PROJECT MANUAL

VOLUME 1 OF 1

GREASE TRAP REPLACEMENT
HARTFORD ARMORY
HARTFORD, CONNECTICUT

PROJECT NO.: 19MIL21801
AGENCY TRACKING NO.: HA 16-001

CONNECTICUT ARMY NATIONAL GUARD
FACILITIES MANAGEMENT OFFICE

360 Broad Street, Hartford, Connecticut

PREPARED BY:

SALAMONE & ASSOCIATES, P.C.
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JUNE 26, 2019

Table of Contents

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01000 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Number 19MIL21801 is entitled Grease Trap Replacement. Project location: The Connecticut Army National Guard (Hartford Armory), 360 Broad Street, Hartford, CT 06105. It is to be completed and ready for use by the Owner and Agency within the Contract Time specified in Section 00020 Bid Proposal Form.

B. The Project Description:

1. Replacement of the existing grease trap, limited piping and installation of ejector pump and fluid overflow containment area.
2. This Project does not Exceed the Threshold Limits as defined by the Connecticut General Statutes.

C. Project Location: The Connecticut Army National Guard Armory (Hartford Armory), located at 360 Broad St, Harford, CT 06105

01001 OWNER AND AGENCY

A. The Owner and Agency is the Connecticut State Military Department.

1. The Agency Design Coordinator is Elizabeth Tracey. The Agency Design Coordinator is located at 360 Broad Street, Hartford Connecticut 06105. Phone: (860) 548-3202; E-mail:elizabeth.s.tracey2.nfg@mail.mil.

    a. The Agency Design Coordinator is the authorized representative for the Military Department for all design related decisions at the facility and or site where the work is being performed but does not have the authority to change the contract documents or direct the contractor.

2. The Agency Construction Coordinator is James A. Cavanna. The Agency Construction Coordinator is located at 360 Broad Street, Hartford, Connecticut 06105. Phone: (860) 548-3279; Fax: (860) 548-3260; E-mail: james.a.cavanna2.nfg@mail.mil.

    a. The Agency Construction Coordinator is the authorized representative for the Military Department for all construction related decisions at the facility and or site where the work is being performed but does not have the authority to change the contract documents or direