipment decontamination activities or personal protective equipment (PPE) shall be considered incidental to work under this Item and will not be measured for separate payment.

**Basis of Payment:**

This work shall be paid for at the contract unit price per ton, which price shall include the processing, loading and transportation of said materials from the waste stockpile area to the treatment/disposal facility; the treatment/disposal or recycling of said materials; the preparation of manifests and fees paid; and all equipment, materials, tools, and labor incidental to loading, transporting, treating/recycling and disposal of materials.

No separate payment shall be made under this Item for the on-site processing, transportation and treatment/disposal of materials not found to be hazardous based upon characterization sampling results.

No separate payment shall be made for the disposal of wastes generated in conjunction with equipment decontamination or the disposal of personal protective equipment (PPE). The cost of such disposal shall be considered incidental to the work under this Item.

Final payment will not made until completed copies of all Manifest(s) and Bills of Lading signed by an authorized disposal facility representative and all associated weigh bills indicating each loads net weight have been provided to the Engineer. Once completed and facility-signed copies of all Manifest(s), Bills of Lading, and associated weigh bills have been received in their entirety, the Engineer will review and make the final payment to the Contractor.

<u>Pay Item</u>	<u>Pay Unit</u>
Disposal of Hazardous Materials	Ton

## **ITEM #0601365A – CONCRETE PAD**

### **Description:**

Work under this item shall consist of furnishing and placing concrete pads for the generator at the locations shown on the plans.

### **Materials:**

Comply with Form 817, Section M.03, "Portland Cement Concrete" Class F. Comply with Form 817, Article M.06.01, "Reinforcing Steel". Comply with Form 817, Article M. 02.01, "Granular Fill"

### **Construction Methods:**

Comply with Form 817, Section 6.01, "Concrete for Structures". Comply with Form 817, Section 6.02, "Reinforcing Steel". Comply with Form 817, Section 2.13, "Granular Fill".

The contractor shall anticipate the need for cold weather concreting.

Testing for the Concrete:

- A. Testing and Inspecting: The contractor shall engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports. The reports shall be turned over to the Engineer.
- B. Inspections:
  - 1. Steel reinforcement placement.
  - 2. Verification of use of required design mixture.
  - 3. Concrete placement, including conveying and depositing.
  - 4. Curing procedures and maintenance of curing temperature.
  - 5. Verification of concrete strength before removal of shores and forms.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
  - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd. , plus one set for each additional 50 cu. yd. or fraction thereof.
    - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31.
  - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
  - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
  - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi .
9. Test results shall be reported in writing to the Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.
11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Engineer.

12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
  13. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract.
- D. Measure floor and slab flatness and levelness according to **ASTM E 1155** within 48 hours of finishing.

**Method of Measurement:**

This work will be measured for Payment by the actual number of cubic yards of concrete pad installed, tested, and accepted.

**Basis of Payment:**

This work will be paid for at the unit price per cubic yard for “Concrete Pad” complete in place, which shall include all material including concrete, reinforcing steel, granular fill, equipment, tools, excavation, labor and testing incidental thereto.

<u>Pay Item</u>	<u>Pay Unit</u>
Concrete Pad	CY



## **ITEM #0604524A – STAND-BY POWER GENERATION SET**

**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 817 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 “Stand-by Power Generation Set” complete.

**Basis of Payment:** This item will be paid for at the contract lump sum price for “Stand-by Power Generation Set”, which price shall include all administrative and procedural requirements, material, equipment, labor, and work incidental thereto.

### **PAY ITEM**

Stand-by Power Generation Set

### **PAY UNIT**

LS

## **ITEM #0651743A – 6” POLYVINYL CHLORIDE PIPE**

### **Description:**

This item shall consist of furnishing and installing polyvinyl chloride pipe for use as drains where shown on the plans or as ordered by the Engineer.

Submit the following in accordance with Form 817 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR - SUBMITTALS.

1. Product Data for all materials.

### **Materials:**

PVC Pipe and Fittings: The pipe shall meet the requirements of Form 817, Subarticle M.08.01-20 “PVC Pipe” or M.08.01-21 “PVC Gravity Pipe” and shall be schedule 40.

Bedding Material: Bedding material shall meet the requirements of Form 817, Article M.08.03-1.

### **Construction Methods:**

General: Do not store plastic pipe and fittings in direct sunlight. Protect pipe, fittings, and seals from dirt and damage. The open ends of pipe shall be closed with a watertight plug at times when pipe laying is not in progress. Support during storage to prevent sagging and bending.

Pipe: The pipe shall be inspected by the Engineer for damage or defects before being placed in the trench. Damaged or defective pipe shall not be installed.

Pipe shall be installed in accordance with the manufacture’s recommendations, unless otherwise directed. The Contractor shall install the pipe in the locations and to the depths as shown on the plans.

Pipe fittings shall be laid so as to form a close concentric joint with the adjoining pipe to avoid sudden offsets of the flowline. Pipe sections shall be joined together to form a watertight seal and in accordance with the manufacture’s recommendations.

Make changes in direction using appropriate branches, bends, and long sweep bends. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of piping in direction of flow is prohibited.

Where shown on the plans or directed by the Engineer, the Contractor shall connect polyvinyl chloride plastic pipe or outlets to existing or proposed drainage systems or structures. This work

shall be performed in a workmanlike manner satisfactory to the Engineer by installation of tees or wyes branches or by providing a hole in the main line.

Bedding: Placement of bedding material shall comply with section 6.51.03 of Form 817.

Cleaning: Clean interior of piping. Remove dirt and debris as work progresses. Flush with potable water.

Trenching: Trench excavation and backfilling for Polyvinyl Chloride Pipe shall be in accordance with Form 817, Article 02.05.03. The dimensions of the trench shall be as indicated on the plans or as ordered. Where the bottom of the trench is unstable or in rock, the trench shall be excavated 6 inches deeper and an additional 6 inch layer of granular fill or aggregate similar to that used to fill the trench shall be placed and compacted in the trench.

**Method of Measurement:**

This work will be measured for payment by the number of linear feet of Polyvinyl Chloride Plastic Pipe completed by the Contractor and accepted by the Engineer.

**Basis of Payment:**

This work shall be paid for at the Contract unit price per linear foot for “Polyvinyl Chloride Plastic Pipe,” of the type specified, complete in place, which price shall include all materials, fittings, equipment, tools, labor and work incidental thereto.

Additionally, the lineal foot price shall include trench excavation, disposing of excess materials, dewatering, furnishing and placing bedding material, restoring turf and all other work shown or specified for furnishing and installing “Polyvinyl Chloride Plastic Pipe” as shown on the plans and specified herein is also included.

For item above, where rock is encountered, the additional efforts to excavate will be paid as “Rock in Trench Excavation 0’-10’ Deep”, in accordance with Article 2.05.05, Form 817.

<u>Pay Item</u>	<u>Pay Unit</u>
6” Polyvinyl Chloride Plastic Pipe	LF

## **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.

### **Materials:**

Steel bollard: Schedule 80 galvanized steel pipe, 8 inch nominal size (8.625" O.D.), conforming to the requirements of ASTM-A53.

Concrete: Shall meet the requirements of Form 817, Section M.03, "Portland Cement Concrete". Class A. Testing for the concrete shall be performed according to Specification No. 0601365A.

Polyethylene sleeve. Bumper (Bollard) Post Sleeve #PLS1009, as manufactured by New Pig Corporation or approved equivalent. Sleeve shall be yellow in color with ¼"-thick polyethylene shell.

### **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. The polyethylene sleeve shall be installed as recommended by the manufacturer.

The contractor shall anticipate the need for cold weather concreting. Cold weather concreting shall be in accordance with Form 817, Subarticle 6.01.03-2(c).

### **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, labor, and testing incidental thereto.

Pay Item  
Bollard

Pay Unit  
EA

## **ITEM #0969070A - CONSTRUCTION FIELD OFFICE FURNISHINGS AND EQUIPMENT**

**Description:** This item requires that all equipment, labor, materials, service contracts, maintenance, replacements, and incidental work necessary to maintain said equipment, be provided by the Contractor, for the duration of the work, and if necessary, for a close-out period determined by the Engineer. The equipment is for the exclusive use of CTDOT forces and others who may be engaged to augment CTDOT forces with relation to the contract. Ownership and liability of the equipment shall remain with the Contractor.

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

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

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

The following equipment shall be provided:

QTY	Description:
1	Digital Camera as specified below under <u>Computer Hardware and Software</u> . All supplies and maintenance shall be provided by the Contractor.
1	Concrete Curing Box as specified below under <u>Concrete Testing Equipment</u> .
1	Concrete Air Meter as specified below under <u>Concrete Testing Equipment</u> .
1	Concrete Slump Cone as specified below under <u>Concrete Testing Equipment</u> .
1	Smart Phones as specified under <u>Hardware and Software</u> .

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

Hardware and Software: Digital Cameras, Flip Phones and Smart Phones must meet the requirements of this specification as well as the latest minimum specifications posted, as of the project advertising date, at CTDOT's web site <http://www.ct.gov/dot/cwp/view.asp?a=1410&q=563904>

Within 10 calendar days after the signing of the Contract but before ordering/purchasing the Digital Camera(s), Flip Phones, or Smart Phones, the Contractor must submit a copy of their proposed order(s) with catalog cuts and specifications to the CTDOT Administering District for review and approval. The Contractor will be solely responsible for the costs of any equipment purchased without approval.

After the approval of the hardware/software, the Contractor must coordinate delivery with the administering Construction District.

The Contractor shall provide all supplies, maintenance, and repairs (including labor and parts) for the hardware/software, for the duration of the Contract. All repairs must be performed with-in 48 hours. If the repairs require more than a 48 hours then an equal or better replacement must be provided.

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

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.

- 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.

All testing equipment will remain the property of the Contractor at the completion of the project.

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

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

**Basis of Payment:** The furnishing and maintenance of the construction field office furnishings and equipment will be paid at the listed unit price per month for the respective item “Construction Field Office Furnishings and Equipment”, which price shall include all material, equipment, labor, service contracts, licenses, repair or replacement of hardware and software, related supplies and work incidental thereto, as well as any other costs to provide requirements of this specification.

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

## **REQUIRED PERMITS**

Flood Management General Certification

## **PERMITS AND/OR REQUIRED PROVISIONS**

The following Permits and/or and Required Provisions follow this page are hereby made part of this Contract.

- **PERMITS AND/OR PERMIT APPLICATIONS**
  - **Flood Management – General Certification**      **Acquired: November 27, 2018**
  
- **Construction Contracts - Required Contract Provisions (State Funded Only Contracts)**



**INDEX OF CSI-FORMATTED SPECIFICATIONS AND  
CORRESPONDING FORM 817 ITEM NUMBER**

**FACILITIES GENERATOR INSTALLATION AND REPLACEMENT  
IN VARIOUS TOWNS  
STATE PROJECT NO. 0170-3476**

<u>Item #</u>	<u>CSI Sect.</u>	<u>Description of Item</u>
<b>DIVISION 13 - SPECIAL CONSTRUCTION</b>		
0604524A	132180	TANK MONITORING SYSTEM
<b>DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING</b>		
0604524A	231123	FACILITY NATURAL-GAS PIPING
<b>DIVISION 26 - ELECTRICAL</b>		
0604524A	260519	LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
0604524A	260526	GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
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0604524A	260553	IDENTIFICATION FOR ELECTRICAL SYSTEMS
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0604524A	264313	SURGE PROTECTION FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

## SECTION 132180 - TANK MONITORING SYSTEM

### PART 1 - GENERAL

#### 1.1 SUMMARY:

- A. This section includes the complete connection of the generator in-tank probes to the existing Tank Monitoring System and all the components/accessories required for such connection as indicated on the Plans and this specification.
- B. The following contain requirements that relate to this Section:

- 1. Division 26 Section 263213, "Engine Generators."

#### 1.2 ACTION SUBMITTALS:

- A. Submit the following in accordance with Form 817 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.
- B. Product Data: Include rated capacities of selected model clearly indicated, furnished specialties and accessories; wiring diagrams; and installation and start-up instructions.

#### 1.3 INFORMATIONAL SUBMITTALS:

- A. Quality Assurance Submittals:
  - 1. Installer Certifications as specified in Part 1.4, "Quality Assurance."
  - 2. Field quality control test reports as specified in Part 3.2, "Field Quality Control."

#### 1.4 QUALITY ASSURANCE:

- A. The tank monitoring system manufacturer shall identify the approved distributor and repair staff located within a 50 mile radius of the Project Site, staffed with factory trained engineers fully capable of providing instruction, routine maintenance and 24 hour emergency repair service on all system components. Emergency repair service is to be available within a 24-hour period of time. Spare parts required for the system installed should be available within 2-4 calendar days.
- B. The Tank Monitoring System/in-tank probe installer shall be certified to program and start-up the system.

- C. The Tank Monitoring System/in-tank probe installer shall provide the engineering, installation, calibration, software programming and check-out necessary for a complete and fully operational tank monitoring system.
- D. The Tank Monitoring System/in-tank probe installer shall have:
  - 1. Adequate experience and verifiable history in the installation of in-tank probes and tank monitoring systems matching the criteria defined in this Specification.
  - 2. Proven expertise and experience in dealing with coordination of installing in-tank probes and tank monitoring systems for municipal fueling facilities.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS:

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work are limited to the following:
  - 1. Pneumercator.
- B. “Or Equal” manufacturers will not be considered for this project due to existing equipment, serviceability, and training concerns.

### 2.2 GENERAL:

- A. The installer shall install the generator in-tank sensors (probes), all the conduit/conductors required along with the appropriate explosion proof fittings. The installation includes steel pipe risers, probe cap and adaptor, etc. Some locations require for the installer to add additional monitoring channels at the Tank Monitoring System as called on the plans and on Part 2.5 of this specification. The installer shall be a qualified installer capable of performing the connections, installing accessories, and performing any reprogramming of the existing Tank Monitoring System.
- B. The tank monitoring system (hereinafter referred to as the system) shall be capable of monitoring 8 tanks, 4 pressurized lines, and 24 liquid sensors.
- C. The system shall be capable of and suitable for monitoring Fuel Oil, Gasoline, Diesel Fuel, E85 Ethanol, Waste Oil, and Wastewater in aboveground and underground storage tanks and oil-water separators.
- D. The system is required to be fully-compatible with the ConnDOT standard Automated Fuel Management System, including the ability to interface with the Headend. The Automated Fuel Management System is specified in CSI Division 13 Section 132160, “Installation of New Fuel Facility.”

## 2.3 CONSOLE:

- A. The console shall be microprocessor-based, of a flexible and modular design so as to accept future system upgrades, and equipped with the following features:
  - 1. All necessary electronics and hardware to continuously accept, process, display, print, and store all probe and sensor data, reporting not only operating conditions, but also system malfunctions or failures contained within a single secured enclosure.
  - 2. Front panel display for on-site viewing of all inventory, leak detection, and alarm information.
  - 3. Front panel annunciator to annunciate alarm or system error conditions. Acknowledgment via front panel control keys shall be programmable to silence alarm horn for all previous conditions.
  - 4. Front panel control keys for on-site control of the system.
  - 5. A printer, of minimum 24 column width, shall provide hard copy reports for documentation of inventory, leak detection, alarm information, etc. Hard copy reports shall exit from the front panel.
  - 6. A back-up battery and/or non-volatile memory shall maintain all configuration data in the case of a power outage. The system's memory shall be capable of storing the most recent inventory, leak detection, and alarm information.
- B. The console shall consist of, but not be limited to, 3 compartments to separate intrinsically safe wiring and devices, high power wiring and devices, and communications wiring and devices.
  - 1. Intrinsically Safe Wiring and Devices. The system shall have the ability to accept 8 in-tank magnetostrictive probes, 4 line leak detectors, and 24 liquid sensors.
    - a. Console shall be UL-listed as intrinsically safe.
    - b. Sensor input electronics shall include support for supervised wiring between the console and the sensor to identify short or open-circuited wiring.
    - c. All probe and leak sensor inputs shall be protected against voltage spikes, such as "near hit" lightning activity.
  - 2. High Power Wiring and Devices. The system shall have the ability via relays, controllers, etc., to actuate external audible and visual alarm devices, monitor the activity of the submersible pumps and valves, etc. Relays shall be UL-listed devices having the following capabilities and features:
    - a. Relays shall be individually programmable via the control keys or the communications interfaces to trigger on any combination of events, including, but not limited to, leak, setpoint, water, theft, or contact closure input.
    - b. Relays shall be individually programmable for, or have connections for, normally energized/de-energized operation.

- c. Relays shall be individually programmable to enable or disable front panel control key acknowledgment. If enabled, acknowledgment shall restore relay to its normal state.
  - d. The system shall allow the programmed activation of a second relay for any event listed above. This feature shall provide isolated control and signaling outputs.
  - e. Contact closure inputs shall be individually programmable for normally open/closed operation.
  - f. Contact closure inputs shall be individually programmable as an acknowledge or gating function to any relay, to trigger an alarm condition, and for pump override control applications.
3. Communications Wiring and Devices. The system shall have a minimum of 4 communications ports with the following capabilities:
- a. The ability to communicate with locally attached electronic devices (Automated Fuel Management System and printer) through RS-232 ports.
  - b. The ability to communicate with networked electronic devices (Headend) through a factory installed network interface card. An internal network card shall be installed within each console.

#### 2.4 IN-TANK PROBES:

- A. The probes shall be magnetostrictive type suitable for leak detection and inventory management in both underground and aboveground storage tanks. Unless otherwise noted, probes shall include 2 floats (product and water), and shall also include a minimum of 5 temperature sensors along its length to allow product temperature averaging.
  - 1. Temperature measurement accuracy of  $\pm 0.5^{\circ}$ .
  - 2. Level measurement accuracy of  $\pm .0005$ -inch.
- B. The probes shall be diesel, gasoline, ethanol, benzene, and oil-resistant. The probes shall be UL-listed as intrinsically safe and shall utilize digital or time-based transmission techniques for high noise immunity and fault detection.
- C. Leak Detection: Capable of manually or automatically performing a static tank tightness test to an accuracy of 0.1-gph, with a 99% probability of detection [P(D)] and a 1% probability of false alarm [P(FA)].
  - 1. System shall be third-party certified to be in accordance with EPA standards for 0.1-gph annual tightness test and for 0.2-gph monthly monitoring.
- D. The probes shall be capable of continuously gauging the water level from within 0.75-inch off of the bottom of the tank to a depth of at least 10-inches for riser pipe installations.

- E. The probes shall be supplied with the manufacturer's standard probe installation kits and wiring.

## 2.5 SOFTWARE:

### A. Network Communications for Remote Alarming/Reporting.

1. The manufacturer shall provide its communications/database software package and license (Headend) to poll remote tank monitoring sites from a total of five (5) locations, including the central location (2800 Berlin Turnpike, Newington, CT), via a network connection.
2. The Headend operator shall connect to remote sites by selecting the user-definable name associated with the site. Manual dialing is not acceptable.
3. The Headend operator shall be able to connect to the system and gain access to the full control, reporting, troubleshooting, and system modification capabilities described in this specification.
4. The Headend shall provide a communications mode, in which it can automatically and continuously poll locations that have been designated for data retrieval, and store data in a standard database format.
5. The system shall have the ability to automatically upload all alarms, reports, logs, and other features as described in this specification. The software package shall provide the ability to program the system from remote locations.
6. In the event that the system is unable to connect with the Headend, it shall continue to attempt communication on a predetermined interval until communication is successful.
7. The stored data shall be easily transferable to other software packages, such as spreadsheets, database packages, etc., for data manipulation.

### B. Reports and Logs. The following reports and logs shall be provided for each tank and oil-water separator as indicated on the Plans:

1. Environmental Compliance Reports. The system shall have the ability to capture the following environmental compliance reports, as well as to provide hard copies of these reports at the console.
  - a. In-Tank Warnings and Alarms.
  - b. In-Tank Tightness Test Results.
  - c. Liquid Sensor Warnings and Alarms.
  - d. System Hardware and Software Errors.
  - e. System Status Messages.
  - f. Normally-closed Sensor warning and alarm conditions.
  - g. External input messages.
2. The system shall also generate hard copy reports at the console for system errors, system clock and calendar, and system setup and configuration data.

C. Reports and Logs. The following reports and logs shall be provided for each diesel fuel tank as indicated on the Plans.

1. Inventory Management Reports shall be generated for each tank either automatically a minimum of three times per day (programmable) or manually. In addition to the system capturing this data, hard copies of the reports will be generated at the console. Inventory Reports shall include the tank identification, product name, time and date, product level and volume, water level and volume, product temperature, gross volume, temperature compensated net volume, percent capacity, 90% ullage, and last in-tank leak test result.
2. Product Delivery Reports shall be generated for each tank automatically after a delivery to the tank is complete. In addition to the system capturing this data, hard copies of the report will be generated at the console. Fuel Delivery Reports shall include the tank identification, product name, time and date, starting and ending product levels and volumes, starting and ending product temperatures, and the net product volume increase.
3. Product Order Reports shall be manually generated for each tank. In addition to the system capturing this data, hard copies of the reports will be generated at the console. Fuel Order Report shall include the average daily product usage calculated from the last delivery, the total and usable inventory, the remaining product supply in days, and the maximum order amount (90% ullage) at the time of report generation.

D. Reports and Logs. The following reports and logs shall be provided for each oil-water separator as indicated on the Plans.

1. Inventory Management Reports shall be generated for each tank either automatically a minimum of three times per day (programmable) or manually. In addition to the system capturing this data, hard copies of the reports will be generated at the console. Inventory Reports shall include the tank identification, product name, time and date, the last in-tank leak test result, product level and volume, and water level and volume.

E. ALARMS:

1. The system shall provide audible and visual indication of all system, in-tank leak (3.0-gph, 0.2-gph, and 0.1-gph failures), product line leak (3.0-gph, 0.2-gph, and 0.1-gph failures), and external sensor (product, water, sensor out) alarm conditions. The system shall also capture this data, and hard copies will be generated.
2. The system shall provide the operator the ability to disable the audible portion of an alarm. The visual portion of an alarm shall not be disabled until the alarm condition has been corrected.
3. The system alarms include:
  - a. High High Limit (Overfill).
  - b. High Limit.

- c. Low Inventory Limit
  - d. High Water Limit.
  - e. Temperature.
  - f. Theft.
  - g. Delivery needed alarm.
  - h. Periodic warning and alarm.
  - i. Annual warning and alarm.
  - j. Non-IS contact closure input.
  - k. IS (liquid) sensor input.
  - l. System error.
  - m. Power recovery.
  - n. Leak Test Failed.
- 4. The product limit alarms identified above shall be programmable in units of volume, percent volume, or level.
  - 5. The operator shall have complete programming control to determine which alarm conditions, if any, shall control pumps, valves, or any other devices. Unless the system is set up to shut part of the system down on alarm, system shall remain operational during all alarm conditions.

F. Diagnostics and Troubleshooting.

- 1. The system shall provide the manufacturer's standard diagnostic and troubleshooting capabilities to facilitate field service. These capabilities shall include, but are not limited to, the following:
  - a. Identifying the location of the malfunction, whether in the field or console.
  - b. The system shall be capable of detecting and reporting corruption of configuration and set-up data. Affected system function(s) shall be disabled until corruption is corrected.
  - c. The system shall be capable of limiting the range of selections on input to only "acceptable" values, or the system shall be capable of scanning operator-entered configuration and set-up data to check for "acceptable" values. Values that result in improper calculations or required entries that have not been defined by the operator shall generate a warning report, and shall disable the affected system function(s).
  - d. The system shall be capable of detecting and reporting a power-up sequence, including power loss and recovery dates and times.
  - e. The system shall be capable of ensuring the integrity of its hardware and software.
  - f. Supervised wiring between the console and the interstitial sensors to identify short or open circuited wiring. System shall identify fault to the failed sensor.
  - g. Supervised wiring between the console and the in-tank probes to detect a fault, either as failed hardware or as a result of faulty wiring. System shall identify fault to the tank.



2. The system shall generate hard copy reports of the diagnostic information, including the alarm history and alarm status at the console.

## 2.6 RELATED ELECTRICAL WORK:

- A. Conduit: Comply with requirements in CSI Division 26 Section 260533, "Raceway and Boxes for Electrical Systems".
- B. Explosion proof Fittings: Threaded, recessed-type, close-up plugs, Model No. EYSF75 as manufactured by Appleton, or an approved equal. Screwdriver slotted close-up plugs shall not be accepted.

## PART 3 - EXECUTION

### 3.1 EXAMINATION:

- A. Examine areas and conditions under which the tank monitoring system is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to the Tank Monitoring Installer.

### 3.2 INSTALLATION REQUIREMENTS:

- A. All probe and leak sensor inputs shall be protected against damage from short circuit conditions due to inadvertent field wiring errors.
- B. In-tank Probes.
  1. Probes, probe installation kits, and wiring shall be installed according to manufacturer-supplied installation manuals and plans.
  2. Probe assemblies for monitoring product and water levels are required for all double-wall tanks as indicated on the Plans.
  3. Probe assemblies in underground storage tanks shall top-mount from a 4-inch diameter probe riser pipe. Riser installation is not work of this Section; risers shall be installed by the applicable CSI Section and as indicated on the Plans.
  4. Probe leader cables to connect inside watertight junction box, sealed off with an explosion proof fitting, for connection to console.
- C. Related Electrical Work: Install conduit. Seal E.Y. fittings. Leave close-up plugs hand tight after sealing to provide for inspection of these fittings.
- D. The wall-mounted console with printer shall be located as shown on the Plans.
  1. Console shall be mounted and wired according to manufacturer-supplied installation manuals, with all intrinsically safe field wiring enclosed in dedicated

conduit and separate from all other wiring. The system's high voltage wiring may share existing conduit with other high voltage devices in accordance with applicable guidelines published in the NEC.

2. Console power requirements: 120-volts, 60-Hz, from a separate, existing dedicated circuit that fed the prior LC: 2000 Console.

### 3.3 FIELD QUALITY CONTROL:

- A. Engage a factory-authorized service representative to inspect and test the system and to perform start-up service. Power shall not be applied to the system prior to start-up.
- B. Perform all necessary testing and run diagnostic tests to ensure proper operation. Test equipment as recommended by manufacturer. Generate all software and enter all database information necessary to perform the sequence of control and specified software routines.
  1. An acceptance test shall be performed in the presence of the Engineer.
- C. The manufacturer shall provide a written certification of installation, start-up, and calibration of the complete system.
- D. The manufacturer shall supply third-party documentation for all products certifying that the performance meets or exceeds EPA requirements.

### 3.4 TRAINING:

- A. Refer to Form 817 Article 1.20-1.08.14 subsection 3 for additional information.
- B. Engage a factory-authorized service representative for an 2-hour on-site class to train Owner's maintenance personnel on all installation, programming, troubleshooting, operating, routine maintenance, and service procedures.

END OF SECTION 132180

## SECTION 231123 - FACILITY NATURAL-GAS PIPING

### PART 1 - GENERAL

#### 1.1 SUMMARY:

##### A. Section Includes:

1. Pipes, tubes, and fittings.
2. Piping specialties.
3. Piping and tubing joining materials.
4. Valves.
5. Pressure regulators.

#### 1.2 PERFORMANCE REQUIREMENTS:

##### A. Minimum Operating-Pressure Ratings:

1. Piping and Valves: 100 psig minimum unless otherwise indicated.

#### 1.3 ACTION SUBMITTALS:

##### A. Submit the following in accordance with Form 817 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

##### B. Product Data: For each type of the following:

1. Pipes, tubes, and fittings.
2. Piping specialties.
3. Piping and tubing joining materials.
4. Valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
5. Pressure regulators. Indicate pressure ratings and capacities.

#### 1.4 INFORMATIONAL SUBMITTALS:

##### A. Quality Assurance Submittals:

1. Field quality-control reports.

## 1.5 DELIVERY, STORAGE, AND HANDLING:

- A. Handling Flammable Liquids: Remove and dispose of liquids from existing natural-gas piping according to requirements of authorities having jurisdiction.
- B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

## 1.6 PROJECT CONDITIONS:

- A. Interruption of Existing Natural-Gas Service: Do not interrupt natural-gas service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide purging and startup of natural-gas supply according to requirements indicated:
  - 1. Notify Engineer no fewer than 7 calendar days in advance of proposed interruption of natural-gas service.
  - 2. Do not proceed with interruption of natural-gas service without Engineer's written permission.

## PART 2 - PRODUCTS

### 2.1 PIPES, TUBES, AND FITTINGS:

- A. Steel Pipe: ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
  - 1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
  - 2. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.

### 2.2 PIPING SPECIALTIES:

- A. Appliance Flexible Connectors:
  - 1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
  - 2. Corrugated stainless-steel tubing with polymer coating.
  - 3. Operating-Pressure Rating: 0.5 psig.
  - 4. End Fittings: Zinc-coated steel.
  - 5. Threaded Ends: Comply with ASME B1.20.1.
  - 6. Maximum Length: 72 inches.

## 2.3 JOINING MATERIALS:

- A. Joint Compound and Tape: Suitable for natural gas.

## 2.4 MANUAL GAS SHUTOFF VALVES:

- A. See Part 3.9 "Aboveground Manual Gas Shutoff Valve Schedule" for where each valve type is applied in various services.
- B. General Requirements for Metallic Valves, NPS 2 and Smaller: Comply with ASME B16.33.
  - 1. CWP Rating: 125 psig.
  - 2. Threaded Ends: Comply with ASME B1.20.1.
  - 3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
  - 4. Tamperproof Feature: Locking feature for valves indicated in Part 3.9 "Aboveground Manual Gas Shutoff Valve Schedule."
  - 5. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller.
  - 6. Service Mark: Valves 1-1/4 inches to NPS 2 shall have initials "WOG" permanently marked on valve body.
- C. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.
  - 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. BrassCraft Manufacturing Company; a Masco company.
    - b. Conbraco Industries, Inc.; Apollo Div.
    - c. Lyall, R. W. & Company, Inc.
    - d. McDonald, A. Y. Mfg. Co.
    - e. Perfection Corporation; a subsidiary of American Meter Company.
  - 2. Body: Bronze, complying with ASTM B 584.
  - 3. Ball: Chrome-plated bronze.
  - 4. Stem: Bronze; blowout proof.
  - 5. Seats: Reinforced TFE; blowout proof.
  - 6. Packing: Threaded-body packnut design with adjustable-stem packing.
  - 7. Ends: Threaded or socket as indicated in Part 3.9 "Aboveground Manual Gas Shutoff Valve Schedule."
  - 8. CWP Rating: 600 psig.
  - 9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
  - 10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

## 2.5 PRESSURE REGULATORS:

### A. General Requirements:

1. Single stage and suitable for natural gas.
2. Steel jacket and corrosion-resistant components.
3. Elevation compensator.
4. End Connections: Threaded for regulators NPS 2 and smaller.

### B. Appliance Pressure Regulators: Comply with ANSI Z21.18.

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. Canadian Meter Company Inc.
  - b. Eaton Corporation; Controls Div.
  - c. Harper Wyman Co.
  - d. Maxitrol Company.
  - e. SCP, Inc.
2. Body and Diaphragm Case: Die-cast aluminum.
3. Springs: Zinc-plated steel; interchangeable.
4. Diaphragm Plate: Zinc-plated steel.
5. Seat Disc: Nitrile rubber.
6. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
7. Factory-Applied Finish: Minimum three-layer polyester and polyurethane paint finish.
8. Regulator may include vent limiting device, instead of vent connection, if approved by authorities having jurisdiction.
9. Maximum Inlet Pressure: 2 psig.

## PART 3 - EXECUTION

### 3.1 EXAMINATION:

- A. Examine roughing-in for natural-gas piping system to verify actual locations of piping connections before equipment installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION:

- A. Close equipment shutoff valves before turning off natural gas to premises or piping section.

- B. Inspect natural-gas piping according to NFPA 54 and the Connecticut Gas Equipment and Piping Code to determine that natural-gas utilization devices are turned off in piping section affected.
- C. Comply with NFPA 54 and the Connecticut Gas Equipment and Piping Code requirements for prevention of accidental ignition.

### 3.3 OUTDOOR PIPING INSTALLATION:

- A. Comply with NFPA 54 and the Connecticut Gas Equipment and Piping Code for installation and purging of natural-gas piping.
- B. Install fittings for changes in direction and branch connections.

### 3.4 VALVE INSTALLATION:

- A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing, aluminum, or copper connector.
- B. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.

### 3.5 PIPING JOINT CONSTRUCTION:

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints:
  - 1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
  - 2. Cut threads full and clean using sharp dies.
  - 3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
  - 4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
  - 5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

### 3.6 CONNECTIONS:

- A. Install piping adjacent to appliances to allow service and maintenance of appliances.

- B. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches of each gas-fired appliance and equipment. Install union between valve and appliances or equipment.
- C. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

### 3.7 FIELD QUALITY CONTROL:

- A. Perform tests and inspections.
- B. Tests and Inspections:
  - 1. Test, inspect, and purge natural gas according to NFPA 54 and the Connecticut Gas Equipment and Piping Code and authorities having jurisdiction.
- C. Natural-gas piping will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

### 3.8 OUTDOOR PIPING SCHEDULE:

- A. Aboveground natural-gas piping shall be the following:
  - 1. Steel pipe with malleable-iron fittings and threaded joints.

### 3.9 ABOVEGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE:

- A. Valves for pipe sizes NPS 2 and smaller at service meter shall be the following:
  - 1. Two-piece, full-port, bronze ball valves with bronze trim.

END OF SECTION 231123



## 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, “Sleeve and Sleeve Seals for Electrical Raceways and Cabling.”

#### 1.2 SUBMITTALS:

- A. Submit the following in accordance with Form 817 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. Testing shall be performed by an independent testing agency.

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 Company
      - 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. Conductor Material: Copper.
- E. Stranding: All wires shall be stranded.
- F. 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.
- G. 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-2/THWN-2, unless otherwise noted or shown; wire size No. 6 AWG and larger shall be type THWN-2 or XHHW-2. 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 LED 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 (except as stated in the next paragraph). 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. Metal-clad cable (MC) shall only be used in lieu of metallic raceways for troffer lighting fixtures from the fixture to the junction box in the office area only unless otherwise noted on plans. MC cable shall be fully sized, fully rated 600V and shall include a green insulated copper grounding conductor above ceiling to lighting fixtures. MC cable outer jacket shall be steel. An appropriate anti-short device shall be installed at all termination points.
- g. Conductor and conduit sizes shown on the drawings are based on copper conductors with Type THHN-2/THWN-2 or XHHW-2 insulation, unless otherwise noted. Increase conductor and conduit sizes as necessary for other approved insulation types.
- h. Aluminum is not approved for conductors or wire.
- i. 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 and specified by the different building systems.
- j. 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 208 Volt circuit exceeds 200 feet, the conductor shall be increased to No. 10 AWG.
- k. Wires, conductors, and cables shall be single conductor, except as otherwise specified or indicated on drawings.
- l. Building BAS system conductors shall be per manufacturer's requirements.
- m. Cable meeting special requirements such as twisted pairs, triads, or individual shielding shall be provided where recommended by the system manufacturer.
- n. Conductor insulation shall be color coded.

208Y/120 Volt (3-Phase)

Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Ground	Green

240/120 Volt (Single Phase)

Phase A	Black
Phase B	Red
Neutral	White
Ground	Green

480Y/277 Volt (3-Phase)

Phase A	Brown
Phase B	Orange
Phase C	Yellow
Neutral	Gray
Ground	Green

- o. Switch leg wiring shall be of the same color code as the corresponding phase.
- p. System color coding shall be in accordance with color code furnished by system manufacturer and shown on wiring diagrams.
- q. 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.
- r. Voltage rating, manufacturer, type and conductor AWG size indication shall be continuous, factory applied the entire length of each conductor.
- s. 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.
- t. 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.
- u. Branch circuit connections or joints shall have an approved type solderless connector suitable for copper conductors.
- v. 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".

## PART 3 - EXECUTION

### 3.1 EXAMINATION:

- A. Examine raceways and building finishes receiving 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. Underground Conductors: XHHW in raceway.
- C. Feeders: Type THHN/THWN, in raceway.
- D. Branch Circuits: Type THHN/THWN, in raceway.
- E. Fire Alarm Circuits: Power-limited, fire-protective, signaling circuit cable.
- F. Class 1 Control Circuits: Type THHN/THWN, in raceway.
- G. Class 2 Control Circuits: Power-limited cable, concealed in building finishes.

### 3.3 INSTALLATION:

- A. All conductors shall be installed in concealed metal raceways, RGSC, PVC Coated RGSC, PVC, and EMT, in accordance with the NEC except where specifically noted otherwise.
- B. Terminals shall be arranged phase A-B-C or 1-2-3 from left to right, top to bottom, and front to back.
- C. 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.
- D. Equipment requiring electric service is also named on the plans 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.
- E. Plans 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.

- F. 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 used, shall be taped and insulated at the final point of connection to equipment.
- G. All grounding conductors shall have green color coded insulation and shall be sized in accordance with the NEC.
- H. Install wires and cables as indicated, according to manufacturer's written instructions and NECA's "Standard of Installation."
- I. 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.
- J. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- K. 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."
- L. 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: Agency: An independent qualified testing agency to perform tests and inspections.
- B. Testing: On installation of all wires, feeders, branch circuit conductors, including conductors of all systems, 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.
  - 4. Test and Inspection Reports to be Submitted: Prepare a written report to record the following:
    - a. Procedures used
    - b. Results that comply with requirements.
    - c. Results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
  - 5. Cables will be considered defective if they do not pass tests and inspections.
- C. 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.
- D. Modification to existing panels and disconnects to separate ground and neutral bonding. Also, furnishing ground or neutral bars in existing panels and relocating neutral and ground conductors to the appropriate neutral or ground bar. Any wire connectors, splicing kits, and conductors shall be part of the installation.

#### 1.2 SUBMITTALS:

- A. Submit the following in accordance with Form 817 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. Testing shall be performed by an independent testing agency.
  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.
- D. Comply with NFPA 780 and UL 96 when interconnecting with a lightning protection system.

### 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. 780, Lightning Protection Code.
    - d. 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. Lightning Master Corp.
- c. Salisbury: W.H. Salisbury & Co., Utility
- d. 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. 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 water pipe & generator bonding to enclosure grounding 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: Bonding conductor shall be as specified below or according to the plans:
  - 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.
- 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. All below-grade (embedded or buried) copper grounding cable connections shall be made by exothermic welding. Bolted connectors shall be acceptable for application where the ground rod or equipment requires periodically disconnection/connection. Connections to stainless steel cables shall be welded.
- 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. Exothermic welded connectors shall be Erico products Company, Cadweld or approved equal.
- D. Water Pipe Clamps:
  - 1. Mechanical type, two pieces with stainless-steel bolts.
  - 2. U-bolt type with malleable-iron clamp and copper ground connector rated for direct burial.

## 2.4 GROUNDING ELECTRODES:

- A. Ground Rods: Ground rods shall be pointed, copper-clad steel, 3/4-inch in diameter and ten feet long (minimum) or as shown 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 equipment 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. Three-phase motor and appliance branch circuits.
  - 6. Flexible raceway runs.
  - 7. Armored and metal-clad cable 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. Computer Outlet Circuits: Install insulated equipment grounding conductor in branch-circuit runs from computer-area power panels or power-distribution units.
- F. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- G. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate equipment grounding conductor. Isolate equipment grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- H. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways unless they are designated for telephone or data cables.

- I. Signal and Communication Systems: For telephone, alarm, voice and data, and other communication systems, provide No. 6 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
  - 1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch grounding bus.
  - 2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
- J. Common Ground Bonding: Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.
  - 1. Use bonding conductor sized the same as system grounding electrode conductor, and install in conduit as detailed on the plans.
  - 2. Verify also that the waterline entering the building is 10' minimum distance in solid earth for an effective ground. Jumper each side of water meter together and bond to the grounding grid.
- K. The removal of bonding jumper between the neutral bar and the ground bar at the existing main disconnect or main panel in existing buildings shall be included where required.
- L. The contract shall include the removal of bonding jumpers between the neutral bar and the ground bar at existing main distribution panels and existing sub-panels affected by the contract plans. For existing panels that only have one ground/neutral bar, an isolated floating neutral bar and/or ground bar shall be installed in the panel. All existing branch neutral conductors that do not do so presently shall be made to terminate at the isolated floating neutral bar. All existing branch ground conductors that do not do so presently shall be made to terminate at the ground bar. Ground bars shall maintain an equipment grounding connection to the panel frame and/or conduit system. The contractor shall be responsible for performing the work outlined in this section (3.2 O) in panels modified or re-fed, also in panels where branch circuits are added modified or removed and additional panels identified as such on the contract drawings. Refer to the plans for identification of panels affected by this work.

### 3.3 INSTALLATION:

- A. All grounding electrodes included but not limited to, Metal underground water pipe, metal frame of the building structure, concrete cased structure, grounding ring, 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 cannot 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.

- 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.
- E. Metal Water Service Pipe: Provide insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at both sides of water meter. Verify that water line is 10' minimum in the earth for an effective ground (no gravel). Any locations in which connection to the water pipe is not existing or there is addition or modifications to the main distribution panel or main disconnect, the contractor shall be responsible for the connection/reconnection to the water piping.
- F. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.
- G. Bond interior metal piping systems and metal air ducts to equipment grounding conductors of associated pumps, fans, blowers, electric heaters, and air cleaners. Use braided-type bonding straps.
- H. Generator enclosure and all metallic parts shall be bonded.

### 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. The Contractor shall engage an independent testing agency shall 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 contract an independent testing agency to 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. 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.
  3. Provide drawings locating each ground rod and ground rod assembly and other grounding electrodes, identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
    - a. Equipment Rated 500 kVA and Less: 10 ohms.
    - b. Equipment Rated 500 to 1000 kVA: 5 ohms.
    - c. Equipment Rated More Than 1000 kVA: 3 ohms.
    - d. Substations and Pad-Mounted Switching Equipment: 5 ohms.
    - e. Manhole Grounds: 10 ohms.
  4. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.
- C. Prepare test and inspection reports and submit reports of all the ground resistance measurements.

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 817 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.
- B. Product Data: For the following:
1. Steel slotted support systems hardware, and accessories.
  2. Clamps, fasteners, anchors, hangers, brackets.
- C. Working 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.

### 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 or PVC coated galvanized for the corrosive locations (i.e. Salt Shed, Wash Bay, etc.).
  - 3. Nonmetallic Coatings required for corrosive locations: Manufacturer's standard PVC coated or Stainless steel. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
  - 4. 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, and associated fittings, designed for types and sizes of raceway or cable to be supported. PVC coated or Stainless steel required for corrosive locations.
- 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. Body shall be malleable iron. Provide stainless steel or PVC coated galvanized supports for conduit installed in the corrosive locations (i.e. Salt Shed, Wash Bay, etc.).
- 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 corrosive locations (i.e. Salt Shed, Wash Bay, etc.) 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. 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.
  - 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.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type. (Stainless steel in corrosive locations (i.e. Salt Shed, Wash Bay, etc.)).
7. Hanger Rods: Threaded steel. (Stainless steel in corrosive locations (i.e. Salt Shed, Wash Bay, etc.)).

G. Hardware: For corrosive areas (i.e. salt shed) and wet locations (i.e. wash bay) 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, RGSC, PVC coated RGSC, and PVC as required by scheduled in NECA 1, where it's 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 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-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, RGSC, PVC coated RGSC, and PVC 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.
- D. Anchor equipment to concrete base.
  1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  2. Install anchor bolts to elevations required for proper attachment to supported equipment.
  3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

### 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 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: RGSC, PVC externally coated rigid steel conduits, PVC, EMT, LFMC, FMC, and wireways.
2. Boxes, enclosures, and cabinets include the following: Device boxes, outlet boxes, pull and junction boxes, 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".

#### 1.2 DEFINITIONS:

1. EMT: Electrical metallic tubing.
2. FMC: Flexible metal conduit.
3. LFMC: Liquidtight flexible metallic conduit.
4. PVC: Polyvinyl Chloride Conduit
5. RGSC (GRC): Rigid galvanized steel conduit.

#### 1.3 SUBMITTALS:

- A. Submit the following in accordance with Form 817 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
  - f. Seals and expansion fittings

#### 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. Alflec 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 CONDUIT AND TUBING:

- A. All conduits shall be 3/4" minimum unless otherwise noted.
- B. RGSC: ANSI C80.1 and UL 6. Use threaded rigid steel conduit fittings.
- C. Plastic-Coated Steel Conduit and Fittings: UL6, ETL PVC-001, coating thickness: 0.040 inch, minimum.
- D. RNC (Schedule 40): 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. Solvents and adhesives as recommended by conduit manufacturer.
- E. RNC (Schedule 80): 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. Solvents and adhesives as recommended by conduit manufacturer.
- F. EMT and Fittings: ANSI C80.3 and UL 797. Fittings: Set-screw or compression type. Cast fittings shall be made of steel or malleable iron. Comply with NEMA FB 2.10.
- G. LFMC: UL 360, Flexible steel conduit with PVC jacket.
- H. FMC: UL ASNI/UL-1, Zinc-coated steel.
- I. Fittings/Conduit bodies for Metallic Conduit: Comply with NEMA FB 1 and UL 514B; match conduit/tubing materials. Cast fittings shall be made of steel or malleable iron,

hot-dip galvanized finish for RGSC. Covers for conduit bodies installed in wet locations shall be gasketed.

- J. Fittings/Conduit bodies RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
- K. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.
- L. Explosion Proof Fittings: Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70. Threaded, recessed-type, close-up plugs. Screwdriver slotted close-up plugs shall not be accepted. Fittings shall be made of malleable iron.
- M. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
- N. Solvent Cement and Adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## 2.3 METAL WIREWAYS:

- A. Material: Sheet metal sized and shaped as indicated. The exterior installed wireways shall be stainless steel 4X as indicated on plans. Interior installed wireways shall be NEMA 1 and NEMA 4X in interior wet locations (i.e. washbay).
- 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 standard enamel finish.

## 2.4 SURFACE RACEWAYS:

- A. Surface Metal Raceways: Galvanized steel with snap-on covers. Finish with manufacturer's standard prime coating.

- B. Types, sizes, and channels as indicated and required for each application, with fittings that match and mate with raceways.

## 2.5 BOXES, ENCLOSURES, AND CABINETS:

- A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations. Boxes, enclosures, and cabinets installed in corrosive locations (i.e. Salt Shed) shall be stainless steel, or PVC coated.
- B. Sheet Metal outlet and Device Boxes: NEMA OS 1 and UL 514A.
- C. Cast Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- D. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
- E. Boxes and fittings: Boxes and fittings shall comply with the applicable provisions of NFPA 70, Article 314.
- F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- G. Cast-Metal Boxes: Comply with NEMA FB 1, aluminum, Type FD, with gasketed cover.
- H. Nonmetallic Junction Boxes: Comply with NEMA OS 2 and UL 514C.
- I. Hazardous (Classified) Location Boxes: Constructed of malleable iron. Appropriate Class and Group classification for the area installed.
- J. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous hinge cover and flush latch.
  - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
  - 2. Nonmetallic Enclosures: Plastic finished inside with radio-frequency-resistant paint.
- K. Cabinets: NEMA 250, Type 1, galvanized steel box (Type 4, Stainless Steel for wet locations). 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:

- A. Indoors: Use the following wiring methods:

1. Office Areas: EMT inside finished wall and above ceiling. RGSC when surface mounted in office areas.
2. Damp locations: RGSC.
3. Wet location (e.g. wash bays): PVC coated RGSC up to 10' elevation AFF, PVC over 10' elevation AFF.
4. Electrical Room, Mechanical Room, and Generator Room: RGSC up to 10' elevation AFF, EMT over 10' elevation AFF.
5. Concealed conduit in all finished walls shall be EMT.
6. Bay Area: RGSC conduit up to 10' elevation AFF, EMT over 10' elevation AFF.
7. Salt Shed: PVC coated RGSC up to 10' elevation AFF, PVC over 10' elevation AFF.
8. Boxes and Enclosures: NEMA 250, Type 1, except as follows:
  - (a) Corrosive Locations (e.g. salt shed): NEMA Type 4X, stainless steel.
  - (b) Damp locations: NEMA 250, Type 4, nonmetallic
  - (c) Wet Location: PVC coated steel boxes and fittings or stainless steel, approved for use with PVC coated conduit (Permacote or equal) below 10' elevation AFF. PVC boxes and fittings shall be installed above 10' elevation AFF.

- B. Outdoors: Use the following wiring methods:

1. Exposed Conduit: Exposed conduit installed above 2' AFG shall be RGSC. Exposed conduit installed 2' AFG and below shall be PVC coated RGSC in paved areas RGSC in grass areas.
2. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
3. Boxes and Enclosures, Aboveground : NEMA 250, Type 3R, (NEMA 4X stainless steel wireways) except as follows:

- (a) Corrosive Locations (e.g. salt shed): NEMA Type 4X, stainless steel.
- (b) Hazardous locations: Appropriate Class and Group classification for the area installed.
- (c) Exterior locations: NEMA 3R

C. Raceway Fittings: Compatible with raceways and suitable for use and location.

- 1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings.
- 2. PVC externally coated, RGS: use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fittings manufacturer. Conduit bodies for PVC RGS conduit shall be made of steel or iron.
- 3. EMT: Use Set-screw or compression type, steel or malleable iron fittings. Comply with NEMA FB 2.10.
- 4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20

### 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.
- C. Conceal conduit and EMT, unless otherwise indicated, within finished walls and ceilings.
- D. 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.
- E. Install raceways level and square and at proper elevations. Provide adequate headroom.
- F. Complete raceway installation before starting conductor installation.
- G. Support raceways as specified in CSI Division 26 Section 260529, "Hangers and Supports for Electrical Systems."
- H. Use temporary closures to prevent foreign matter from entering raceways.
- I. Stub-ups shall be rigid 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. RGSC shall be utilized under slab. Under slab installations shall be limited only for the penetration of utilities.

- J. 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.
- K. Use raceway fittings compatible with raceways and suitable for use and location. For rigid steel conduit, use threaded rigid steel conduit fittings.
- L. Run concealed raceways, with a minimum of bends, in the shortest practical distance considering the type of building construction and obstructions, unless otherwise indicated.
- M. Install exposed raceways parallel or at right angles to nearby surfaces or structural members, and follow the surface contours as much as practical.
  - 1. Run parallel or banked raceways together, on common supports where practical.
  - 2. Make bends in parallel or banked runs from same centerline to make bends parallel. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.
- N. 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.
- O. Tighten set screws of threadless fittings with suitable tools.
- P. Terminations: 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.
- Q. 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.
- R. 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.
- S. Telephone, Fire Alarm, and Signal System Raceways: 3-Inch trade size and smaller unless otherwise indicated. In addition to the above requirements, install raceways in maximum lengths of 150 feet and with a maximum of two 90-degree bends or



equivalent, unless otherwise indicated. Separate lengths with pull or junction boxes where necessary to comply with these requirements.

- T. 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:
  - 1. Where otherwise required by NFPA 70.
- U. Stub-up Connections: Extend 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; FMC may be used 6 inches above the floor.
- V. Flexible Connections: Use maximum of 6 feet of FMC 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.
- W. PVC Externally Coated, Rigid Steel Conduits: Use only fittings approved for use with the material. Mounting hardware shall be stainless steel. Patch all nicks and scrapes in PVC coating after installing conduits.
- X. PVC: Use only fittings approved for use with the material.
- Y. Surface Raceways: Install a separate, green, ground conductor in raceways from junction box supplying the raceways to receptacle or fixture ground terminals.
  - 1. Select each surface raceway outlet box, to which a lighting fixture is attached, of sufficient diameter to provide a seat for the fixture canopy.
  - 2. Where a surface raceway is used to supply a fluorescent lighting fixture having central-stem suspension with a backplate and a canopy (with or without extension ring), no separate outlet box is required.
  - 3. Provide surface metal raceway outlet box, and the backplate and canopy, at the feed-in location of each fluorescent lighting fixture having end-stem suspension.
- Z. Install hinged-cover enclosures and cabinets plumb. Support at each corner.
- AA. 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.
- BB. Do not leave any box openings exposed. Install hole plugs on any knockout holes that are removed without any conduit attached.

- CC. 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.
- DD. Install 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.
- EE. 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.
- FF. Where portions of a cable raceway or sleeve are known to be subjected to different temperatures and where condensation is known to be a problem, as in cold storage areas of the building or where passing from the interior to the exterior of the building, the raceway or sleeve shall be filled with an approved material to prevent the circulation of a warm air to a colder section of the raceway or sleeve.
- GG. Raceways shall be provided with expansion fittings where necessary to compensate for thermal expansion and contraction.
- HH. Threaded conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- II. Patch any wall penetration with the appropriate cement for the type of wall/floor penetration. Firestopping cement shall be used for fire rated walls. Use regular cement for any other wall.

#### 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.
  - 2. Saw cutting paved areas, trenching, backfilling and satisfactory disposal of all surplus excavated material.
  - 3. Restoration of any paved or turfed areas.
- B. All materials and construction methods shall conform to State of Connecticut Department of Transportation's Form 817 and/ or the above listed specifications unless as noted within this specification.

#### 1.2 SUBMITTALS:

- A. Submit the following in accordance with Form 817 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, and fittings, and solvent cement.
- 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: (locations as indicated on drawings)

- A. Minimum size shall be ¾ inches.
- B. Rigid Steel Conduit: Galvanized. Comply with ANSI C80.1 and UL6.
- C. RNC (Schedule 40): 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.
- D. RNC (Schedule 80): 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.
- E. Plastic-Coated Steel Conduit and Fittings: UL6, ETL PVC-001, coating thickness: 0.040 inch, minimum.
- F. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.

2.2 RACEWAY/DUCT SEALING COMPOUND:

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. The materials for this work for the encasement of conduit or cable, shall be bedding material, all of which passes a 3/8-inch sieve, and not more than 10% passes a No. 200 (75-micron) sieve. Topsoil, fertilizer, seed and mulch shall conform to Section M.13. Pavement and sidewalk shall conform to Sections M.02, M.03 and M.04. Bituminous Concrete – Class 2 shall conform to Form 817 Article M.04.01.
- 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 spare 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 the utility company. All spare conduits shall be capped. Use PVC schedule 80 under pavement or as indicated in the plans. Provide PVC coated RGSC for sweeps/stub-ups located in bituminous pavement and walkways.
- B. RNC:
  - 1. PVC conduit shall be installed in locations indicated on drawings. All non-metallic conduits shall be installed in accordance with manufacturer's instructions.
  - 2. For all conduit runs for the Fuel Island, motor fuel and any other conduit that are installed in Hazardous Locations. RGSC and PVC coated RGSC shall be used for the last two (2) feet of underground run to emergence or the point of connection to the aboveground raceway in accordance with NEC 514.8, Exception No. 2 and NEC 515.8(A). Hazardous Locations conduits routed to handholes shall transition to RGSC for the last 2' to the point of connection to the handhole.
  - 3. Termination of conduits in handholes or other concrete structures shall be made with end bells.
  - 4. All conduit runs shall leave or enter structures perpendicularly.
- C. RGSC:
  - 1. RGSC conduit shall be installed in locations indicated on drawings. All metallic conduits shall be installed in accordance with manufacturer's instructions.
  - 2. Termination of conduits in concrete structures shall be made with end bells.
  - 3. All conduit runs shall leave or enter structures perpendicularly.

D. PVC Coated RGSC:

1. RGSC conduit shall be installed in locations indicated on drawings. All metallic conduits shall be installed in accordance with manufacturer's instructions.
2. PVC coated RGSC for sweeps/stub-ups located in bituminous pavement and walkways.
3. Termination of conduits in concrete structures shall be made with end bells. All conduit runs shall leave or enter structures perpendicularly.

E. Elbows or bends shall be in accordance the NEC.

F. Transition between conduits of different materials shall be made using the manufacturer's standard adapters.

G. Slope: Pitch ducts a minimum slope of 1:300 down toward handholes and away from buildings and equipment. Slope ducts from a high point in runs between two handholes to drain in both directions.

H. Wall Penetrations: Make a transition from PVC to rigid steel conduit at least 5 feet outside the building wall without reducing duct line slope away from the building, and without forming a trap in the line. Use fittings manufactured for duct-to-conduit transition. Install conduit penetrations of building walls as specified in CSI Division 26 Section 260544, "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

I. 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.

J. 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 THHN-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 inch and larger

3 - 250 kcmil  
Mandrel

### 3.3 GROUNDING

- A. Ground underground ducts according to CSI Division 26 Section 260526, "Grounding and Bonding for Electrical Systems."

### 3.3 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. The following pavement reconstruction items shall be paid for under their respective pay item, anything additional to these items shall be paid for under the lump sum.:

1.	0202529	CUT BITUMINOUS CONCRETE PAVEMENT
2.	0209001	FORMATION OF SUBGRADE
3.	0212000	SUBBASE
4.	0304002	PROCESSED AGGREGATE BASE
5.	0406172	HMA S0.375
6.	0406236	MATERIAL FOR TACK COAT

- 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 excavated material shall be removed and disposed of in accordance with instructions issued by the 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.

#### 3.4 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.

#### 3.5 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 – SLEEVES AND SLEEVE 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.
6. Firestopping

#### 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 817 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR SUBMITTALS.
- B. Product Data: For sleeve seals and silicon sealants.
- C. Quality Assurance Submittals:
  1. Manufacturer Certification Letter in accordance with NOTICE TO CONTRACTOR – POTENTIAL FOR ASBESTOS CONTAINING MATERIALS.

#### 1.4 COORDINATION:

- A. Coordinate sleeve selection and application with selection and application of firestopping in fire rated walls and patching in standard walls.

## 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.
- D. Coordinate sleeve selection and application of firestopping.

### 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: Carbon steel (Composite material for the Salt Shed). Include two for each sealing element.
  - 4. Connecting Bolts and Nuts: Carbon steel (stainless steel for the Salt Shed) of length required to secure pressure plates to sealing elements. Include one for each sealing element.

### 2.3 SLEEVE-SEAL FITTINGS:

SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND  
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- 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.

- 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. 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.

## 2.6 FIRESTOPPING:

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

- 1. Available Manufacturer 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. A/D Fire Protective System Inc.
    - b. Nelson Firestop Products
    - c. 3M Fire Protection Products.

- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of **0.01-inch wg (2.49 Pa)**.
  - 2. Fire-resistance-rated walls include fire walls
  - 3. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- D. VOC Content: Penetration firestopping sealants and sealant primers shall 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.

## 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.
    - 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 817 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 ASME A13.1.
- B. Comply with NFPA 70.
- C. Comply with ANSI Z535.4 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. Raceways: 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 non-metallic strip or core.
  - 4. Printed legend indicating type of underground line.
- D. 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, reverse engraved and double laminated: Weather-resistant, nonfading, preprinted with colors, legend, and size required for the application.
- 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.
- E. Arc-Flash labels: Comply with requirements in CSI Section 260574, "Overcurrent Protection Device Arc-Flash Study." Produce a 3.5-by-5-inch thermal transfer label of high-adhesion polyester for each work location included in the analysis.
- F. Short-Circuit label(s): Comply with requirements in CSI Section 260572, "Overcurrent Protection Device Short-Circuit Study." Produce a thermal transfer label of high-adhesion polyester for each work location included in the analysis.

## 2.3 MISCELLANEOUS IDENTIFICATION PRODUCTS:

- A. Cable Ties: UL Listed, 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. Temperature: 85 deg C.
  - 4. Color: Natural.
  - 5.

## 2.4 IDENTIFICATION OF EXISTING CONDUCTORS

- A. The Contractor shall color code all the existing conductors with the appropriate color depending on the voltage system. Refer to Division 26 Section 260519, "Low Voltage Electrical Power Conductors and Cables" and Part 3.1 F of this specification for color coding. The work shall consist of color coding all existing conductors in existing panels as shown on the plans.

## 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 25-foot maximum intervals in straight runs, and at 10-foot maximum intervals in congested areas.
  - 3. Apply the following colors to the systems listed below:
    - a. Fire Alarm System: Red.
    - b. Telecommunication: Green and yellow.
- E. Paths of Underground Electrical Lines: During trench backfilling, for exterior underground power, control, signal, and communication lines, install continuous underground metallic 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 208/120-V(Three Phase) feeders as follows:
  - a. Phase A: Black.
  - b. Phase B: Red.
  - c. Phase C: Blue.
  - d. Neutral: White.
  - e. Ground: Green.
2. Color-code 240/120-V(Single Phase) feeders as follows:
  - a. Phase A: Black.
  - b. Phase B: Red.
  - c. Neutral: White.
  - d. Ground: Green.
3. Color-code 480/277-V(Three Phase) system as follows:
  - a. Phase A: Brown
  - b. Phase B: Orange
  - c. Phase C: Yellow
  - d. Neutral: Gray
  - e. Ground: Green
4. Factory apply color the entire length of conductors or apply the following color-coding methods:
  - 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 circuit number.
2. Multiple Control and Communication Circuits 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 identification to junction boxes including voltage, circuit number, and phase of enclosed circuits.
- I. 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.
  - 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.
- J. 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. Access doors and panels for concealed electrical items.
  - 3. Emergency system boxes and enclosures.
  - 4. Disconnect switches.
  - 5. Enclosed circuit breakers.
  - 6. Motor starters.
  - 7. Push-button stations.
  - 8. Contactors.
  - 9. Control devices.
  - 10. Power-generating units.
  - 11. Telecommunications equipment.
  - 12. Fire alarm system.
  - 13. Main disconnect.
- K. Each disconnect means shall be legibly marked to indicate its purpose. The marking shall be of sufficient durability to withstand the environment involved.

- L. Exterior, reverse engraved and double laminated: Weather-resistant, nonfading, preprinted with colors, legend, and size required for the application. Apply labels for each unit of the following categories of equipment using mechanical fasteners:
  - 1. Service entrance location. Mount sign to building adjacent to meter socket and main disconnect switch using appropriate concrete fasteners (ie: stainless steel concrete screws, non-rusting concrete expansion anchor, non-rusting concrete lag shield anchor, non-rusting concrete metal hit anchor, or approved equal) Sign shall read "STAND-BY DIESEL GENERATOR UNIT LOCATED IN OUTDOOR ENCLOSURE ADJACENT TO BUILDING".

END OF SECTION 260553

## 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 817 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. 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 NEMA 250, Type 1 and others.
  - 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.
  - 6. Panelboard Schedule: For installation in panelboards. Submit final versions after load balancing.
- 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. Testing Agency Qualifications: Independent agency company of NETA or an NRTL.
  - 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.
- B. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.
- C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. Comply with NEMA PB 1.
- F. Comply with NFPA 70.

### 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 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. Eaton Corp.; Westinghouse & Cutler-Hammer Products.
  - 2. General Electric Co.; Electrical Distribution & Control Div.
  - 3. Siemens Energy & Automation, Inc.
  - 4. 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. Other Damp Indoor Locations: NEMA 250, Type 4.
  - 3. Other Wet Indoor Locations (I.e. Wash bay): NEMA 250, 4X
  - 4. Other Corrosive Locations(I.e. Salt Shed): NEMA 250, 4X
- B. Directory Frame: Metal, mounted inside each panelboard door.
- C. Bus: Hard drawn copper of 98 percent conductivity. All panelboard's bus shall be copper including the main service disconnects.
- D. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors. Bonded to box.
- E. All main circuit breakers and branch circuit breakers shall be sized as indicated on the plans.

### 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 above 225-A frame size 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 fluorescent 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.
- 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. Provide a typed directory for both new and modified existing panelboards. Obtain approval before installing.
- E. Install filler plates in unused spaces.
- F. Provision for Future Circuits at Flush Panelboards: Stub four 1-inch (27-GRC) empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch (27-GRC) empty conduits into raised floor space or below slab not on grade.
- G. 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. Testing Agency: Engage a qualified independent testing agency to perform tests and inspections.

- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Prepare for acceptance tests as follows:
  - 1. Test insulation-resistance tests of each panelboard bus, main circuit breaker, and branch circuit breakers, component, connecting supply, feeder, and control circuits.
  - 2. Test continuity tests of each circuit.
- D. 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 or per manufacturer's written testing instructions. 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.
  - 3. Perform the following infrared scan tests and inspections and prepare reports:
    - a. Initial Infrared Scanning: After Substantial Completion, perform an infrared scan of each panelboard. Remove front panel so joints and connections are accessible to portable scanner.
    - b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard after the semi-final inspection.
    - c. Instruments and Equipment:
      - 1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
- E. Panelboards will be considered defective if they do not pass tests and inspections.
- F. Prepare test and inspection reports; including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken and observations after remedial action.
- G. 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 Eversource and United Illuminating (UI).

#### 1.2 SUBMITTALS:

- A. Submit the following in accordance with Form 817 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR SUBMITTALS.
- B. 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.
- C. Test and Inspection reports performed by an independent agency.

#### 1.3 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Independent agency company of NETA or an NRTL.
  - 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.
- B. Source Limitations: Obtain main disconnect switch, overcurrent protective devices, components, and accessories from single source from single manufacturer.
- C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for main disconnect switch including clearances between main disconnect switch and adjacent surfaces and other items. Comply with indicated maximum dimensions.

- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. Comply with NEMA PB 1.

#### 1.4 DELIVERY, STORAGE, AND HANDLING:

- A. Receive, store, and handle modular meter center as specified in NECA 400.

#### 1.5 COORDINATION:

- A. Coordinate electrical service disconnection and reconnection with utilities. It is not anticipated that any of the meters will be replaced. However, if the utilities determine that a meter needs to be replaced, the meter socket and main switch shall be approved by utilities. The meter shall be furnished by the utilities.
  - 1. Coordinate any reconfiguration of utilities' equipment and any equipment relocation with utilities.
  - 2. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.
- B. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces.
- C. East Haven: Utility work includes the disconnection of service, Utility Power Transformers (PTs) and Current Transformers (CTs) within the existing MDS and any service work performed on the line/load side of the new MDS by the local utility company. Utility Power Transformers (PTs) and Current Transformers (CTs) are expected to be reused. The Contractor shall coordinate with utilities for disconnection and reconnection of service after work hours and on weekends. Service shall be maintained during work hours as well as all times during winter storms. When shutdown of service is required during all other times, the Contractor shall provide temporary power using a portable generator and/or existing generator and temporary panels to maintain power to the facility emergency panel(s) and critical loads (eg, emergency lighting, UPS, etc). The use of temporary portable generators and electrical panels shall be supplied, fueled and connected by the Contractor.
- D. East Windsor: Utility work includes the disconnection of service within the existing MDS/MDP and any service work performed on the line/load side of the new Service Entrance Rated ATS by the local utility company. The Contractor shall coordinate with utilities for disconnection and reconnection of service after work hours and on weekends. Service shall be maintained during work hours as well as all times during winter storms. When shutdown of service is required during all other times, the Contractor shall provide temporary power using a portable generator and/or existing

generator and temporary panels to maintain power to the facility emergency panel(s) and critical loads (eg, emergency lighting, UPS, etc). The use of temporary portable generators and electrical panels shall be supplied, fueled and connected by the Contractor.

- E. Mansfield: Utility work includes the disconnection and removal of the single phase, 120/240V Jet Hanger service.
- F. Rocky Hill: Utility work includes the disconnection of service to the existing MDS and any service work performed on the line/load side of the MDS by the local utility company. The Contractor shall coordinate with utilities for disconnection and reconnection of service after work hours and on weekends. Service shall be maintained during work hours as well as all times during winter storms. When shutdown of service is required during all other times, the Contractor shall provide temporary power using a portable generator and/or existing generator and temporary panels to maintain power to the facility emergency panel(s) and critical loads (eg, emergency lighting, UPS, etc). The use of temporary portable generators and electrical panels shall be supplied, fueled and connected by the Contractor.
- G. No local utility (Eversource/UI) charges are anticipated in the contract bid price during the local utilities normal business hours. The Contractor shall be responsible for all after hour and weekend utility work charges. The Contractor shall coordinate shut down time with the local utility and Article 1.20-1.08.04-Limitation of Operations. Should a utility charge transpire during normal business hours, the Contractor by construction order shall provide all applicable written billing documentation from the local utility. The Contractor will be compensated only for the actual billed amount, if any. No additional Contractor mark-up shall be allowed during normal business hours only. No additional compensation for after hour and weekend utility work shall be granted.
- H. The Contractor shall call "Call Before You Dig!" at 811 or (800) 922-4455, before any excavation takes place. Contractor shall coordinate excavation with paving operation.

## PART 2 - PRODUCTS

### 2.1 EQUIPMENT FOR ELECTRICITY METERING:

- A. Current-Transformer Cabinets: Comply with requirements of electrical power utility company.
- B. Meter Sockets: Comply with requirements of electrical power utility company.
  - 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. 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 on 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.
  - b. Identification: Complying with CSI Division 26 Section 260553, "Identification for Electrical Systems."
  - c. Physical Protection: Tamper resistant, with hasp for padlock.
- 3. Meter Socket: Type as approved by utility company, with rating coordinated with indicated tenant feeder circuit rating.
- C. Utility Current Transformers (CTs) and Power Transformers (PTs): Supplied by the utility company.

## 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. Support clamps shall comply with Section 260529 "Hangers and Supports for Electrical Systems".



### 3.3 SUPPORT INSTALLATION:

- A. Supports shall comply with Section 260529 “Hangers and Supports for Electrical Systems”. Install support 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.

### 3.4 UTILITY COMPANY ELECTRICITY-METERING EQUIPMENT:

- A. Install equipment according to utility company's written requirements. Provide grounding, empty conduits, and pullwire as required by utility company. Contractor shall only run conduit under slab of building for conduits penetrating the building and routed from the outside. Conduits within the building shall not be run in slab unless otherwise indicated.
- B. Metering enclosure per Electric Utilities’ specifications. The meter is to be located outside the building wall within 50 feet of the main switch.
- C. All service entrance equipment including the appropriate size and type of conduit and service entrance conductors per the NEC and local authority having jurisdiction.

### 3.5 FIELD QUALITY CONTROL:

- B. Testing Agency: Engage a qualified independent testing agency to perform tests and inspections.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- D. Prepare for acceptance tests as follows:
  - 1. Test insulation-resistance tests of main switch disconnect, main circuit breaker, component, connecting supply, feeder, and control circuits.

2. Test continuity tests of each circuit.
- E. Testing: After installing main switch disconnect 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 or per manufacturer's written testing instructions. 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.
  3. Perform the following infrared scan tests and inspections and prepare reports:
    - a. Initial Infrared Scanning: After Substantial Completion, perform an infrared scan of each main switch disconnect. Remove front panel so joints and connections are accessible to portable scanner.
    - b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each main switch disconnect after the semi-final inspection.
    - c. Instruments and Equipment:
      - 1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
- F. Main Disconnect Switch will be considered defective if they do not pass tests and inspections.
- G. Prepare test and inspection reports, including a certified report that identifies Main Disconnect Switch included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

### 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 262713

## 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 817 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.
4. 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 817 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 up to 600A: Class J, time delay.
- C. Motor Branch Circuits: Class RK1, RK5 time delay.
- D. Other Branch Circuits: Class RK1, 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 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

### PART 1 - GENERAL

#### 1.1 SUMMARY:

- A. This Section includes individually mounted switches and circuit breakers used for the following:
  - 1. Service disconnect switches
  - 2. Feeder and equipment disconnect switches
  - 3. Feeder branch-circuit protection
  - 4. Motor disconnect switches
  - 5. Bolt-on circuit breakers
- B. Related CSI Sections: The following Sections contain requirements that relate to this section:
  - 1. Division 26 Section 260533, "Raceways and Boxes for Electrical Systems".
  - 2. Division 26 Section 262813, "Fuses".

#### 1.2 SUBMITTALS:

- A. Submit the following in accordance with Form 817 Article 1.20 – 1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.
- B. Product Data for switches, circuit breakers, and accessories specified in this Section. Include the following:
  - 1. Descriptive data and time-current curves.
  - 2. Let-through current curves for circuit breakers with current-limiting characteristics.
  - 3. Coordination charts and tables and related data.
  - 4. Wiring diagrams detailing wiring for power and control systems and differentiating between manufacturer-installed and field-installed wiring.
  - 5. 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 817 Article 1.20 – 1.08.14 subsection 2 and described in NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS.

D. Quality Assurance Submittals:

1. Qualification data for firms and persons specified in Part 1.3 "Quality Assurance" to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

E. Test and Inspection reports performed by an independent agency.

1.3 QUALITY ASSURANCE:

A. Testing Agency Qualifications: The independent testing agency shall meet OSHA criteria for accreditation of testing laboratories, Title 29, Part 1907, or shall be a full member company of NETA.

1. Testing Agency's Field Supervisor: Person currently certified by NETA or the NICET, to supervise on-site testing specified in Part 3.

B. Source Limitations: Obtain disconnect switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from one source and by a single manufacturer.

C. Comply with NFPA 70 for components and installation.

D. Listing and Labeling: Provide disconnect switches and circuit breakers specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in the NEC, Article 100.

1.4 COORDINATION:

A. Coordinate layout and installation of switches, circuit breakers, and components with other construction, including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate the installation of new bolt-on branch circuit breakers and main panel circuit breakers with existing panels. Match existing panel KIC rating and manufacture.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS:

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering disconnect switches and circuit breakers that may be incorporated into the Work include, but are not limited to, the following:

1. Fusible Switches:

- a. Eaton Corp.; Cutler-Hammer Products
- b. General Electric Co.; Electrical Distribution and Control Division
- c. Siemens Energy & Automation, Inc.
- d. Square D Co.

2. Molded-Case Circuit Breakers:

- a. Eaton Corp.; Cutler-Hammer Products
- b. General Electric Co.; Electrical Distribution and Control Division
- c. Siemens Energy & Automation, Inc.
- d. Square D Co.

3. Combination Circuit Breaker and Ground Fault Trip:

- a. General Electric Co.; Electrical Distribution and Control Division
- b. Siemens Energy & Automation, Inc.
- c. Square D Co.

4. Molded-Case, Current-Limiting Circuit Breakers:

- a. General Electric Co.; Electrical Distribution and Control Division
- b. Siemens Energy & Automation, Inc.
- c. Square D Co.

5. Integrally Fused, Molded-Case Circuit Breakers

- a. General Electric Co.; Electrical Distribution and Control Division
- b. Siemens Energy & Automation, Inc.
- c. Westinghouse Electric Corp.; Distribution & Control Business Unit.

6. Bolt-on circuit breakers

- a. General Electric Co.
- b. Square D Co.



## 2.2 DISCONNECT SWITCHES:

- A. Enclosed, Nonfusible Switch: NEMA KS 1, Type HD, with lockable handle.
- B. Enclosed, Fusible Switch, 800 A and Smaller: NEMA KS 1, Type HD, clips to accommodate specified fuses, enclosure consistent with environment where located, handle lockable with 2 padlocks, and interlocked with cover in CLOSED position.
- C. Enclosure: NEMA KS 1, Type 1, unless otherwise specified or required to meet environmental conditions of the installed location.
  - 1. Outdoor Locations: Type 3R.
  - 2. Wet Locations: Type 4X, stainless steel.
  - 3. Corrosive Location (i.e, Salt Shed, etc): Type 4X, stainless steel.
  - 4. Damp Indoor Locations: Type 4.

## 2.3 ENCLOSED CIRCUIT BREAKERS:

- A. Enclosed, Molded-Case Circuit Breaker: NEMA AB 1, with lockable handle.
- B. Characteristics: Frame size, trip rating, number of poles, and auxiliary devices as indicated and interrupting rating to meet available fault current.
- C. Application Listing: Appropriate for application, including switching fluorescent lighting loads or heating, air-conditioning, and refrigerating equipment.
- D. Circuit Breakers, 200 A and Larger: Trip units interchangeable within frame size.
- E. Circuit Breakers, 400 A and Larger: Field-adjustable, short-time and continuous-current settings.
- F. Current-Limiting Trips: Where indicated, let-through ratings less than NEMA FU 1, Class RK-5.
- G. Current Limiters: Where indicated, integral fuse listed for circuit breaker.
- H. Molded-Case Switch: Where indicated, molded-case circuit breaker without trip units.
- I. Lugs: Mechanical lugs and power-distribution connectors for number, size, and material of conductors indicated.
- J. Shunt Trip: Where indicated.
- K. Accessories: As indicated.

- L. Enclosure: NEMA AB 1, Type 1, unless otherwise specified or required to meet environmental conditions of installed location.
  - 1. Outdoor Locations: Type 3R.
  - 2. Wet Locations: Type 4X, stainless steel.
  - 3. Corrosive Locations (i.e, Salt Shed, etc): Type 4X, stainless steel.
  - 4. Damp Indoor Locations: Type 4.

## PART 3 - EXECUTION

### 3.1 INSTALLATION:

- A. Install disconnect switches and circuit breakers in locations as indicated, according to manufacturer's written instructions.
- B. Install disconnect switches and circuit breakers level and plumb.
- C. Connect disconnect switches and circuit breakers and components to wiring system and to ground as indicated and instructed by manufacturer.
  - 1. Tighten electrical connectors and terminals 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.
- D. Identify each disconnect switch and circuit breaker according to requirements specified in CSI Division 26 Section 260553, "Identification for Electrical Systems."

### 3.2 FIELD QUALITY CONTROL:

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Acceptance Testing Preparation:
  - 1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
  - 2. Test continuity of each circuit.
- D. Testing: After installing disconnect switches and circuit breakers 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 disconnect switches and Section 7.6 for molded-case circuit breakers or per manufacturer's requirements. 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.
  3. Perform the following infrared scan tests and inspections and prepare reports:
    - a. Initial Infrared Scanning: After Substantial Completion, perform an infrared scan of each enclosed switch and circuit breaker. Remove front panel so joints and connections are accessible to portable scanner.
    - b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each enclosed switch and circuit breaker after the semi-final inspection.
    - c. Instruments and Equipment:
  4. Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device
- E. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- F. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

### 3.3 CLEANING:

- A. After completing system 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 262816

## SECTION 263213 – ENGINE GENERATORS

### PART 1 - GENERAL

#### 1.1 SUMMARY:

- A. The Installer shall design, engineer, furnish, deliver, and install one exterior diesel engine or natural gas generator set with all necessary accessories and auxiliary equipment for use on the services as hereinafter described.
- B. The generator set manufacturer shall also:
  - 1. Conduct a program of its standard factory tests to verify system performance in accordance with this Section.
  - 2. Provide erection and commissioning advisers and testing personnel to ensure operation of the generator set as specified herein.
- C. Related Requirements:
  - 1. Section 263600 "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine-generator sets.

#### 1.2 SYSTEM DESCRIPTION:

- A. The generator and auxiliaries shall be classified as a Type 10, Class 48, and Level 2 Standby Power Supply System in accordance with NFPA 110. The generator set and auxiliaries shall meet all NFPA 110 requirements, which apply to this classification.
- B. The system shall include a complete unit consisting of the engine, generator, basic accessories mounted on a rigid common base, double wall base fuel tank, enclosure, control panels, automatic voltage regulator, and necessary accessories, all comprising a complete package. It shall be completely assembled, piped, wired, and tested as a complete system at the factory. The factory testing shall consist of the manufacturer's standard program of tests as required by NEMA MG1. The complete system shall be in accordance with NEC Article 700 and NFPA 110.
- C. The diesel or natural gas generator and all other accessory equipment shall be of the latest design conforming to accepted manufacturers' standards for this equipment and shall be offered only for the rating and service for which they were designed. All equipment and material required for operation shall be furnished by the diesel or natural gas generator manufacturer.

- D. The Installer shall arrange with the manufacturer in writing, with a copy to the Engineer, for supervision by the manufacturer to insure proper installation of the equipment. This shall include as many site visits as necessary, but not less than three. The first site visit shall be made by the manufacturer before the diesel or natural gas generator is set in place or connections roughed, and the second site visit shall be made by the manufacturer after the diesel or natural gas generator is set in place but before connections are made. During visits, the manufacturer shall consult with the Engineer, the Installer, and all others providing work or connections to the standby generator. Failure to receive a written request shall not relieve the manufacturer of his responsibility to supervise and visit the installation. Any changes or recommendations made during site visits shall be forwarded in writing to the Engineer.
- E. Should the engine, the generator, or both, or associated parts be damaged in any way during construction, the complete diesel or natural gas generator unit shall be removed from the site and replaced with a new diesel or natural gas generator at the expense of the Installer without cost to others. Additional construction costs or other costs to the purchaser caused because of the engine-generator and ancillary equipment replacement shall be at the expense of the installer without cost to others. A temporary unit shall be provided if necessary in order not to delay completion of the Work.
- F. Failure to receive a written request shall not relieve the manufacturer of his responsibility to supervise and visit the installation. Any changes or recommendations made during site visits shall be forwarded in writing to the Engineer.

### 1.3 APPLICABLE DOCUMENTS:

- A. The latest issues of the following documents are in addition to those previously referenced. If there is, or seems to be, a conflict between this Section and a referenced document, the matter shall be referred to the Engineer.

ANSI/ABMA-9	Load Ratings and Fatigue Life for Ball Bearings
ANSI/ABMA-11	Load Ratings and Fatigue Life for Roller Bearings
ANSI B31.1	Power Piping Code
ANSI C37.20	Switchgear Assemblies, Including Metal Enclosed Bus with Supplement C37.20D
ANSI C50.10	General Requirements for Synchronous Machines
ANSI C50.12	Requirements for Salient Pole Synchronous Generation and Condensers
ANSI C57.13	Requirements, Terminology, and Test Code for Instrument Transformers
ANSI/ASA 47	Sound Level Meters
ANSI/ASA 53	Preferred Frequencies and Band Numbers for Acoustical Measurements
ANSI/ASA 6586	Octave, Half Octave, and Third Octave Band Filter Sets
IEEE Std 85	Test Procedures for Airborne Noise Measurement on Rotating Electric Machinery

IEEE 112	Standard Test Procedure for Polyphase Induction Motors and Generators
IEEE Std 115	Test Procedure for Synchronous Machines
NEMA MG1	Standards for Motors and Generators
NFPA 30	Flammable and Combustible Liquids Code
NFPA 37	Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines
NFPA 110	Emergency and Standby Power Systems
UL 80	Steel Inside Tanks for Burner Fuel
UL 2200	Generator

#### 1.4 SUBMITTALS:

- A. Submit the following in accordance with Form 817 Article 1.20-1.02.02 and NOTICE TO CONTRACTOR – SUBMITTALS.
- B. Product Data:
  1. Generator capability curves.
  2. Field forcing data to calculate sustained fault current.
  3. Pertinent performance curves, which shall include the following:
    - a. Electrical load starting capability curves, with time and voltage on the ordinate and starting kVA on the abscissa axis, showing the minimum value reached, the time it is reached, recovery value, and time to reach recovery value;
    - b. The same curves stated above for frequency instead of voltage;
    - c. Curves showing time to recover to 100 percent nominal voltage vs. starting kVA;
    - d. Curves showing time to recover to 100 percent nominal frequency vs. starting kVA;
    - e. A 'plot' or 'coordinate point listing' versus time, at 0.1" intervals, for 5" following each load application, shall be furnished for both voltage and frequency. One set of data based on the loading requirements delineated in Section 3.2.
- C. Shop Drawings:
  1. Assembly and shop detail drawings.
  2. Field erection drawings, if required.
  3. Outline drawings, including plans and elevations.
  4. Electrical elementary and wiring diagrams. Wiring diagrams shall be of the continuous line type. All transfer switches shall be shown on one wiring drawing along with all conduits and wire sizes.
  5. Schematic and piping diagrams.

6. Catalog cuts showing the general arrangement and approximate dimensions of the equipment proposed.
7. Typical cross-sectional catalog cuts, or other means of showing salient features of the equipment proposed.
8. Catalog cuts showing estimated weights and distribution of static, live, and other loads.
9. Sound Levels:
  - a. The manufacturer shall provide, with the shop drawings, the maximum octave band sound pressure levels and the maximum A-weighted sound level at 23 ft from the engine block, and at the outlet of the exhaust muffler with an average 8 measurements. The sound level shall be in accordance to the town where the generator is installed and the defined property line.
  - b. The Contractor shall submit the basis for which the sound level data is made. This may include certified test data from identical or similar equipment. All data should show conformance to proper test procedures, as detailed in IEEE 85, DEMA Test Code for the Measurement of Sound from heavy-duty Reciprocating Engines, and AMCA 300 Test Code for Sound Rating Air Moving Devices. Where measured data are not available, estimated values may be submitted for the Designers' evaluation if accompanied by a thorough explanation, including all assumptions made.
  - c. Sound pressure level data shall be measured in decibels, referenced to 2x10 Pascal's, using a sound level meter conforming to ANSI S1.4, Type 1, tolerance limits. All octave band filter sets shall conform to ANSI S1.11, Class II, Type E, and tolerance limits. The nine preferred octave bands, specified in ANSI S1.6, shall be used in submitting these data.

D. Operation and Maintenance Manuals: For generators, all installed devices associated, and components to include in the operational and maintenance manuals specified in Form 816 Article 1.20-1.08-14 subsection 2 and described in NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS.

1. All equipment shall be specifically identified, such as by serial number.
2. One set of instructions, certified by the manufacturer, shall be packed and sent with the equipment to the Project Site. A parts identification list shall accompany each set of instructions. This shall include sectional and/or outline prints or illustrations, identifying each numbered part and location in relation to the equipment as a whole.

## 1.5 QUALITY ASSURANCE:

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
  1. Maintenance Proximity: Not more than four hours' normal travel time from Installer's place of business to Project Site.

- a. The manufacturer, in addition, shall maintain a complete stock of genuine factory replacement parts necessary for a complete overhaul of the systems. Factory-trained service personnel shall be made available on a 24-hr basis. Availability of service and parts shall remain a direct function of the manufacturer and shall not be relegated to other service organizations.
  2. Engineering Responsibility: Preparation of data for vibration isolators of engine skid mounts, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 200 miles of Project Site, a service center capable of providing training, parts, and emergency maintenance repairs.
  - C. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the NETA or is a nationally recognized testing laboratory (NRTL), 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.
  - D. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.
  - E. 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.
  - F. Comply with ASME B15.1.
  - G. Comply with NFPA 37.
  - H. Comply with NFPA 70.
  - I. Comply with NFPA 99.
  - J. Comply with NFPA 110 requirements for Level 2 stand-by power supply system.
  - K. Comply with UL 2200.
  - L. Engine Exhaust Emissions: Comply with applicable state and local government requirements.
  - M. Noise Emission: Noise levels shall consist of the average sound pressure measurements at eight evenly spaced locations 360° around the generator enclosure taken 23' from the generator enclosure under full load. The following noise levels shall apply:



1. Generator in a sound attenuated enclosure, Average noise level at 23' shall be no more than:
  - a. 70 db (A) for 60KW/75KVA Generator in East Haven
  - b. 75 db (A) for 30KW/30KVA Generator in East Lyme
  - c. 77 db (A) for 60KW/75KVA Generator in East Windsor
  - d. 76 db (A) for 40KW/50KVA Generator in Haddam
  - e. 75 db(A) for 70KW/87.5KVA Generator in Hartford
  - f. 76 db (A) for 40KW/50KVA Generator in Mansfield
  - g. 83 db(A) for 250KW/562KVA Generator in Rocky Hill

#### 1.6 WARRANTIES:

- A. Refer to Form 817 Article 1.20-1.06.08 and NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS for additional information.
- B. The standby generator system shall be warranted by the manufacturer for 5 years or 3,000 hours, whichever occurs first, from the date of the issuance of the Certificate of Compliance. The vendor must be the authorized distributor of all major components and must provide documentation supporting their ability and authority to perform all warranty service and repairs. The warranty shall cover both parts and labor for the complete warranty period.

#### 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. Include name, address, and telephone number of in-state supplier of spare parts. No out-of-state suppliers shall be permitted Quantities below are examples only.
  1. Fuses: One for every 10 of each type and rating, but no fewer than one of each.
  2. Indicator Lamps: Two for every six of each type used, but no fewer than two of each.
  3. Filters: One set each of lubricating oil, fuel, and combustion-air filters.
  4. Keys: 6 spares of each type for generator enclosure.

#### 1.8 COORDINATION:

- A. The contractor shall fill the generator base tank with motor vehicle diesel fuel as defined in Section 22a-174-42 of the Regulations of Connecticut State Agencies. A charge of \$5,155 shall be included in the Contract Bid Price for the filling of the generator base tank with Ultra Low Sulfur Diesel fuel for the six sites (East Haven, East Lyme, East Windsor, Haddam, Mansfield, and Rocky Hill) or as otherwise directed by

the Engineer. 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.

East Haven – 187 gallons of diesel required which approximately cost \$584.00

East Lyme – 96 gallons of diesel required which approximately cost \$300.00

East Windsor – 187 gallons of diesel required which approximately cost \$584.00

Haddam – 158 gallons of diesel required which approximately cost \$493.00

Mansfield – 158 gallons of diesel required which approximately cost \$493.00

Rocky Hill - 730 gallons of diesel required which approximately cost \$2,280.00

- B. For natural gas generator, there are no charges. The natural gas will be obtained from the existing service. This applies to the Hartford Site only.

## PART 2 - PRODUCTS

### 2.1 GENERATOR UNIT:

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work are the following:
  - 1. Cummins Power Systems.
  - 2. Kohler Power Systems.
  - 3. Caterpillar.
  - 4. MTU Onsite Energy (Atlantic Power Systems)
- B. Responsibility: The generator unit shall be the standard product of a firm regularly engaged in the manufacture or assembly of generating sets. Either the generator or engine manufacturer or their authorized distributor shall provide the generator unit. The engine-generator units shall be assembled and tested at the manufacturer's facility prior to shipment to the Project Site. The generator set manufacturer shall be fully responsible to the Installer and Owner for the successful operation of the entire standby generator unit and shall use only proven standard packaged unit.
- C. Conditions of Service:
  - 1. The generator unit will be required to operate in case of complete loss of utility power, to supply power to 100% of the load until normal power is returned. It will

- also be periodically started and test run and loaded to assure that the unit is maintained in good operating condition.
2. The equipment will be used to supply emergency power to a maintenance facility on a 208Y/120 VAC 3 phase, 60 Hz, 4 wire, grounded commercial power system (East Haven, East Windsor, Haddam, Hartford, and Mansfield), or 480Y/277 VAC 3 phase, 60 Hz, 4 wire, grounded commercial power system (Rocky Hill), or 120/240 VAC 1 phase, 60 Hz, 3 wire, grounded commercial power system (East Lyme).
  3. The generator unit shall be capable of starting cold in a minimum outdoor ambient of -20°F, accelerating to rated speed, frequency, and full voltage and ready to accept load to its rated capacity in not more than 10 seconds from system start signal, and shall also be capable of carrying continuously rated load in a maximum outdoor ambient of 105°F. The generator unit shall be capable of carrying rated load with the outside combustion and cooling air temperature ranging from -20°F to 105°F with a maximum relative humidity of 100 percent. The electrical components and transfer switch shall be capable of functioning properly when exposed to these outside ambient conditions with such cooling air conditions. The installer shall coordinate interfaces with others as required.

D. Performance Required:

1. The generator set shall be rated continuous standby, 208Y/120 VAC, 3 phase, 4 wire, 60 Hz; or 480Y/277 VAC, 3 phase, 4 wire, 60 Hz, or 120/240 VAC, 1 phase, 3 wire, 60 Hz, 0.8-lagging power factor for the 3 phase generators and 1-lagging power factor for the 1 phase generators, minimum rated size as shown on the plans at the environmental conditions stated herein.
2. The generator shall be capable of starting either manually or automatically and, in either case, transferring to previously energized or de-energized loads.
3. Upon receiving a start signal from any transfer switch, the generator shall be capable of starting automatically without local attendance, reaching synchronous speed and rated voltage and frequency within 10 seconds, and be ready to accept load to the specified overload rating in one step.
4. The system automatic start signal shall not be initiated until a delay of 2 sec has elapsed after a power failure in order to prevent starts due to momentary utility interruptions.
5. During periodic tests, the generator shall be capable of starting on manual signal and being accelerated to synchronous speed and rated voltage within 10 seconds in accordance with NFPA 110.
6. The generator shall be capable of being loaded sequentially in accordance with the requirements delineated in the loading sequence table included at the end of this subsection which, also, refers to the load on the panels indicated on the drawings. The bidder shall propose larger size standard units if his standard rated generator unit cannot meet the specified performance requirements.
7. It is required that the generator be capable of operating up to 2.0 hr at operating speed and less than 20 percent of rated full load and then picking up its sequenced loads with no disruption of power.

8. When loaded sequentially in accordance with the loading summary, the transient voltage drop at any sequence step shall be limited such that the generator voltage is not less than 80 percent of nominal voltage, and frequency is not less than 95 percent of nominal. In addition, the voltage at the generator shall recover to within 100% of nominal voltage and the frequency to within 98% of nominal within 2 sec after each sequential load application.
9. During recovery from transients caused by step load increases, step load decreases, or resulting from 100 percent load rejection, the speed of the generator set shall not reach the overspeed shutdown set point.

E. Engine:

1. The engine shall be multicylinder, 4 cycle, fuel natural gas or diesel (depending on the site), turbocharged, stationary type, having removable cylinder liners with a direct injection fuel system, liquid cooled with a unit-mounted radiator, fan, and cooling pump, and positive crankcase ventilation.
2. The engine shall have a continuous horsepower rating when equipped with all engine accessories, including radiator fans; to provide rated generator output at rated speed and frequency under specified ambient conditions.
3. The crankshaft shall be fully counterbalanced. Bearings shall be the precision insertion type, readily replaceable without machining or scraping.
4. Bearings shall be suitable for continuous service. The life of the antifriction bearing shall be the L10 Service Life calculated in accordance with ANSI/ABMA-9 and ANSI/ABMA-11 for the design speed and load condition.
5. The engine generator unit shall be completely equipped with all necessary auxiliary systems as hereinafter specified to form a complete package. Industrial control devices, controllers, and assemblies shall be in accordance with NEMA ICS-1, ICS-2, and ICS-6. All control relays shall be provided with dust tight covers.
6. Harmful torsion vibration stresses shall not occur within a range of 10 percent above to 10 percent below rated synchronous speed.
7. Moving parts shall be designed to withstand, without damage, overspeed caused by full extended load rejection, with ample margin to allow the overspeed trip devices to be set sufficiently high to guarantee that the engine-generators will not trip on full extended load rejection.
8. Removable metal guards shall adequately protect exposed rotating parts, such as couplings, bolts, or pulleys.

F. Engine Starting System:

1. The engine shall be provided with a dc motor-driven starting system, which shall be capable of starting the engine without outside power. The starting system shall include a heavy-duty electric motor-driven cranking mechanism with overcranking protection, starting battery, battery rack, battery cables, dc voltage regulator, starting battery dual rate float/equalize charger, and complete instrumentation and control systems.

2. A lead-acid type storage battery, 12 V or 24 V, together with rack and connections, shall be provided inside the generator enclosure. The battery shall have sufficient capacity to crank the engine three times at the specified outside ambient temperature without lowering the terminal voltage of the individual cells below 1.6 V. A complete cranking cycle shall consist of an automatic crank period of approximately 15 seconds followed by a rest period of approximately 15 seconds. A high-grade hydrometer shall be included. The battery shall be adequately sealed to prevent the emission of acid fumes and be equipped with explosion resistant vent caps.
3. A static type dual rate float/equalize charger with automatic and manual charge control shall be furnished to service and float the battery and maintain it fully charged from the 120 V, single phase, 60 Hz, alternating current power supply when the unit is stopped. The charger shall operate satisfactorily at the ambient range temperature of -20°F to 115°F and shall be provided with protective fuses, rheostat, DC voltmeter and ammeter. The charger shall have alarm features to provide low battery, high battery voltage and charger malfunction alarms. The charger shall be by LaMarche, or an approved equal.

G. Engine Fuel System:

1. The fuel system shall be equipped with a fuel filter having replaceable elements, which may be easily removed from their housings for replacing without breaking any fuel line connection or disturbing the fuel pumps or any other part of the engine. Fuel filters shall be conveniently located in one accessible housing, ahead of the injection pumps, so that the fuel will have been thoroughly filtered before it reaches the pumps.
2. The fuel system shall be furnished with the engine manufacturer's standard electric motor-driven or engine-driven startup fuel pump for 10 second starting.
3. The engine shall be equipped with a built-in gear type, engine-driven fuel pump for supplying fuel through the filters to the injection pumps at constant pressure.
4. For diesel fuel generators, the engine shall be suitable for #2 low sulfur winterized diesel fuel so that low emissions as well as no gelling of fuel will occur.
5. For diesel fuel generators, a 48 - hour base fuel tank shall be furnished. The base fuel tank shall be UL Approved, double wall construction. It shall be supplied with normal and emergency vents, 2" locking fill cap, fuel level gauge, low fuel alarm contacts and remote rupture alarm panel. The fuel tank shall be equipped with a 2" port to connect a sensor to the Tank Monitoring System. The fuel tank shall provide sufficient fuel for 48 hours at 75% load. The fuel system shall be equipped with a fuel filter having replaceable elements which may be easily removed from their housings for replacing without breaking any fuel line connection or disturbing the fuel pumps or any other part of the engine. Fuel filters shall be conveniently located in one accessible housing, ahead of the injection pumps, so that the fuel will have been thoroughly filtered before it reaches the pumps.

H. Engine Cooling System:

1. The engine shall be water-cooled, glycol anti-freeze protected, and the cooling system shall consist of a direct, engine-driven water circulating pump, water temperature regulating valves, unit-mounted radiator with blower fan, radiator air discharge duct adapter, and necessary pipe fittings and lagging.
2. The engine cooling water system shall be equipped with an engine-mounted, thermostatically controlled. The coolant heater shall keep the cooling water warm when the engine is not running, thereby maintaining the generator set in a ready-to-start condition.
3. A rigid guard shall enclose both top and sides of all moving parts between the engine and the radiator.

I. Engine Lubrication System:

1. The engine lubrication system shall be integral with the engine and be positive in action. It shall include a direct engine-driven gear type lubricating oil pump, lubricating oil filters, all piping, valves, and control devices to form a complete lubrication system.
2. Lubricating oil filters shall be of the multiple elements, continuous full flow type, utilizing suitable filtering media.

J. Engine Air Intake System: The engine shall be provided with one or more dry type, replaceable element, and air cleaners.

K. Engine Exhaust System: The exhaust system for the engine shall consist of a continuous flexible high temperature stainless steel exhaust connector with flanged connections at both ends, and a muffler with flanged connections at both ends, tapped for drainage. The muffler shall be suitable for critical type silencing and shall be Maxim M51 with side inlet or approved equal.

L. Engine Speed and Load Control System:

1. The engine speed and load control system for the engine-generator set shall consist of a suitable electronic isochronous governor and all necessary equipment, for controlling the engine speed. Mechanical governors are not acceptable.
2. A separate overspeed device, independent of the governor, shall be provided to prevent engine runaway in the event of any failure which may render the governor inoperable.

M. Engine Protection System:

1. The engine shall be provided with a system of automatic controls designed to initiate engine alarm and shutdown sequences to prevent damage or destruction of the engine should a malfunction occur during operation. The controls shall be of a positive-action type and shall contain electrical contacts to be used for energizing the alarm, trip, and shutdown devices. The pressure and temperature alarm controls shall be set to operate before the shutdown controls to provide warning of impending shutdown. The engine protection systems shall be integrated with the alarm, trip,

and shutdown control systems described under Part 2.1P "Generator and Excitation Protection Systems."

2. Automatic engine, shutdown shall be initiated by any one of the following conditions:
  - a. High engine cooling water temperature
  - b. Low lubricating oil pressure
  - c. Engine overcrank
3. The manufacturer representative shall advise the Engineer and the Installer of any additional alarm and shutdown devices they consider necessary and that they intend to furnish for the safe operation and protection of the unit.

N. Generator:

1. The Generator shall be designed, manufactured, and tested in accordance with NEMA MG1 and ANSI C50.10.
2. The Generator shall be mounted on the common base with its respective engine driver and shall be directly connected to the engine by means of a suitable coupling. It shall be self-ventilated, drip-proof construction.
3. The generator shall have a continuous standby rating at rated speed, 208/120 V, 3 phase, 60 Hz; or 480Y/277 VAC, 3 phase, 4 wire, 60 Hz, or 120/240 VAC, 1 phase, 3 wire, 60 Hz, 0.8- lagging power factor for the 3 phase generators and 1-lagging power factor for single phase generators. It shall be Wye-connected and shall be capable of satisfactorily meeting the starting, loading, and voltage drop requirements as delineated in "Performance Required," without exceeding temperature rises specified by NEMA MG1 for a continuous standby rated generator. The minimum rating of the generator shall be as specified on the plans at 105°C temperature rises.
4. Both ends of each phase of the stator windings shall be brought out through suitably rated copper bus terminal box, providing adequate space for connection of the power cables at the bottom of the generator. The insulation for the starter windings, the rotor windings and for the exciter windings shall be class H as defined in the ANSI Standard C50.10.
5. The Generator shall be capable of 350% minimum motor start kVA with 100% voltage recovery.
6. The insulation for the stator windings, the rotor windings, and for the exciter windings shall be Class H, as defined in ANSI Standard C50.10.
7. Insulation shall be treated to make it of the sealed type, suitable for protection against severe moisture, oil, chemicals, and abrasive dust.
8. The Generator and its output terminals shall be properly designated to identify the phase sequence.
9. The Generator short-circuit capability, wave shape, telephone influence factor, and overspeed requirements shall meet those delineated in ANSI Standards C50.10 and MG-1.

10. The-stator frame shall be provided with one unpainted copper ground pad for the Purchaser's ground connection. Ad shall be drilled and tapped for a standard NEMA 2-hole connection in accordance with NEMA CC1-4.05.
11. Generator bearings shall be suitably insulated, where necessary, to prevent the flow of shaft currents.

O. Excitation System:

1. The generator shall be equipped with a fast response, continuously acting, and permanent magnet generator excitation system, consisting of a brushless rotary type main exciter and a static voltage regulator. The exciter shall be capable of remote control to raise and lower the voltage. The exciter shall be capable of providing sustained fault current in excess of rated output current for selective tripping of downstream molded case circuit breakers.
2. The excitation system shall have the capability of minimizing voltage disturbances and maintaining the generator output voltage within acceptable limits during the starting and acceleration of induction motors as described in the starting, loading, and voltage drop requirements delineated in Part 2.1.G, "Engine Fuel System". The voltage regulator shall be high speed, continuously acting, and shall be suitable for maintaining normal operating voltage within plus or minus 0.5 percent.

P. Generator and Excitation Protection Systems:

1. The generator and its respective excitation system shall be provided with a system of automatic controls designed to initiate generator alarm and trip sequences to prevent damage or destruction of the generator should a malfunction occur during operation. The controls shall be of a positive-action type and shall contain electrical contacts to be used for energizing the alarm, trip, and shutdown devices. The manufacturer shall provide means for shorting or de-energizing the generator field upon engine shutdown.
2. Automatic generator trip shall be initiated by conditions, which shut down the engine.
3. The manufacturer representative shall state any additional alarm and trip devices they consider necessary and propose to furnish for the safe operation and protection of the generators and excitation systems.

Q. Generator Set Mounting: The diesel generator set shall be equipped with factory installed vibration isolators mounted between the set and the fabricated steel base to prevent the distortion of alignment between generator and engine when installed. The vibration isolators shall be seismic rated. The equipment shall be mounted on and anchored to a concrete slab by the Installer. The vibration isolators shall be as required by the generator set manufacturer. The natural gas generator set shall be equipped with a factory installed spring vibration isolator sound skirt mounted to the bottom of the vibration isolators to prevent rodents from entering the enclosure through the bottom.

R. Vibration and Balance: All equipment as assembled units shall operate with minimum vibration throughout the operating range.



- S. Generator Circuit Breaker: A main generator output line 3 pole circuit breaker with solid state trip, 100% rated, shall be unit-mounted as shown on the drawings. It shall operate both manually as an isolation switch and automatically during overload and short-circuit conditions. The generator circuit breaker shall be sized to carry generator rated output in accordance with NFPA-110 and NEC, shall be UL listed, and shall meet applicable NEMA standards.
- T. Shop Cleaning and Painting:
1. Component parts of the generator system shall be cleaned during final assembly to provide the assembled units free of all foreign material such as chips, waste, mill scale, weld rod spatter, oil, grease, or other deleterious material. Chlorinated solvents shall not be used. Openings shall be closed immediately after cleaning. Rust, if any, shall consist of not more than a surface film discoloration that can be readily removed by wiping.
  2. After completion of testing, the Contractor shall clean, prime, and finish paint all external metal parts, with the exception of machined and bright surfaces. The priming coat shall contain a rust inhibiting pigment.
  3. No filler shall be used before painting. The coating shall be applied only on dry, clean surfaces, after removal of all oil, paraffin, or grease with a suitable solvent.
  4. Exposed, machined, and bright surfaces subject to corrosion, with the exception of abutting joints and base-plates, shall be coated as soon as practicable after acceptance by the manufacturer's inspector, with a suitable petroleum grease or rust-inhibiting compound.

## 2.2 DIESEL FUEL-OIL SYSTEM

- A. Comply with NFPA 30.
- B. Piping: Fuel-oil piping shall be Schedule 40 black steel, or as recommended by the manufacturer.
- C. Main Fuel Pump: Mounted on engine to provide primary fuel flow under starting and load conditions.
- D. Fuel Filtering: Remove water and contaminants larger than 1 micron.
- E. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.
- F. Fuel-Oil Storage Tank: Comply with requirements of manufacturer.

1. Consult tank manufacturers about capacities available for size of set in Project.

2. Fuel Tank Capacity: Minimum 133 percent of total fuel required for periodic maintenance operations between fuel refills plus fuel for the hours of continuous operation required for the indicated EPSS Class.

G. Subbase-Mounted, Double-Wall, Fuel-Oil Tank: Factory installed and piped, complying with UL 142 fuel-oil tank. Features include the following:

1. Tank level indicator.
2. Fuel-Tank Capacity: Minimum 133 percent of total fuel required for periodic maintenance operations between fuel refills, plus fuel for the hours of continuous operation for indicated EPSS class.
3. Vandal-resistant fill cap.
4. Containment Provisions: Comply with requirements of authorities having jurisdiction.

## 2.3 GASEOUS FUEL SYSTEM

A. Natural-Gas Piping: Comply with requirements of gas company.

B. Engine Fuel System:

1. Natural-Gas, Vapor-Withdrawal System:

- a. Carburetor.
- b. Secondary Gas Regulators: One for each fuel type, with atmospheric vents piped to building exterior.
- c. Fuel-Shutoff Solenoid Valves: NRTL-listed, normally closed, safety shutoff valves; one for each fuel source.
- d. Fuel Filters: One for each fuel type.
- e. Manual Fuel Shutoff Valves: One for each fuel type.
- f. Flexible Fuel Connectors: Minimum one for each fuel connection.
- g. Fuel change gas pressure switch.

## 2.4 CONTROLLER:

A. Standards:

1. Control must meet NFPA-110 Level 2 requirements
2. NFPA-99 and NEC must also be accommodated.
3. The generator set control must be listed under UL 508.

B. Applicability:

1. For standardization purposes, the control described herein must be available on generator sets 20 kW and larger.
2. The control must be usable on 12- or 24-volt starting system.
3. Environment:
  - a. -40°C to +70°C operating temperature range
  - b. 5-95% humidity, non-condensing

4. It shall be possible to mount the control on the generator set or remotely within 40 feet of the generator set. If mounted on the generator, the control must be able to be mounted in any of 4 orientations for ease of viewing.

C. Hardware Requirements:

1. The control shall have a run-off/reset-auto three-position selector switch. If required, in the plans and specs, a version of the control shall have a key operated selector switch.
2. A controller mounted latch type emergency stop push button must be supplied.
3. It shall be possible to adjust alternator output voltage at the control.
4. Five indicating lights as follows:
  - a. System ready – green
  - b. Not in auto – yellow
  - c. Programming mode – yellow
  - d. System warning – yellow
  - e. System shutdown - red
5. Lighted display with two lines of 20 alphanumeric characters for messages. Panel lights must be supplied as standard.
6. Sealed keypad for menu selection and data entry.
7. For ease of use, an operating guide must be on the controller faceplate.

D. Control Functional Requirements:

1. Field programmable time delay for engine start. Adjustment range, 0-5 minutes in 1 second increments.
2. Field programmable time delay engine cooldown. Adjustment range, 0-10 minutes in 1 second increments.
3. It shall be possible to start the generator and run it at an idle speed during warm-up. The idle time must be user adjustable. Engine cooldown at idle must also be available. Required for ECM equipped engines only.
4. Real time clock and calendar for time stamping of events.
5. Output with adjustable timer for an ether injection starting system. Adjustment range, 0-10 seconds.
6. Output for shedding of loads if the generator reaches a user programmable percentage of its kW rating. Load shed must also be enabled if the generator output frequency falls below 59 Hz (60 Hz system) or 49 Hz (50 Hz system).
7. Programmable cyclic cranking that allows up to six crank cycles and up to 15 seconds of crank time per crank cycle.
8. The capability to reduce controller current battery draw, for applications where no continuous battery charging is available, must be provided.
9. The controller firmware must provide alternator protection for overload and short circuit matched to each individual alternator and duty cycle.

10. A  $\pm 0.25\%$  digital voltage regulator must be incorporated into the controller software. No separate voltage regulator is acceptable. The digital voltage regulator must be applicable on single or three phase systems.
  11. It must be possible to exercise the generator by programming a running time into the controller. This feature must also be enabled through the PC software.
- E. Generator System Monitoring Requirements: All monitored functions must be viewable on the digital display.
1. The following generator functions must be monitored:
    - a. All output voltages - single phase, three phase, line to line, and line to neutral, 0.25% accuracy
    - b. All single phase and three phase currents, 0.25% accuracy
    - c. Output frequency, 0.25% accuracy
    - d. Power factor by phase with leading/lagging indication
    - e. Total instantaneous kilowatt loading and kilowatts per phase, 0.5% accuracy
    - f. kVARs total and per phase, 0.5% accuracy
    - g. kVA total and per phase, 0.5% accuracy
    - h. kW hours
  2. Engine parameters listed below shall be monitored:
    - a. Coolant temperature both in English and metric units
    - b. Oil pressure in English and metric units
    - c. Battery voltage
    - d. Rpm
    - e. Lube oil temperature
    - f. Lube oil level
    - g. Fuel level
    - h. Crankcase pressure
    - i. Coolant level
    - j. Coolant pressure
    - k. Fuel pressure
    - l. Fuel temperature
    - m. Fuel rate
    - n. Fuel used during the last run
    - o. Ambient temperature
  3. Operational records since system startup must be stored in the controller:
    - a. Run time hours
    - b. Run time loaded
    - c. Run time unloaded
    - d. Number of starts

- e. Factory test date
  - f. Last run data including date, duration, and whether loaded or unloaded
  - g. kW hours
4. The following operational records must also be available in a resettable form for maintenance purposes:
- a. Run time hours
  - b. Run time loaded
  - c. Run time unloaded
  - d. Kilowatt hours
  - e. Days of operation
  - f. Number of starts
  - g. Start date after reset
5. The controller must store the last 32 generator system events with date and time of the event.
6. For maintenance and service purposes, the following information must be stored in the control and displayed on demand:
- a. Manufacturer's model and serial number
  - b. Battery voltage
  - c. Generator set kilowatt rating
  - d. Rated current
  - e. System voltage
  - f. System frequency
  - g. Number of phases
- F. The control must be capable of detecting the following conditions, indicate if the condition will shutdown the generator or provide a warning, and annunciate the situation, using words and phrases, on the digital display.
1. Will cause a system shutdown:
- a. Air damper tripped (if used)
  - b. Customer programmed digital auxiliary input ON (any of the 21 inputs available)
  - c. Customer programmed analog auxiliary input out of bounds (any of 7 inputs for ECM equipped engines and 5 inputs for non ECM engines)
  - d. Emergency stop
  - e. High coolant temperature
  - f. High oil temperature
  - g. Controller internal fault
  - h. Locked rotor - fail to rotate
  - i. Low coolant level
  - j. Low oil pressure

- k. Master switch error
- l. NFPA common alarm
- m. Overcrank
- n. Overspeed with user adjustable level range 65-70 Hz on 60 Hz systems and 55-70 Hz on 50 Hz systems
- o. Generator overvoltage with user adjustable level range 105% to 135%
- p. Overfrequency with user adjustable level range 102% to 140%
- q. Underfrequency with user adjustable level range 80% to 90%
- r. Generator undervoltage with user adjustable level range 70% to 95%
- s. Coolant temperature signal loss
- t. Oil pressure gauge signal loss

2. Will cause a warning but leave the generator running:

- a. Battery charger failure
- b. Customer programmed digital auxiliary input on (any of the 21 inputs available)
- c. Customer programmed analog auxiliary input on (any of the 7 inputs available on ECM engines and 5 inputs for non ECM engines)
- d. Power system supplying load
- e. Ground fault detected - detection by others
- f. High battery voltage - Level must be user adjustable.
- g. Range 14.5 to 16.5 volts for 12-volt system and 29-33 volts for 24-volt systems.
- h. High coolant temperature
- i. Load shed
- j. Loss of AC sensing
- k. Underfrequency
- l. Low battery voltage – level must be user adjustable Range 10-12.5 volts for 12-volt systems and 20-25 volts for 24-volt systems.
- m. Low coolant temperature
- n. Low fuel level or pressure
- o. Low oil pressure
- p. NFPA common alarms
- q. Overcurrent
- r. Speed sensor fault
- s. Weak battery
- t. Alternator protection activated

G. Inputs and Outputs:

1. Inputs:

- a. There shall be 21 dry contact inputs that can be user configured to shutdown the generator or provide a warning.

- b. There shall be 7 user programmable analog inputs for ECM engines (5 for non ECM engines) for monitoring and control.
  - 1) Each analog input can accept 0-5 volt analog signals.
  - 2) Resolution must be 1 part in 10,000.
  - 3) Each input can be programmed to provide up to 4 trip values – 2 warnings and 2 shutdowns.
  - 4) It must be possible to view the analog value on the display.
- c. It shall be possible to define each user configured input using words or phrases that will be viewable on the digital display.
- d. Additional standard inputs required:
  - 1) Input for an external ground fault detector. Digital display must show "ground fault" upon detection of a ground fault.
  - 2) Reset of system faults.
  - 3) Remote two wire start.
  - 4) Remote emergency stop.
  - 5) Idle mode enable.

## 2. Outputs:

- a. All NFPA 110 Level 2 outputs must be available.
- b. There shall be thirty outputs available for interfacing to other equipment:
  - 1) Any of these outputs shall be able to be user configured from a list of over 25 functions and faults.
  - 2) These outputs shall drive optional dry contacts.
- c. A programmable user defined common fault output with over 40 selections shall be available.

## H. System Programming

- 1. It must be possible to disable programming so the system can only be monitored.
- 2. It shall be possible to program the control with the controller keypad or using an IBM compatible personal computer.
- 3. Programming access is to be enabled only at the controller and must be password protected.
- 4. The generator shall be programmed to exercise weekly with one test per month being under load, time and day of test to be directed by the engineer. For sites with building automation systems the Contractor shall hire TRANE and TRANE will be responsible for programing, installation of any modules, interfacing with existing BAS, engineering, and any equipment and wiring required for the successful connection to the BAS. The existing BAS shall perform the following functions: activate the weekly exercise function, monitor generator status indicating “Generator

Running and Supplying Load”, and monitor the transfer switch position (normal or emergency power).

a. TRANE Contact: Alan Berard - 860-616-6514

5. The following must be programmable from the controller keypad:

a. Time delay settings:

- 1) Generator run time (0 to 72 hours) – exercise
- 2) Load shed
- 3) Engine start
- 4) Engine cooldown
- 5) Overvoltage and undervoltage delays
- 6) Starting aid
- 7) Crank on and crank pause time
- 8) Idle time

b. Trip point settings:

- 1) High battery voltage
- 2) Low battery voltage
- 3) Overspeed
- 4) Underfrequency
- 5) Overfrequency
- 6) Overvoltage
- 7) Undervoltage
- 8) Load shed

I. Communications:

1. If the generator engine is equipped with an ECM (engine control module), the controller must communicate to the ECM for control, monitoring, and diagnostics. SAE J1939 standard communications is required.
2. Industry standard Modbus RTU communication shall be available.
  - a. A Modbus master will be able to monitor controller data.
  - b. A Modbus master will be able to alter parameters.
  - c. The Modbus master must be capable of starting and stopping the generator.

J. Communications & Personal Computer Software

1. The controller must have the capability to communicate to a personal Windows compatible computer. Both RS-232 and RS-485 communication formats shall be available.
2. A variety of connections shall be available based on requirements:



- a. A single connection to a PC. A cable length of up to 4000 feet must be supported.
  - b. Multiple devices at a single location connected to a PC.
  - c. A single connection from a device to a PC over phone lines.
  - d. Multiple devices to a PC over phone lines.
3. When equipped with communications modules, transfer switches and power monitors along with generator controllers must be able to be connected to the same communication network with no additional interfaces being required.
  4. The capability to connect up to 128 devices (genset controls and transfer switches) on a single network must be supported.
  5. Cabling is to be device to device in a daisy chain fashion with no limitation on device locations within the network.
  6. The network must be self- powered. No power wiring between devices is allowed.
  7. A single software package with the following capabilities is required:
    - a. Any combination of transfer switches and generator controls.
    - b. Up to 128 devices at a single site must be supported.
    - c. The same software package must support communications over phone lines. The software shall allow communications with up to 128 sites (phone numbers) including phone number fields large enough for International communication.
    - d. Access to individual devices by the software shall be protected by password.
    - e. To support future expansion, it must be possible to add devices (ATS and generator set controllers), up to 128 and sites up to 128, with the installed software. Changing to a different software package is not acceptable.
  8. All displays, data inquiries, and program functions allowed on the controllers, both generator and ATS, shall also be available through the software.
  9. A single software screen must be capable of displaying data from multiple devices simultaneously.
  10. It shall be possible to reset shutdown faults, and restart the generator using the software.

K. Loading Sequence Table:

1. At time = 0 sec, the generator set is at rated speed and voltage and ready to accept load, and no more than 9 sec have elapsed from the initial loss of power.
2. At time = 0 sec, ATS-1 shall energize Main Distribution Panel (MDP) and all loads connecting thereto.

NOTE: The loads on this panel are shown on the plans.

3. If additional sequencing is required because of generator limitations, the manufacturer shall recommend and the installer shall provide such sequencing, using

contactors on individual loads, at no additional charge. The designer shall approve such additional sequencing.

## 2.3 ENCLOSURE STANDARD TYPE:

### A. Weatherproof Sound Enclosure:

1. The generator shall be equipped with shut-down button in location indicated on the plans.
2. Provide a 14 gauge aluminum, weatherproof, insulated enclosure. The enclosure shall be of modular design with gasketed roof bolts, gravity-operated louvers (fixed with intake and exhaust hoods), and a rain ledges. The enclosure is to be in compliance with the NEC and the NFPA with regard to clearance around electrical equipment as specified. Provide sufficient space for skid base tank, space heaters and other specified equipment.
3. The enclosure shall conform to the following design criteria:
  - a. Rigidity wind test equal to 115 mph.
  - b. Roof load equal to 50 lbs. per sq. ft.
  - c. Rain test equal to 4-inches per hour.
  - d. The enclosure walls and roof shall have 2 inches of thermal insulation.
4. The roof shall be flanged lap rain tight construction, with stiffeners. Two access doors shall be provided along two sides of the generator. Doors shall have heavy duty, stainless steel, hinges. Doors shall have locks all keyed alike.
5. Louvers shall be appropriately sized for the size of the engine to ensure proper operation of the generator.
6. The complete enclosure shall be primed and painted at the factory using manufacturer applied methods. Color shall be gray or approved equal. Final color selection shall be approved by Designer.
7. Gravity operated dampers shall drive air intake and exhaust louvers. The gravity operated dampers shall be of tight-fitting construction and of proper size for engine cooling airflow. The enclosure should be fitted with spring open – motor closing louvers and these should be closed as soon as possible after stopping of the machine, consistent with avoiding abnormal temperature built-up. All enclosure parts must either be galvanized or powder coated or painted with a salt-resistant paint to avoid corrosion and particular care must be taken with areas where moisture can be trapped. Gravity operated louvers are not required with intake and exhaust hoods.
8. The generator set shall be mounted on a skid base consisting of two structural channel main rails and heavy plate mounting pads.
9. The unit shall include an extended ground bolt stud and provisions for outgoing power and signal cables.
10. The unit shall include gas cocks and nipples to the engine, along with flexible oil-resistant lines, for easy engine maintenance.
11. The enclosure shall include the specified battery racks, batteries, and cables, permanently located for convenient servicing.

12. The critical exhaust silencer shall be mounted inside of the enclosure and secured with welded support brackets.
13. Provide a diesel tank as shown on the drawings (or larger, depending upon the gallons of fuel consumed per hour by the generator run at 75% of full load rating for a period of 48 hours), double wall base fuel tank. The tank shall conform to UL142 requirements including construction and testing. The tank shall be equipped with normal and emergency vents, locking fill cap, mechanical fuel level gauge, 110% rupture basin, remote rupture alarm panel, low fuel level alarm and any other accessories required to meet State and Local Codes.
14. For diesel generators, the generators base tank shall be provided with an additional 2" port to connect a probe for measuring diesel and communicating the readings to the Tank Monitoring System (TMS) within the building.

B. Generator Equipment Branch Circuits:

1. The Installer shall provide an interior electrical distribution system, complete with EMT conduit (minimum conduit size shall be ¾"), and Separate circuits for the engine block heater, service receptacle, and battery charger shall be installed per manufacturer's recommendations, circuits shall originate as indicated on plans.

## PART 3 - EXECUTION

### 3.1 INSTALLATION:

A. Manufacturer's Field Representatives for Erection and Start-up.

1. The manufacturer shall furnish the services of competent erection and start-up field representatives and shall make such persons available for the periods of time required for the start-up of the generator systems and the testing thereof, as specified herein.
2. The field representatives shall furnish all possible information and advice to assist the Installer and/or the Engineer in attaining a properly installed, missioned, and tested installation. The field representative shall be responsible to show the Department the proper operational and maintenance features of the equipment.
3. If any field representative encounters anything not consistent with these goals, he shall immediately call the matter to the attention of the parties directly concerned. If the situation is not then rectified, the field representative shall immediately confirm his objection in writing, with copies thereof delivered to both the Installer and the Engineer.
4. The work and operations of the field representatives shall be coordinated with the program of construction at the joist, as directed by the Installer.
5. In the event that the furnished equipment requires repairs or replacements effected by the field representative during erection, start-up, or under warranty, a detailed written report which lists the repairs or replacements

made, the identity of the parts replaced or repaired, along with a brief description of the causes of failure, analysis of the failure if requested, and the date of repair completion, shall be submitted to the Engineer.

- B. Ground equipment according to CSI Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Provide generator signage according to CSI Section 260553 "Identification for Electrical Systems."

### 3.2 TESTING:

- A. Engage an independent qualified testing agency to perform tests and inspections and prepare reports.
- B. Contractor shall have all new plumbing/mechanical equipment installed and tested prior to generator acceptance testing
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections, Report results in writing.
- D. Tests and Inspections:
  - 1. Perform tests recommended by manufacturer and each electrical test and visual and mechanical inspection for "AC Generators and for Stand-by Systems" specified in NETA Acceptance Testing Specification. Certify compliance with test parameters.
  - 2. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, single-step full-load pickup test.
  - 3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.
    - a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
    - b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
    - c. Verify acceptance of charge for each element of the battery after discharge.
    - d. Verify that measurements are within manufacturer's specifications.
  - 4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
  - 5. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.

6. Exhaust-System Back-Pressure Test: Use a manometer with a scale exceeding 40-inch wg (120 kPa). Connect to exhaust line close to engine exhaust manifold. Verify that back pressure at full-rated load is within manufacturer's written allowable limits for the engine.
  7. Exhaust Emissions Test: Comply with applicable government test criteria.
  8. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
  9. Harmonic-Content Tests: Measure harmonic content of output voltage under 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.
  10. Noise Level Tests: Measure A-weighted level of noise emanating from generator-set installation, including engine exhaust and cooling-air intake and discharge, at two locations on the property line and compare measured levels with required values.
- E. Coordinate tests with tests for transfer switches and run them concurrently.
- F. Test instruments shall have been calibrated within the last 12 months, traceable to standards of NIST, and adequate for making positive observation of test results. Make calibration records available for examination on request.
- G. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
- H. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
- I. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- J. Remove and replace malfunctioning units and retest as specified above.
- K. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.
- L. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.
- M. Infrared Scanning: Perform the following infrared scan tests and inspections and prepare reports:
1. Initial Infrared Scanning: After Substantial Completion, perform an infrared scan of each power wiring termination and each bus connection. Remove all access panels so terminations and connections are accessible to portable scanner.

2. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each power wiring termination and each bus connection after the semi-final inspection.
3. Record of Infrared Scanning: Prepare a report that identifies terminations and connections checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
4. Instruments and Equipment:
  - a. Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

### 3.3 TRAINING:

- A. Refer to Form 817 Article 1.20 – 1.08.14 Subsection 3 for additional information.
- B. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain generator and related equipment as specified.
- C. Coordinate this training with that for the ATS equipment.

END OF SECTION 263213

## SECTION 263600 – TRANSFER SWITCHES

### PART 1 - GENERAL

#### 1.1 SUMMARY:

- A. This Section includes transfer switches rated 600 V and less, including the following:
  - 1. Automatic transfer switches.
  - 2. Remote annunciation and control systems functionality.

#### 1.2 SUBMITTALS:

- A. Submit the following in accordance with Form 817 Article 1.20 – 1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.
- B. Product Data: For each type of product indicated. Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.
  - 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: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.
  - 1. Single-Line Diagram: Show connections between transfer switch, power sources, and load; and show interlocking provisions for each combined transfer switch.

#### 1.3 QUALITY ASSURANCE:

- A. Manufacturer Qualifications: Maintain a service center capable of providing training, parts, and emergency maintenance repairs within a response period of less than eight hours from time of notification.
- B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the NETA or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, 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.

- C. 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.
- D. Comply with NEMA ICS 1.
- E. Comply with NFPA 70.
- F. Comply with NFPA 99.
- G. Comply with NFPA 110.
- H. Comply with UL 1008 unless requirements of these Specifications are stricter.

#### 1.4 WARRANTIES:

- A. Refer to Form 817 Article 1.20-1.06.08 and NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS for additional information.
- B. The ATS shall be warranted by the manufacturer for 5 years or 3,000 hours, whichever occurs first, from the date of the issuance of the Certificate of Compliance. The vendor must be the authorized distributor of all major components and must provide documentation supporting their ability and authority to perform all warranty service and repairs. The warranty shall cover both parts and labor for the complete warranty period.

### 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 the following:
  - 1. Automatic Transfer Switches:
    - a. Cummins Power Systems
    - b. Kohler Power Systems
    - c. Russ Electric
    - d. Caterpillar
    - e. MTU Onsite Energy (Atlantic Power Systems)
    - f. ASCO



## 2.2 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS:

- A. General: The automatic transfer switch shall be rated, for use in a 208/120 VAC, 3 phase, 4 wire, and 60 Hz system; or 480/277 VAC, 3 phase, 4 wire, and 60 Hz system; or 240/120 VAC, 1 phase, 3 wire, and 60 Hz system. It shall be 3 pole or 2 pole and shall have an interrupting capacity as listed on the plans. Size of automatic switch shall be shown on plans.
- B. Ratings: The automatic transfer switch ratings and number of poles shall be as shown on the drawings. The complete switch assembly ratings shall be listed under UL-1008 for use on stand-by systems.
- C. Responsibility:
  - 1. The Installer shall provide an automatic transfer switch as shown on the drawings and as specified herein. The ATS shall be UL listed to UL-1008 and shall be in accordance with NEC Article 700 and NFPA- 110.
  - 2. The Generator Manufacturer, Installer, and Transfer Switch Manufacturer shall each ensure that all interfaces between the transfer switch and the diesel generator, including control wiring, generator load sequencing, and operating requirements, are properly coordinated.
  - 3. The transfer switch shall be considered part of the standby system. The generator manufacturer shall be responsible for the coordination and warranty of the entire standby system, including the automatic transfer switch.
- D. Construction:
  - 1. The transfer switch shall be mounted in a NEMA 1 enclosure, NEMA 3R enclosure, NEMA 4X enclosure as indicated on the plans. Enclosures shall be fabricated from 12-gauge steel. The enclosure shall be sized to exceed minimum wire bending space required by UL 1008.
  - 2. The transfer switch shall be equipped with an internal welded steel pocket, housing an operations and maintenance manual.
  - 3. The transfer switch shall be top and bottom accessible.
  - 4. The main contacts shall be capable of being replaced without removing the main power cables.
  - 5. The main contacts shall be visible for inspection without any major disassembly of the transfer switch.
  - 6. All bolted connections shall have Belleville compression type washers.
  - 7. When a solid neutral is required, a fully rated bus bar with required AL-CU neutral lugs shall be provided.
  - 8. Control components and wiring shall be front accessible. All control wires shall be multiconductor 18 gauge 600-volt SIS switchboard type points to point harness. All control wire terminations shall be identified with tubular sleeve-type markers.

9. The switch shall be equipped with 90 degrees C rated copper/aluminum solderless mechanical type lugs.
10. The complete transfer switch assembly shall be factory tested to ensure proper operation and compliance with the specification requirements. A copy of the factory test report shall be available upon request.

E. Automatic Transfer Switch:

1. The transfer switch shall be double throw, actuated by two electric operators momentarily energized, and connected to the transfer mechanism by a simple over center type linkage. Minimum transfer time shall be 400 milliseconds.
2. The normal and stand-by contacts shall be positively interlocked mechanically and electrically to prevent simultaneous closing. Main contacts shall be mechanically locked in both the normal and stand-by positions without the use of hooks, latches, magnets, or springs, and shall be silver-tungsten alloy. Separate arcing contacts with magnetic blowouts shall be provided on all transfer switches. Interlocked, molded case circuit breakers or contactors are not acceptable.
3. The transfer switch shall be equipped with a safe external manual operator, designed to prevent injury to operating personnel. The manual operator shall provide the same contact to contact transfer speed as the electrical operator to prevent a flashover from switching the main contacts slowly.

F. Service-Rated Transfer Switch:

1. Comply with UL 869A and UL 489.
2. Provide terminals for bonding the grounding electrode conductor to the grounded service conductor.
3. In systems with a neutral, the bonding connection shall be on the neutral bus.
4. Provide removable link for temporary separation of the service and load grounded conductors.
5. Service Disconnecting Means: Externally operated, main circuit breaker.

G. Automatic Transfer Switch Controls:

1. The transfer switch shall be equipped with a microprocessor based control system to provide all the operational functions of the automatic transfer switch. The controller shall have two asynchronous serial ports. The controller shall have a real time clock with Nicad battery back up.
2. The CPU shall be equipped with self-diagnostics, which perform periodic checks of the memory I/O and communication circuits, with a watchdog/power fail circuit.
3. The controller shall use industry standard open architecture communication protocol for high-speed serial communications via

multidrop connection to other controllers and to a master terminal with up to 4000 ft of cable, or further, with the addition of a communication repeater. The serial communication port shall be RS232/485 compatible.

4. The serial communication port shall allow interface to the manufacturer's furnished remote supervisory control.
5. The controller shall have password protection required to limit access to qualified and authorized personnel.
6. The controller shall include a 20 character, LCD display, with a keypad, which allows access to the system.
7. The controller shall include three-phase over/under voltage, over/under frequency, and phase sequence detection and phase differential monitoring on both normal and emergency sources.
8. The controller shall be capable of storing the following records in memory for access either locally or remotely:
  - a. Number of hours transfer switch is in the emergency position (total since record reset).
  - b. Number of hour's standby power is available (total since record reset).
  - c. Total transfer in either direction (total since record reset).
  - d. Date, time, and description of the last four source failures.
  - e. Date of the last exercise period.
  - f. Date of record reset.

#### H. Sequence of Operation:

1. When the voltage on any phase of the normal source drops below 80% or increases to 120%, or frequency drops below 90%, or increases to 110%, or 20% voltage differential between phases occurs, after a programmable time delay period of 0-9999 seconds factory set at 3 seconds to allow for momentary dips, the engine starting contacts shall close to start the generating plant.
2. The transfer switch shall transfer to stand-by when the generating plant has reached specified voltage and frequency on all phases.
3. After restoration of normal power on all phases to a preset value of at least 90% to 110% of rated voltage, and at least 95% to 105% of rated frequency, and voltage differential is below 20%, an adjustable time delay period of 0-9999 seconds (factory set at 300 seconds) shall delay retransfer to allow stabilization of normal power. If the stand-by power source should fail during this time delay period, the switch shall automatically return to the normal source.
4. After retransfer to normal, the engine generator shall be allowed to operate at no load for a programmable period of 0-9999 seconds, factory set at 300 seconds.

#### I. Automatic Transfer Switch Accessories:

1. Programmable three phases sensing of the normal source set to pickup at 90% and dropout at 80% of rated voltage and overvoltage to pickup at 120% and dropout at 110% of rated voltage. Programmable frequency pickup at 95% and dropout at 90% and over frequency to pickup at 110% and dropout at 105% of rated frequency Programmable voltage differential between phases, set at 20% and phase sequence monitoring.
2. Programmable three phases sensing of the stand-by source set to pickup at 90% and dropout at 80% of rated voltage and overvoltage to pickup at 120% and dropout at 110% of rated voltage. Programmable frequency pickup at 95% and dropout at 90% and over frequency to pickup at 110% and dropout at 105% of rated frequency. Programmable voltage differential between phases, set at 20% and phase sequence monitoring.
3. Time delay for override of momentary normal source power outages (delays engine start signal and transfer switch operation). Programmable 0-9999 seconds. Factory set at seconds, if not otherwise specified.
4. Time delay to control contact transition time on transfer to either source. Programmable 0-9999 seconds, factory set at 3 seconds.
5. Time delay on retransfer to normal, programmable 0- 9999 seconds, factory set at 300 seconds if not otherwise specified, with overrun to provide programmable 0-9999 second time delay, factory set at 300 seconds, unloaded engine operation after retransfer to normal.
6. Time delay on transfer to emergency, programmable 0- 9999 seconds, factory set at 3 seconds.
7. A maintained type load test switch shall be included to simulate a normal power failure, keypad initiated.
8. A remote type load test switch shall be included to simulate abnormal power failure, remote switch initiated.
9. A time delay bypass on retransfer to normal shall be included. Keypad initiated.
10. Contact rated 10 Amps 30 volts DC, to close on failure of normal source to initiate engine starting.
11. Contact rated 10 Amps 30 volts DC, to open on failure of normal source for customer functions.
12. Light emitting diodes shall be mounted on the microprocessor panel to indicate: switch is in normal position, switch is in emergency position and controller is running.
13. The ATS shall be capable of receiving a remote signal from closed contacts of the building automation system to activate the weekly exercise function (“under load exercise sequence”), which will run as long as the contacts are closed. The generator shall be capable of providing status information to the building automation system. The ATS shall start the generator, transfer, and shall close a set of auxiliary contacts that the automation system will monitor to indicate that the “Generator Running and Supplying Load” on the automation system. The load shall transfer back to commercial power after an adjustable time upon the opening of automation system signal contacts. The generator shall automatically shut

down after an adjustable cool down time. The ATS shall be able to communicate with any Building Automation System (BAS) such as TRANE controls. The Contractor shall ensure compatibility between systems. The Contractor is responsible for any additional component, accessory, wiring, conduit, etc. required for the complete installation and operation of the system. For sites with building automation systems the Contractor shall hire TRANE and TRANE will be responsible for programming, installation of any modules, interfacing with existing BAS, engineering, and any equipment and wiring required for the successful connection to the BAS. The existing BAS shall perform the following functions: activate the weekly exercise function, monitor generator status indicating "Generator Running and Supplying Load", and monitor the transfer switch position (normal or emergency power).

a. TRANE contact: Alan Berard - 860-616-6514

14. Provision to select either "no commit" or "commit" to transfer operation in the event of a normal power failure shall be included. In the "no commit position," the load will transfer to the emergency position unless normal power returns before the stand-by source has reached 90% of its rated values (switch will remain in normal). In the "commit position" the load will transfer to the emergency position after any normal power failure. Keypad initiated.
  15. Four auxiliary contacts rated 10 Amp, 120 volts AC (for switches 100 to 800 amps) shall be mounted on the main shaft, one closed on normal, the other closed on stand-by. Both contacts will be wired to a terminal strip for ease of customer connections. In addition, 2 sets of Form C relay contacts shall be provided to indicate loss of utility power.
  16. A three phase digital LCD voltage readout, with 1% accuracy shall display all three separate phase to phase voltages simultaneously, for both the normal and stand-by source.
  17. A digital LCD frequency readout with 1-% accuracy shall display frequency for both normal and stand-by source.
  18. An LCD readout shall display normal source and stand-by source availability.
- J. The following accessories shall be available by simple activation, via the keypad, if required.
1. Include (2) time delay contacts that open simultaneously just (milliseconds) prior to transfer in either direction. These contacts close after a time delay upon transfer. Programmable 0-9999 seconds after transfer.
  2. A block transfer function shall be included, energized from a 24VDC signal from the generator control switchgear, to allow transfer to standby.

3. A load-shed function shall be included, energized from a 24VDC signal from the generator control switchgear, to disconnect the load from the standby source when an overload condition occurs.
4. A peak shave function shall be included, energized from a 24VDC signal from the generator control switchgear. This function will start the standby generator and transfer the ATS to the standby source reducing the utility supply to the building. After the peak shave signal is removed, the transfer switch will retransfer to the normal supply, bypassing the retransfer time delay.

K. Approval:

1. As a condition of approval, the manufacturer of the automatic transfer switches shall verify that their switches are listed by Underwriters Laboratories, Inc., Standard UL-1008 with 3 cycle short circuit closing and withstand as indicated on plans or per Arc-Flash Study whichever is higher.
2. During the 3 cycle closing and withstand tests, there shall be no contact welding or damage. The 3 cycle tests shall be performed without the use of current limiting fuses. The test shall verify that contact separation has not occurred, and there is contact continuity across all phases. Test procedures shall be in accordance with UL-1008, and UL shall certify testing.
3. When conducting temperature rise tests to UL-1008, the manufacture shall include post-endurance temperature rise tests to verify the ability of the transfer switch to carry full rated current after completing the overload and endurance tests.
4. The microprocessor controller shall meet the following requirements:
  - a. Storage conditions - 25 degrees C to 85 degrees C.
  - b. Operation conditions - 20 degrees C to 70 degrees C ambient.
  - c. Humidity 0 to 99% relative humidity, noncondensing.
  - d. Capable of withstanding infinite power interruptions.
  - e. Surge withstand per ANSI/IEEE C-37.90A-1978.
5. Manufacturer shall provide copies of test reports upon request.

L. Manufacturer:

1. The transfer switch manufacturer shall employ a nationwide factory-direct, field service organization, available on a 24-hour a day, 365 days a year, call basis.
2. The manufacturer shall include an 800-telephone number, for field service contact, affixed to each enclosure.
3. The manufacturer shall maintain records OD each transfer switch, by serial number, for a minimum 20 years.

### 2.3 REMOTE ANNUNCIATOR AND CONTROL SYSTEM:

A. Functional Description: Include the following functions for indicated transfer switches:

1. Indication of sources available, as defined by actual pickup and dropout settings of transfer-switch controls.
2. Indication of switch position.
3. Indication of switch in test mode.
4. Indication of failure of digital communication link.
5. Key-switch or user-code access to control functions of panel.
6. Control of switch-test initiation.
7. Control of switch operation in either direction.
8. Control of time-delay bypass for transfer to normal source.

B. Malfunction of annunciator, annunciation and control panel, or communication link shall not affect functions of automatic transfer switch. In the event of failure of communication link, automatic transfer switch automatically reverts to stand-alone, self-contained operation. Automatic transfer-switch sensing, controlling, or operating function shall not depend on remote panel for proper operation.

C. Remote Annunciation and Control Panel: Solid-state components. Include the following features:

1. Controls and indicating lights grouped together for each transfer switch.
2. Label each indicating light control group. Indicate transfer switch it controls, location of switch, and load it serves.
3. Digital Communication Capability: Matched to that of transfer switches supervised.
4. Mounting: Flush, modular, steel cabinet, unless otherwise indicated.
5. It shall be equipped with an integral alarm horn.

D. Remote Generator Annunciator:

1. A remote annunciator panel shall be provided with the diesel generator set to give audible and visual indication of:
  - a. Mode selector switch "Off" (flashing red)
  - b. Overcrank (red)
  - c. Emergency stop (red)
  - d. High cooling water temperature (red)
  - e. Overspeed (red)
  - f. Low oil pressure (red)
  - g. Anticipatory high cooling water temperature (yellow)
  - h. Anticipatory low oil pressure (yellow)
  - i. Low cooling water temperature (red)

- j. Battery charger fault (red)
  - k. Low battery voltage (red)
  - l. System ready (green) - not tied to audible alarm
  - m. Base tank rupture (red)
  - n. Normal line power (yellow)
  - o. Generator power (yellow)
  - p. Alarm switch off (red)
  - q. Audible alarm with shutoff switch
- 2. The remote annunciator panel shall be located where shown on the plans. The Installer shall provide interconnecting cabling as recommended by the manufacturer, minimum No. 14 AWG twisted shielded pair.
  - 3. The Generator shall also provide remote status information to the building automation system for event log monitoring

#### 2.4 SOURCE QUALITY CONTROL:

- A. Factory test and inspect components, assembled switches, and associated equipment. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION:

- A. Design each fastener and support to carry load indicated according to CSI Division 26 Section 260529, "Hangers and Supports for Electrical Systems."
- B. Annunciator and Control Panel Mounting: Surface mounted, unless otherwise indicated.
- C. Identify components according to CSI Division 26 Section 260553, "Identification for Electrical Systems."
- D. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

#### 3.2 CONNECTIONS:

- A. Wiring to Remote Components: Match type and number of cables and conductors to control and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary to accommodate required wiring.



- B. Ground equipment according to CSI Division 26 Section 260526, "Grounding and Bonding for Electrical Systems."
- C. Connect wiring according to CSI Division 26 Section 260519, "Low-Voltage Electrical Power Conductors and Cables."

### 3.3 FIELD QUALITY CONTROL:

- A. Testing agency: Engage an independent qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- C. Perform the following tests and inspections:
  - 1. After installing equipment and after electrical circuitry has been energized, test for compliance with requirements.
  - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
  - 3. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. 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.
    - c. Verify that manual transfer warnings are properly placed.
    - d. Perform manual transfer operation.
  - 4. After energizing circuits, demonstrate interlocking sequence and operational function for each switch at least three times.
    - a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
    - b. Simulate loss of phase-to-ground voltage for each phase of normal source.
    - c. Verify time-delay settings.
    - d. Verify pickup and dropout voltages by data readout or inspection of control settings.
    - e. Test unit functional modes and related automatic transfer-switch operations.

- f. Perform contact-resistance test across main contacts and correct values exceeding 500 microhms and values for 1 pole deviating by more than 50 percent from other poles.
  - g. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.
- 5. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.
  - a. Verify grounding connections and locations and ratings of sensors.

D. Testing Agency's Tests and Inspections:

- 1. After installing equipment and after electrical circuitry has been energized, test for compliance with requirements.
- 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
- 3. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. 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.
  - c. Verify that manual transfer warnings are properly placed.
  - d. Perform manual transfer operation.
- 4. After energizing circuits, demonstrate interlocking sequence and operational function for each switch at least three times.
  - a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
  - b. Simulate loss of phase-to-ground voltage for each phase of normal source.
  - c. Verify time-delay settings.
  - d. Verify pickup and dropout voltages by data readout or inspection of control settings.
  - e. Test unit functional modes and related automatic transfer-switch operations.
  - f. Perform contact-resistance test across main contacts and correct values exceeding 500 microhms and values for 1 pole deviating by more than 50 percent from other poles.

- g. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.
- 5. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.
  - a. Verify grounding connections and locations and ratings of sensors.
- E. Coordinate tests with tests of generator and run them concurrently.
- F. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.
- G. Remove and replace malfunctioning units and retest as specified above.
- H. Prepare test and inspection reports.
- I. Infrared Scanning: Perform the following infrared scan tests and inspections and prepare reports:
  - 1. Initial Infrared Scanning: After Substantial Completion, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.
  - 2. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch after the semi-final inspection.
  - 3. Record of Infrared Scanning: Prepare a report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
  - 4. Instruments and Equipment:
  - 5. Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

#### 3.4 TRAINING:

- A. Refer to Form 817 Article 1.20-1.08.14 subsection 3 for additional information.
- B. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment as specified below.

- C. Coordinate this training with that for generator equipment.

END OF SECTION 263600

## SECTION 264313 - SURGE PROTECTION FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

### PART 1 - GENERAL

#### 1.1 SUMMARY:

- A. This Section includes surge protection for low-voltage power, control, and communication equipment.

#### 1.2 DEFINITIONS:

- A. ATS: Acceptance Testing Specifications.
- B. SVR: Suppressed Voltage Rating.
- C. SPD : Surge Protective Device.
- D. SCCR : Short-circuit current rating.
- E. MCOV : Maximum continuous operating voltage.
- F. MOV : Metal-oxide varistor ; an electronic component with a significant non-ohmic current voltage characteristic.
- G. VPR : Voltage protection rating.

#### 1.3 SUBMITTALS:

- A. Submit the following in accordance with Form 817 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.
- B. Product Data: For each type of product indicated. Include rated capacities, operating weights, operating characteristics, furnished specialties, and accessories.
- C. Product Certificates: For transient voltage suppression devices, signed by product manufacturer certifying compliance with the following standards:
  - 1. UL 1283.
  - 2. UL 1449.
  - 3. UL 96a.
- D. Qualification Data: For testing agency.

- E. Field quality-control test reports, including the following:
  - 1. Test procedures used.
  - 2. Test results that comply with requirements.
  - 3. Failed test results and corrective action taken to achieve requirements.
- F. Operation and Maintenance Data: For transient voltage suppression devices to include in the operation and maintenance manuals specified in Form 817 Article 1.20-1.08.14 subsection 2 and described in NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS.
- G. Warranties: Special warranties specified in this Section.

#### 1.4 QUALITY ASSURANCE:

- A. Testing Agency Qualifications: An independent testing agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, 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. Source Limitations: Obtain suppression devices and accessories through one source from a single manufacturer.
- C. 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.
- D. Comply with IEEE C62.41, "IEEE Guide for Surge Voltages in Low Voltage AC Power Circuits," and test devices according to IEEE C62.45, "IEEE Guide on Surge Testing for Equipment Connected to Low-Voltage AC Power Circuits."
- E. Comply with NEMA LS 1, "Low Voltage Surge Protection Devices."
- F. Comply with UL 1283, "Electromagnetic Interference Filters," and UL 1449, "Surge Protective Devices."

#### 1.5 PROJECT CONDITIONS:

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Engineer not less than 7 calendar days in advance of proposed utility interruptions.
  2. Do not proceed with utility interruptions without Engineer's written permission.
- B. Service Conditions: Rate surge protection devices for continuous operation under the following conditions, unless otherwise indicated:
1. Maximum Continuous Operating Voltage: Not less than 115 percent of nominal system operating voltage.
  2. Operating Temperature: 30 to 120 deg F.
  3. Humidity: 0 to 85 percent, noncondensing.
  4. Altitude: Less than 20,000 feet above sea level.

#### 1.6 COORDINATION:

- A. Coordinate location of field-mounted surge suppressors to allow adequate clearances for maintenance.

#### 1.7 WARRANTIES:

- A. Refer to Form 817 Article 1.20-1.06.08 and NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS for additional information.
- B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of surge suppressors, that fail in materials or workmanship within five years from the issuance of the Certificate of Compliance.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS:

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cutler-Hammer Products; Eaton Corporation.
  2. Hubbell Inc. Wiring Device
  3. Siemens Industry Inc.

#### 2.2 GENERAL SPD REQUIREMENTS:

- A. SPD with Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- B. Comply with NFPA 70.
- C. Comply with UL 1449.
- D. MCOV of the SPD shall be at least 150 percent of the nominal system voltage.

## 2.3 SERVICE ENTRANCE SUPPRESSOR:

- A. SPDs: Comply with UL 1449.
- B. SPDs: Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1449.
  - 1. SPDs with the following features and accessories:
    - a. Indicator light display for protection status.
    - b. Form-C contacts rated at 5 A and 250-V ac, one normally open and one normally closed, for remote monitoring of protection status. Contacts shall reverse on failure of any surge diversion module or on opening of any current-limiting device. Coordinate with building power monitoring and control system.
    - c. Surge counter.
- C. Comply with UL 1283.
- D. Peak Surge Current Rating: The minimum single-pulse surge current withstand rating per phase shall not be less than 250 kA. The peak surge current rating shall be the arithmetic sum of the ratings of the individual MOVs in a given mode.
- E. Protection modes and UL 1449 SVR for grounded circuits with 240/120 V, single-phase, three-wire circuits shall not exceed the following:
  - 1. Line to Neutral: 600 V for 240/120 V.
  - 2. Line to Ground: 800 V for 240/120 V.
  - 3. Line to Line: 1000 V for 240/120 V.
  - 4. Neutral to Ground: 600 V for 240/120V.
- F. Protection modes and UL 1449 SVR for grounded circuits with 208/120 V, three-phase, four-wire circuits shall not exceed the following
  - 1. Line to Neutral: 600 V for 208Y/120 V.
  - 2. Line to Ground: 800 V for 208Y/120 V.
  - 3. Line to Line: 1000 V for 208Y/120 V.
  - 4. Neutral to Ground: 600 V for 208Y/120V
- G. Protection modes and UL 1449 SVR for grounded circuits with 480/277 V, three-phase, four-wire circuits shall not exceed the following:



1. Line to Neutral: 1000 V for 480Y/277 V.
2. Line to Ground: 1000 V for 480Y/277 V.
3. Line to Line: 1500 V for 480Y/277 V.
4. Neutral to Ground: 1000 V for 480Y/277V

H. SCCR: Equal or exceed 250 kA.

I. Nominal discharge current rating: 20kA

## 2.4 ENCLOSURES:

A. Indoor Enclosures: NEMA 250, Type 1.

## PART 3 - EXECUTION

### 3.1 INSTALLATION OF SURGE PROTECTION DEVICES:

- A. SPD shall be installed on the load side of the ATS overcurrent protection device. SPD shall be mounted as close as possible to the ATS. Refer to NEC Article 285.
- B. External mounted SPD shall be installed per manufacturer's installation instructions with lead lengths as short (less than 24") and straight as possible. Conductors shall be twisted together to reduce inductive losses. Do not bond neutral and ground.
  1. Provide fused disconnect for the SPD. Disconnect shall be equipped with fuses sized per SPD manufacture requirements.

### 3.2 PLACING SYSTEM INTO SERVICE:

- A. Do not energize or connect service entrance equipment, panelboards, control terminals, and data terminals to their sources until surge protection devices are installed and connected.

### 3.3 FIELD QUALITY CONTROL:

- A. Manufacturer's Field Service: Engage an independent testing agency to inspect, test, and adjust equipment installation, including connections, and to assist in field testing. Report results in writing.
  1. Verify that electrical wiring installation complies with manufacturer's written installation requirements.
- B. Testing: Perform the following field tests and inspections and prepare test reports:

1. After installing surge protection devices, but before electrical circuitry has been energized, test for compliance with requirements.
2. Complete startup checks according to manufacturer's written instructions.
3. Perform each visual and mechanical inspection and electrical test stated in NETA ATS, "Surge Arresters, Low-Voltage Surge Protection Devices" Section. Certify compliance with test parameters.

C. Remove and replace malfunctioning units and retest as specified above.

#### 3.4 STARTUP SERVICE

- A. Complete startup checks according to manufacturer's written instructions.
- B. Do not perform insulation-resistance tests of the distribution wiring equipment with SPDs installed. Disconnect SPDs before conducting insulation-resistance tests, and reconnect them immediately after the testing is over.
- C. Energize SPDs after power system has been energized, stabilized, and tested.

#### 3.5 TRAINING:

- A. Refer to Form 817 Article 1.20-1.08.14 subsection 3 for additional information.
- B. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transient voltage suppression devices.

END OF SECTION 264313

STATE OF CONNECTICUT  
DEPARTMENT OF TRANSPORTATION

m e m o r a n d u m

FLOOD MANAGEMENT GENERAL CERTIFICATION

Project No.: 170-3476

Description: Generator Replacement Project

Town: East Haven, East Lyme, East Windsor,  
Haddam, Mansfield, Rocky Hill, Hartford

Date: November 7, 2018

to: Mr. Michael E. Masayda  
Trans. Principal Engineer  
Hydraulics and Drainage  
Bureau of Engineering and Highway Operations

from: Mr. Christopher Bonsignore  
Trans. Principal Engineer  
Facilities Design  
Bureau of Engineering and Construction

John W. Waleszczyk  
Digitally signed by John W. Waleszczyk  
DN: C=US,  
E=john.waleszczyk@ct.gov, O=CT  
DOT, OU=Facilities Design, CN=John  
W. Waleszczyk  
Date: 2018.11.19 11:12:27-05'00'

Please review this request for Flood Management General Certification and indicate your concurrence below.

**Certification** (to be completed by designer)

*I have read the Flood Management General Certification and the descriptions for the approved DOT minor activities. This project qualifies for the Flood Management General Certification under:*

- ☒ ( X ) Minor Safety Improvements and Streetscape Projects
- ☐ ( ) Roadway Repaving, Maintenance & Underground Utilities
- ☐ ( ) Minor Stormwater Drainage Improvements
- ☐ ( ) Removal of Sediment or Debris from a Floodplain
- ☐ ( ) Wetland Restoration Creation or Enhancement
- ☐ ( ) Scour Repairs at Structures; *(Must acquire DEEP Fisheries Concurrence to be eligible)*
- ☐ ( ) Guide Rail Installation
- ☐ ( ) Deck and Superstructure Replacements
- ☐ ( ) Minor Bridge Repairs and Access
- ☐ ( ) Fisheries Enhancements
- ☐ ( ) Surveying and Testing
- ☐ ( ) Bicycle / Pedestrian, Multi Use Trails and Enhancement Projects

*The following required documentation is attached in support of this certification:*

- Project description
- Location plan
- Description of Floodplain involvement and how project qualifies for general certification
- 8-1/2" by 11" excerpt copy of the FEMA Flood Insurance Rate Map (FIRM) and Floodway Boundary Map (if applicable)
- Design plans, (dated 11-6-18 ) with FEMA floodplain and floodway boundaries plotted, cross sections and profiles, as necessary, that clearly depict the floodplain involvement
- FEMA 100-year flood elevation plotted on elevation view (for structures)

Print Name Matthew Easdon

Title TE III

Signature

Matthew Easdon  
Digitally signed by Matthew Easdon  
DN: C=US, E=matthew.easdon@ct.gov,  
O=CT DOT, OU=Facilities Design,  
CN=Matthew Easdon  
Date: 2018.11.19 11:10:35-05'00'

Date November 7, 2018

**Concurrence** (to be completed by Hydraulics and Drainage)

Based on the documentation submitted, I hereby concur that the project qualifies for Flood Management General Certification.

*If there are any changes to the proposed activities within the floodplain or floodway, the project must be re-submitted for review and approval.*

Signature

Date 11-27-18

## **Project Description**

### **GENERATOR INSTALLATION AND REPLACEMENT AT FACILITIES IN EAST HAVEN, EAST LYME, EAST WINDSOR, HADDAM, HARTFORD, MANSFIELD AND ROCKY HILL**

**(This project description has been modified to show only the two sites located within a floodplain. Based on attached FEMA mapping, the other 5 sites fall outside of any floodplain.)**

**November 2018**

A complete, 100% back-up, standby generator will be installed on the site of the existing Property and Facilities Region 2 facility in East Lyme. Complete, 100% back-up, standby generators will be installed to replace the existing generators on the sites of the existing maintenance facilities in East Windsor, Haddam, **Hartford** and Mansfield, the existing repair facility in **East Haven** and the existing central warehouse facility in Rocky Hill.

Sites description as follows:

#### **East Haven Repair Facility**

1. Installation of a diesel generator, generator components, generator pad, outdoor sound attenuated standard generator enclosure and aboveground, double-wall, 48-hour, diesel tank on the site of the facility.
2. Installation of protective bollards around the generator.
3. Addition of fill to level the grade at the generator location.
4. Installation of an automatic transfer switch, surge protective device, disconnect for surge protective device, and generator remote annunciator inside the building.
5. Installation of conduits and circuitry from the generator to the building.
6. Connection of the generator to the existing tank monitoring system.
7. Any necessary rewiring and rearrangement of the electrical system components existing inside the building.
8. Any necessary installation of ground rods.
9. Any necessary separation of existing neutral and grounding conductors in panels impacted by generator work.
10. Any necessary relocation of existing conductors that are double tapped to a separate branch circuit breaker in panels impacted by generator work.
11. Any necessary installation of branch circuit breakers in panels impacted by generator work.
12. Installation of (3) 20 amp branch circuit breakers in an existing panel for power feeds to the generator battery charger, block heater and receptacle.
13. Replacement of the existing 600 amp main disconnect switch and main distribution panel with a new main disconnect switch and main distribution panel inside the building
14. Providing temporary power using a portable generator and/or existing generator and temporary panels.
15. Removal of the existing diesel generator, generator stand-alone aboveground diesel tank and accessories located in the generator room, and removal of the existing automatic transfer switch located in the electrical room.
16. Removal of a tree at the new generator location.

## Hartford Bridge and Electrical Maintenance Facility

1. Installation of a natural gas generator, generator components and outdoor sound attenuated standard generator enclosure on the site of the facility.
2. Connection of the existing natural gas feed to the generator.
3. Installation of a generator remote annunciator inside the building.
4. Installation of circuitry in existing conduit from the generator to the building.
5. Connection of the generator to the existing building automation system.
6. Any necessary rewiring and rearrangement of the electrical system components existing inside the building.
7. Any necessary installation of ground rods.
8. Any necessary separation of existing neutral and grounding conductors in panels impacted by generator work.
9. Any necessary relocation of existing conductors that are double tapped to a separate branch circuit breaker in panels impacted by generator work.
10. Any necessary installation of branch circuit breakers in panels impacted by generator work.
11. Installation of (3) 20 amp branch circuit breakers in an existing panel for power feeds to the generator battery charger, block heater and receptacle.
12. Providing temporary power using a portable generator and/or existing generator and temporary panels.
13. Removal of the existing natural gas generator and accessories located outside on the site of the facility.

### Notes:

1. Environmental remediation work will be addressed by Environmental Compliance.

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**Generator Replacement Project  
East Haven  
State Project No. 170-3476**

**Floodplain Involvement**

The generator will be located outside of the 500 year flood zone but within the zone X delineation. Limited trench work associated with the generator conduits will occur within the floodplain. All trenching disruptions will be reestablished to pre-project condition.

Sedimentation and erosion control measures, in accordance with the 2002 CT E&S Control Guidelines and Section 1.10 of Form 817, will be installed and maintained during construction.

This project qualifies for general flood management certification under the category “Minor Safety Improvements, Streetscape, and Transportation Facility and Enhancement Projects”. There will be no change to the flood storage capacity.

**Generator Replacement Project  
Hartford  
State Project No. 170-3476**

**Floodplain Involvement**

The proposed site is shown on the attached FEMA map as being in the 500-yr floodplain protected by the levee system of the Connecticut River. The ground elevation for the proposed site is at elevation 22.30 and the estimate for the top of the levee varies from 46.00 to 51.00.

Based on the existing site constraints, the permanent generator cannot be located above, or even at, the 100-year (31.50) or 500-year (36.00) floodplain elevations which are in excess of existing grade (22.30). The proposed aboveground generator will be fed by a natural gas line. Per coordination with DEEP IWRD, the levee system is considered to be a “dry-floodproofing” measure.

## **Construction Contracts - Required Contract Provisions (State Funded Only Contracts)**

### **Index**

1. Title VI of the Civil Rights Act of 1964 / Nondiscrimination Requirements
2. Contractor Work Force Utilization / Specific Equal Employment Opportunity
3. Contract Wage Rates
4. Americans with Disabilities Act of 1990, as Amended
5. Connecticut Statutory Labor Requirements
  - a. Construction, Alteration or Repair of Public Works Projects; Wage Rates
  - b. Debarment List - Limitation on Awarding Contracts
  - c. Construction Safety and Health Course
  - d. Awarding of Contracts to Occupational Safety and Health Law Violators Prohibited
  - e. Residents Preference in Work on Other Public Facilities (Not Applicable to Federal Aid Contracts)
6. Tax Liability - Contractor's Exempt Purchase Certificate (CERT – 141)
7. Executive Orders (State of CT)
8. Non Discrimination Requirement (pursuant to section 4a-60 and 4a-60a of the Connecticut General Statutes, as revised)
9. Whistleblower Provision
10. Connecticut Freedom of Information Act
  - a. Disclosure of Records
  - b. Confidential Information
11. Service of Process
12. Substitution of Securities for Retainages on State Contracts and Subcontracts
13. Health Insurance Portability and Accountability Act of 1996 (HIPAA)
14. Forum and Choice of Law
15. Summary of State Ethics Laws
16. Audit and Inspection of Plants, Places of Business and Records
17. Campaign Contribution Restriction



- 18. Tangible Personal Property
- 19. Bid Rigging and/or Fraud – Notice to Contractor
- 20. Consulting Agreement Affidavit

**Index of Exhibits**

- EXHIBIT A – Title VI Contractor Assurances (page 13)
- EXHIBIT B – Contractor Work Force Utilization / Equal Employment Opportunity (page 14)
- EXHIBIT C – Health Insurance Portability and Accountability Act of 1996 (HIPAA) (page 17)
- EXHIBIT D - Campaign Contribution Restriction (page 25)
- EXHIBIT E - State Wage Rates (Attached at the end)

## **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, as Amended**

This provision applies to those Contractors who are or will be responsible for compliance with the terms of the Americans with Disabilities Act of 1990, as amended (42 U.S.C. 12101 et seq.), (Act), during the term of the Contract. The Contractor represents that it is familiar with the terms of this Act and that it is in compliance with the Act. Failure of the Contractor to satisfy this standard as the same applies to performance under this Contract, either now or during the term of the Contract as it may be amended, will render the Contract voidable at the option of the State upon notice to the contractor. The Contractor warrants that it will hold the State harmless and indemnify the State from any liability which may be imposed upon the State as a result of any failure of the Contractor to be in compliance with this Act, as the same applies to performance under this Contract.

## 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 31-53a of the Connecticut General Statutes, as revised.

**(c) Construction Safety and Health Course.** The Contractor shall comply with section 31-53b of the Connecticut General Statutes, as revised. The contractor shall furnish proof to the Labor Commissioner with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 of the Connecticut General Statutes, as revised, on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

Any employee required to complete a construction safety and health course as required that has not completed the course, shall have a maximum of fourteen (14) days to complete the course. If the employee has not been brought into compliance, they shall be removed from the project until such time as they have completed the required training.

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

**(d) Awarding of Contracts to Occupational Safety and Health Law Violators Prohibited.** The Contract is subject to Section 31-57b of the Connecticut General Statutes, as revised.

**(e) Residents Preference in Work on Other Public Facilities. NOT APPLICABLE TO FEDERAL AID CONTRACTS.** Pursuant to Section 31-52a of the Connecticut General Statutes, as revised, in the employment of mechanics, laborers or workmen to perform the work specified herein, preference shall be given to residents of the state who are, and continuously for at least six months prior to the date hereof have been, residents of this state, and if no such person is available, then to residents of other states

## 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](http://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 Executive Order No. 14 of Governor M. Jodi Rell, promulgated April 17, 2006, concerning procurement of cleaning products and services and to Executive Order No. 49 of Governor Dannel P. Malloy, promulgated May 22, 2015, mandating disclosure of certain gifts to public employees and contributions to certain candidates for office. If Executive Order No. 14 and/or Executive Order No. 49 are applicable, they are deemed to be incorporated into and are made a part of the contract as if they had been fully set forth in it. At the Contractor's request, the Department shall provide a copy of these orders to the Contractor.

**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:

- (1) "Commission" means the Commission on Human Rights and Opportunities;
- (2) "Contract" and "contract" include any extension or modification of the Contract or contract;
- (3) "Contractor" and "contractor" include any successors or assigns of the Contractor or contractor;
- (4) "Gender identity or expression" means a person's gender-related identity, appearance or behavior, whether or not that gender-related identity, appearance or behavior is different from that traditionally associated with the person's physiology or assigned sex at birth, which gender-related identity can be shown by providing evidence including, but not limited to, medical history, care or treatment of the gender-related identity, consistent and uniform assertion of the gender-related identity or any other evidence that the gender-related identity is sincerely held, part of a person's core identity or not being asserted for an improper purpose.
- (5) "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations;

- (6) "good faith efforts" shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements;
- (7) "marital status" means being single, married as recognized by the state of Connecticut, widowed, separated or divorced;
- (8) "mental disability" means one or more mental disorders, as defined in the most recent edition of the American Psychiatric Association's "Diagnostic and Statistical Manual of Mental Disorders", or a record of or regarding a person as having one or more such disorders;
- (9) "minority business enterprise" means any small contractor or supplier of materials fifty-one percent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise, and (3) who are members of a minority, as such term is defined in subsection (a) of Connecticut General Statutes § 32-9n; and
- (10) "public works contract" means any agreement between any individual, firm or corporation and the State or any political subdivision of the State other than a municipality for construction, rehabilitation, conversion, extension, demolition or repair of a public building, highway or other changes or improvements in real property, or which is financed in whole or in part by the State, including, but not limited to, matching expenditures, grants, loans, insurance or guarantees.

For purposes of this Section, the terms "Contract" and "contract" do not include a contract where each contractor is (1) a political subdivision of the State of Connecticut, including, but not limited to municipalities, unless the contract is a municipal public works contract or quasi-public agency project contract, (2) any other state of the United States, including but not limited to, the District of Columbia, Puerto Rico, U.S. territories and possessions, and federally recognized Indian tribal governments, as defined in Connecticut General Statutes § 1-267, (3) the federal government, (4) a foreign government, or (5) an agency of a subdivision, state or government described in subdivision (1), (2), (3), or (4) of this subsection.

- (b) (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, status as a veteran, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such Contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the State of Connecticut; and the Contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, status as a veteran, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by the Contractor that such disability prevents performance of the work involved; (2) the Contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the Commission; (3) the Contractor agrees to provide each labor union or representative of workers with which the Contractor has a collective bargaining agreement or other contract or understanding and each vendor with which the Contractor has a contract or understanding, a notice to be provided by the Commission, advising the labor union or workers' representative of the Contractor's commitments under this section and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) the Contractor

agrees to comply with each provision of this Section and Connecticut General Statutes §§ 46a-68e and 46a-68f and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes §§ 46a-56, 46a-68e and 46a-68f; and (5) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor as relate to the provisions of this Section and Connecticut General Statutes § 46a-56. If the contract is a public works contract, the Contractor agrees and warrants that he will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works projects.

- (c) Determination of the Contractor's good faith efforts shall include, but shall not be limited to, the following factors: The Contractor's employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the Commission may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.
- (d) The Contractor shall develop and maintain adequate documentation, in a manner prescribed by the Commission, of its good faith efforts.
- (e) The Contractor shall include the provisions of subsection (b) of this Section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes §46a-56; provided if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.
- (f) The Contractor agrees to comply with the regulations referred to in this Section as they exist on the date of this Contract and as they may be adopted or amended from time to time during the term of this Contract and any amendments thereto.
- (g) (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or the State of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) the Contractor agrees to provide each labor union or representative of workers with which such Contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such Contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the Contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (3) the Contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes § 46a-56; and (4) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor which relate to the provisions of this Section and Connecticut General Statutes § 46a-56.
- (h) The Contractor shall include the provisions of the foregoing paragraph in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such

provisions including sanctions for noncompliance in accordance with Connecticut General Statutes § 46a-56; provided, if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.

Please be aware the Nondiscrimination Certifications can be found at the Office of Policy and Management website:

<https://portal.ct.gov/OPM/Fin-PSA/Forms/Nondiscrimination-Certification>

## 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 3-112a 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(f)(1) as having a value in a calendar year of \$50,000 or more, or a combination or series of such agreements or contracts having a value of \$100,000 or more, the authorized signatory to this contract expressly acknowledges receipt of the State Elections Enforcement Commission's notice advising state contractors of state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice, as set forth in "Notice to Executive Branch State Contractors and Prospective State Contractors of Campaign Contribution and Solicitation Limitations," a copy of which is attached hereto and hereby made a part of this contract, attached as Exhibit 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**

<b>Bridgeport</b>				<b>14%</b>
<b>6.9%</b>				
Ansonia	Beacon Falls	Bridgeport	Derby	
Easton	Fairfield	Milford	Monroe	
Oxford	Seymour	Shelton	Stratford	
Trumbull				
<b>Danbury</b>				<b>4%</b>
<b>6.9%</b>				
Bethel	Bridgewater	Brookfield	Danbury	
Kent	New Fairfield	New Milford	Newtown	
Redding	Ridgefield	Roxbury	Sherman	
Washington				
<b>Danielson</b>				<b>2%</b>
<b>6.9%</b>				
Brooklyn	Eastford	Hampton	Killingly	
Pomfret	Putnam	Scotland	Sterling	
Thompson	Voluntown	Union	Woodstock	
<b>Hartford</b>				<b>15%</b>
<b>6.9%</b>				
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****2%****6.9%**

Chester	Deep River	Essex	Old Lyme
Westbrook			

**New Haven****14%****6.9%**

Bethany	Branford	Cheshire	Clinton
East Haven	Guilford	Hamden	Killingworth
Madison	Meriden	New Haven	North Branford
North Haven	Orange	Wallingford	West Haven
Woodbridge			

**New London****8%****6.9%**

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****17%****6.9%**

Darien	Greenwich	New Canaan	Norwalk
Stamford	Weston	Westport	Wilton

**Torrington****2%****6.9%**

Canaan	Colebrook	Cornwall	Goshen
Hartland	Kent	Litchfield	Morris
Norfolk	North Canaan	Salisbury	Sharon
Torrington	Warren		

<b>Waterbury</b>				<b>10%</b>
<b>6.9%</b>				
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 is necessary to amend this Section of the Contract from time to time as is necessary for Covered Entity to comply with requirements of the Privacy Rule and the Health Insurance Portability and Accountability Act of 1996, Pub. L. No. 104-191.
- (3) Survival. The respective rights and obligations of Business Associate shall survive the termination of this Contract.
- (4) Effect on Contract. Except as specifically required to implement the purposes of this Section of the Contract, all other terms of the Contract shall remain in force and effect.
- (5) Construction. This Section of the Contract shall be construed as broadly as necessary to implement and comply with the Privacy Standard. Any ambiguity in this Section of the Contract shall be resolved in favor of a meaning that complies, and is consistent with, the Privacy Standard.
- (6) Disclaimer. Covered Entity makes no warranty or representation that compliance with this Section of the Contract will be adequate or satisfactory for Business Associate's own purposes. Covered Entity shall not be liable to Business Associate for any claim, civil or criminal penalty, loss or damage related to or arising from the unauthorized use or disclosure of PHI by Business Associate or any of its officers, directors, employees, contractors or agents, or any third party to whom Business Associate has disclosed PHI contrary to the provisions of this Contract or applicable law. Business Associate is solely responsible for all decisions made, and actions taken, by Business Associate regarding the safeguarding, use and disclosure of PHI within its possession, custody or control.

(7) Indemnification. The Business Associate shall indemnify and hold the Covered Entity harmless from and against any and all claims, liabilities, judgments, fines, assessments, penalties, awards and any statutory damages that may be imposed or assessed pursuant to HIPAA, as amended or the

HITECH Act, including, without limitation, attorney's fees, expert witness fees, costs of investigation, litigation or dispute resolution, and costs awarded thereunder, relating to or arising out of any violation by the Business Associate and its agents, including subcontractors, of any obligation of Business Associate and its agents, including subcontractors, under this section of the contract, under HIPAA, the HITECH Act, the Privacy Rule and the Security Rule.

## Notice to Executive Branch State Contractors and Prospective State Contractors of Campaign Contribution and Solicitation Limitations

This notice is provided under the authority of Connecticut General Statutes §9-612(g)(2), as amended by P.A. 10-1, and is for the purpose of informing state contractors and prospective state contractors of the following law (*italicized words are defined on the reverse side of this page*).

### CAMPAIGN CONTRIBUTION AND SOLICITATION LIMITATIONS

No *state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor*, with regard to a *state contract or state contract solicitation* with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall make a contribution to (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee (which includes town committees).

In addition, no holder or principal of a holder of a valid prequalification certificate, shall make a contribution to (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of State senator or State representative, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

On and after January 1, 2011, no state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor, with regard to a state contract or state contract solicitation with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall **knowingly solicit** contributions from the state contractor's or prospective state contractor's employees or from a *subcontractor or principals of the subcontractor* on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

### DUTY TO INFORM

State contractors and prospective state contractors are required to inform their principals of the above prohibitions, as applicable, and the possible penalties and other consequences of any violation thereof.

### PENALTIES FOR VIOLATIONS

Contributions or solicitations of contributions made in violation of the above prohibitions may result in the following civil and criminal penalties:

**Civil penalties**—Up to \$2,000 or twice the amount of the prohibited contribution, whichever is greater, against a principal or a contractor. Any state contractor or prospective state contractor which fails to make reasonable efforts to comply with the provisions requiring notice to its principals of these prohibitions and the possible consequences of their violations may also be subject to civil penalties of up to \$2,000 or twice the amount of the prohibited contributions made by their principals.

**Criminal penalties**—Any knowing and willful violation of the prohibition is a Class D felony, which may subject the violator to imprisonment of not more than 5 years, or not more than \$5,000 in fines, or both.

### CONTRACT CONSEQUENCES

In the case of a state contractor, contributions made or solicited in violation of the above prohibitions may result in the contract being voided.

In the case of a prospective state contractor, contributions made or solicited in violation of the above prohibitions shall result in the contract described in the state contract solicitation not being awarded to the prospective state contractor, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

The State shall not award any other state contract to anyone found in violation of the above prohibitions for a period of one year after the election for which such contribution is made or solicited, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

Additional information may be found on the website of the State Elections Enforcement Commission, [www.ct.gov/seec](http://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: Facilities Generator Installation And Replacement For Various Towns

**Minimum Rates and Classifications  
for Heavy/Highway Construction**

**ID#: H 25835**

**Connecticut Department of Labor  
Wage and Workplace Standards Division**

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number:

Project Town: Norwich

FAP Number:

State Number: 170-3476

Project: Facilities Generator Installation And Replacement For Various Towns

CLASSIFICATION	Hourly Rate	Benefits
1) Boilermaker	33.79	34% + 8.96
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	34.72	32.15
2) Carpenters, Piledrivermen	32.60	25.34
2a) Diver Tenders	32.60	25.34

**As of:** Wednesday, March 20, 2019

Project: Facilities Generator Installation And Replacement For Various Towns

3) Divers	41.06	25.34
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03a) Millwrights	33.14	25.74
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4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	49.75	21.05
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4a) Painters: Brush and Roller	33.62	21.05
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4b) Painters: Spray Only	36.62	21.05
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4c) Painters: Steel Only	35.62	21.05
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4d) Painters: Blast and Spray	36.62	21.05
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Project: Facilities Generator Installation And Replacement For Various Towns

4e) Painters: Tanks, Tower and Swing	35.62	21.05
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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)	40.00	25.97+3% of gross wage
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6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection	35.47	35.14 + a
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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)	42.62	31.21
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---LABORERS----

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8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	30.05	20.10
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9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen	30.30	20.10
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Project: Facilities Generator Installation And Replacement For Various Towns

10) Group 3: Pipelayers	30.55	20.10
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11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block paver, curb setter and forklift operators	30.55	20.10
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12) Group 5: Toxic waste removal (non-mechanical systems)	32.05	20.10
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13) Group 6: Blasters	31.80	20.10
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Group 7: Asbestos/lead removal, non-mechanical systems (does not include leaded joint pipe)	31.05	20.10
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Group 8: Traffic control signalmen	16.00	20.10
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Group 9: Hydraulic Drills	29.30	18.90
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Project: Facilities Generator Installation And Replacement For Various Towns

---LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and  
Liner Plate Tunnels in Free Air.---

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13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	32.22	20.10 + a
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13b) Brakemen, Trackmen	31.28	20.10 + a
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---CLEANING, CONCRETE AND CAULKING TUNNEL---

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14) Concrete Workers, Form Movers, and Strippers	31.28	20.10 + a
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15) Form Erectors	31.60	20.10 + a
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---ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL  
IN FREE AIR:---

Project: Facilities Generator Installation And Replacement For Various Towns

16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	31.28	20.10 + a
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17) Laborers Topside, Cage Tenders, Bellman	31.17	20.10 + a
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18) Miners	32.22	20.10 + a
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---TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED  
AIR: ----

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18a) Blaster	38.53	20.10 + a
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19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	38.34	20.10 + a
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20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	36.41	20.10 + a
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Project: Facilities Generator Installation And Replacement For Various Towns

21) Mucking Machine Operator	39.11	20.10 + a
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---TRUCK DRIVERS---(\*see note below)

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Two axle trucks	29.13	23.33 + a
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Three axle trucks; two axle ready mix	29.23	23.33 + a
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Three axle ready mix	29.28	23.33 + a
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Four axle trucks, heavy duty trailer (up to 40 tons)	29.33	23.33 + a
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Four axle ready-mix	29.38	23.33 + a
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*As of:*

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Project: Facilities Generator Installation And Replacement For Various Towns

Heavy duty trailer (40 tons and over)	29.58	23.33 + a
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Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	29.38	23.33 + a
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---POWER EQUIPMENT OPERATORS----

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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, Tunnel Boring Machines. (Trade License Required)	39.55	24.30 + a
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Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 cubic yards; Piledriver (\$3.00 premium when operator controls hammer); Bauer Drill/Caisson. (Trade License Required)	39.23	24.30 + a
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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)	38.49	24.30 + a
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Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper)	38.10	24.30 + a
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Project: Facilities Generator Installation And Replacement For Various Towns

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)	37.51	24.30 + a
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Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	37.51	24.30 + a
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Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	37.20	24.30 + a
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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).	36.86	24.30 + a
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Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	36.46	24.30 + a
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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).	36.03	24.30 + a
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Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	33.99	24.30 + a
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Project: Facilities Generator Installation And Replacement For Various Towns

Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	33.99	24.30 + a
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Group 12: Wellpoint Operator.	33.93	24.30 + a
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Group 13: Compressor Battery Operator.	33.35	24.30 + a
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Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	32.21	24.30 + a
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Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	31.80	24.30 + a
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Group 16: Maintenance Engineer/Oiler	31.15	24.30 + a
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Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	35.46	24.30 + a
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Project: Facilities Generator Installation And Replacement For Various Towns

Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	33.04	24.30 + a
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\*\*NOTE: SEE BELOW

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---LINE CONSTRUCTION---(Railroad Construction and Maintenance)---

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20) Lineman, Cable Splicer, Technician	48.19	6.5% + 22.00
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21) Heavy Equipment Operator	42.26	6.5% + 19.88
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22) Equipment Operator, Tractor Trailer Driver, Material Men	40.96	6.5% + 19.21
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23) Driver Groundmen	26.50	6.5% + 9.00
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Project: Facilities Generator Installation And Replacement For Various Towns

23a) Truck Driver	40.96	6.5% + 17.76
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---LINE CONSTRUCTION---

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24) Driver Groundmen	30.92	6.5% + 9.70
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25) Groundmen	22.67	6.5% + 6.20
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26) Heavy Equipment Operators	37.10	6.5% + 10.70
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27) Linemen, Cable Splicers, Dynamite Men	41.22	6.5% + 12.20
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28) Material Men, Tractor Trailer Drivers, Equipment Operators	35.04	6.5% + 10.45
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Project: Facilities Generator Installation And Replacement For Various Towns

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\*\*

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**Project: Facilities Generator Installation And Replacement For Various Towns**

*Welders: Rate for craft to which welding is incidental.*

*\*Note: Hazardous waste removal work receives additional \$1.25 per hour for truck drivers.*

*\*\*Note: Hazardous waste premium \$3.00 per hour over classified rate*

***ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra \$4.00 premium in addition to the hourly wage rate and benefit contributions:***

***1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)***

***2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson***

***3) Cranes (under 100 ton rated capacity)***

*Crane with 150 ft. boom (including jib) - \$1.50 extra*

*Crane with 200 ft. boom (including jib) - \$2.50 extra*

*Crane with 250 ft. boom (including jib) - \$5.00 extra*

*Crane with 300 ft. boom (including jib) - \$7.00 extra*

*Crane with 400 ft. boom (including jib) - \$10.00 extra*

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyman instructing and supervising the work of each apprentice in a specific trade.

*~~Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing 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](http://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.*

*Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.*

**As of:** Wednesday, March 20, 2019



Project: Facilities Generator Installation And Replacement For Various Towns

*Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage*

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

**~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).**

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

*As of:*

Wednesday, March 20, 2019

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 4<sup>th</sup>, 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(d).

*Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification. If unsure, the employer should seek guidelines for CTDOL.*

**Below are additional clarifications of specific job duties performed for certain classifications:**

- **ASBESTOS WORKERS**

Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.

- **ASBESTOS INSULATOR**

Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.

- **BOILERMAKERS**

Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.

- **BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS**

Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.

- **CARPENTERS, MILLWRIGHTS. PILEDRIVERMEN. LATHERS. RESILEINT FLOOR LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS**

Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.

- **LABORER, CLEANING**

- The clean up of any construction debris and the general (heavy/light) cleaning, including sweeping, wash down, mopping, wiping of the construction facility and its furniture, washing, polishing, and dusting.

- **DELIVERY PERSONNEL**

- If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages are not required. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.

- An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer or tradesman, and not a delivery personnel.

- **ELECTRICIANS**

Install, erect, maintenance, alteration or repair of any wire, cable, conduit, etc., which generates, transforms, transmits or uses electrical energy for light, heat, power or other purposes, including the Installation or maintenance of telecommunication, LAN wiring or computer equipment, and low voltage wiring. ***\*License required per Connecticut General Statutes: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9.***

- **ELEVATOR CONSTRUCTORS**

Install, erect, maintenance and repair of all types of elevators, escalators, dumb waiters and moving walks. *\*License required by Connecticut General Statutes: R-1,2,5,6.*

- **FORK LIFT OPERATOR**

Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.

Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.

- **GLAZIERS**

Glazing wood and metal sash, doors, partitions, and 2 story aluminum storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers, which require equal composite workforce.

- **IRONWORKERS**

Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which require equal composite workforce.

- **INSULATOR**

- Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings.

- **LABORERS**

Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), decorative security fence (non-metal)).

installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.

- **PAINTERS**

Maintenance, preparation, cleaning, blasting (water and sand, etc.), painting or application of any protective coatings of every description on all bridges and appurtenances of highways, roadways, and railroads. Painting, decorating, hardwood finishing, paper hanging, sign writing, scenic art work and drywall hhg for any and all types of building and residential work.

- **LEAD PAINT REMOVAL**

- Painter's Rate

1. Removal of lead paint from bridges.
2. Removal of lead paint as preparation of any surface to be repainted.
3. Where removal is on a Demolition project prior to reconstruction.

- Laborer's Rate

1. Removal of lead paint from any surface NOT to be repainted.
2. Where removal is on a *TOTAL* Demolition project only.

- **PLUMBERS AND PIPEFITTERS**

Installation, repair, replacement, alteration or maintenance of all plumbing, heating, cooling and piping. ***\*License required per Connecticut General Statutes: P-1,2,6,7,8,9 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. (demolition or removal of any type of roofing and or clean-up of any and all areas where a roof is to be relaid.)

- **SHEETMETAL WORKERS**

Fabricate, assemble, install and repair sheetmetal products and equipment in such areas as ventilation, air-conditioning, warm air heating, restaurant equipment, architectural sheet metal work, sheetmetal roofing, and aluminum gutters. Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, fascia, louvers, partitions, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc. The sheet metal classification also applies to the vast variety of coated metal material panels and composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal and composite lockers and shelving, kitchen equipment, and walk-in coolers. To include testing and air –balancing ancillary to installation and construction.

- **SPRINKLER FITTERS**

Installation, alteration, maintenance and repair of fire protection sprinkler systems.

***\*License required per Connecticut General Statutes: F-1,2,3,4.***

- **TILE MARBLE AND TERRAZZO FINISHERS**

Assists and tends the tile setter, marble mason and terrazzo worker in the performance of their duties.

- **TRUCK DRIVERS**

~How to pay truck drivers delivering asphalt is under REVISION~

Truck Drivers are required to be paid prevailing wage for time spent "working" directly on the site. These drivers remain covered by the prevailing wage for any time spent transporting between the actual construction location and facilities (such as fabrication, plants, mobile factories, batch plant, borrow pits, job headquarters, tool yards, etc.) dedicated exclusively, or nearly so, to performance of the contract or project, which are so located in proximity to the actual construction location that it is reasonable to include them. ***\*License required, drivers only, per Connecticut General Statutes.***



***For example:***

- Material men and deliverymen are not covered under prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.
- Hauling material off site is not covered provided they are not dumping it at a location outlined above.
- Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

➤ *Any questions regarding the proper classification should be directed to:*  
*Public Contract Compliance Unit*  
*Wage and Workplace Standards Division*  
*Connecticut Department of Labor*  
*200 Folly Brook Blvd, Wethersfield, CT 06109*  
*(860) 263-6543.*

# Statute 31-55a

Last Updated: June 02, 2008

You are here: [DOL Web Site](#) ▶ [Wage and Workplace Issues](#) ▶ Statute 31-55a

## - Special Notice -

To All State and Political Subdivisions, Their Agents, and Contractors

Connecticut General Statute 31-55a - Annual adjustments to wage rates by contractors doing state work.

*Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee, effective each July first.*

- The prevailing wage rates applicable to any contract or subcontract awarded on or after October 1, 2002 are subject to annual adjustments each July 1st for the duration of any project which was originally advertised for bids on or after October 1, 2002.
- Each contractor affected by the above requirement shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.
- It is the **contractor's** responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's Web Site. The annual adjustments will be posted on the Department of Labor Web page: [www.ctdol.state.ct.us](http://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](http://www.osha.gov/fso/ote/training/edcenters/fact_sheet.html);
- (6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;
- (7) Within 30 days of receiving a contract award, a general contractor must furnish proof to the Labor Commissioner that all employees and apprentices performing manual labor on the project will have completed such a course;
- (8) Proof of completion may be demonstrated through either: (a) the presentation of a *bona fide* student course completion card issued by the federal OSHA Training Institute; *or* (2) the presentation of documentation provided to an employee by a trainer certified by the Institute pending the actual issuance of the completion card;
- (9) Any card with an issuance date more than 5 years prior to the commencement date of the construction project shall not constitute proof of compliance;

- (10) Each employer shall affix a copy of the construction safety course completion card to the certified payroll submitted to the contracting agency in accordance with Conn. Gen. Stat. § 31-53(f) on which such employee's name first appears;
- (11) Any employee found to be in non-compliance shall be subject to removal from the worksite if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;
- (12) Any such employee who is determined to be in noncompliance may continue to work on a public building construction project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;
- (13) The Labor Commissioner may make complaint to the prosecuting authorities regarding any employer or agent of the employer, or officer or agent of the corporation who files a false certified payroll with respect to the status of an employee who is performing manual labor on a public building construction project;
- (14) The statute provides the minimum standards required for the completion of a safety course by manual laborers on public construction contracts; any contractor can exceed these minimum requirements; and
- (15) Regulations clarifying the statute are currently in the regulatory process, and shall be posted on the CTDOL website as soon as they are adopted in final form.
- (16) Any questions regarding this statute may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of <http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm>; or by telephone at (860)263-6790.

**THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE, AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTIMATELY ARISE CONCERNING THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.**

**Sec. 31-53b. Construction safety and health course. Proof of completion required for employees on public building projects. Enforcement. Regulations.** (a) Each contract entered into on or after July 1, 2007, for the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public building project by the state or any of its agents, or by an political subdivision of the state or any of its agents, where the total cost of all work to be performed by all contractors and subcontractors in connection with the contract is at least one hundred thousand dollars, shall contain a provision requiring that, not later than thirty days after the date such contract is awarded, each contractor furnish proof to the Labor Commissioner that all employees performing manual labor on or in such public building, pursuant to such contract, have completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, in the case of telecommunications employees, have completed at least ten hours of training in accordance with 29 CFR 1910.268.

(b) Any employee required to complete a construction safety and health course required under subsection (a) of this section who has not completed the course shall be subject to removal from the worksite if the employee does not provide documentation of having completed such course by the fifteenth day after the date the employee is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section.

(c) Not later than January 1, 2007, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project.

(d) For the purposes of this section, "public building" means a structure, paid for in whole or in part with state funds, within a roof and within exterior walls or fire walls, designed for the housing, shelter, enclosure and support or employment of people, animals or property of any kind, including, but not limited to, sewage treatment plants and water treatment plants, "Public building" does not include site work, roads or bridges, rail lines, parking lots or underground water, sewer or drainage systems including pump houses or other utility systems.

CONNECTICUT DEPARTMENT OF LABOR  
WAGE AND WORKPLACE STANDARDS DIVISION

**CONTRACTORS WAGE CERTIFICATION FORM**

I, \_\_\_\_\_ of \_\_\_\_\_  
Officer, Owner, Authorized Rep. Company Name

do hereby certify that the \_\_\_\_\_  
Company Name

\_\_\_\_\_  
Street

\_\_\_\_\_  
City

and all of its subcontractors will pay all workers on the

\_\_\_\_\_  
Project Name and Number

\_\_\_\_\_  
Street and City

the wages as listed in the schedule of prevailing rates required for such project (a copy of which is attached hereto).

\_\_\_\_\_  
Signed

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 2004.

\_\_\_\_\_  
Notary Public

 Return to:

Connecticut Department of Labor  
Wage & Workplace Standards Division  
200 Folly Brook Blvd.  
Wethersfield, CT 06109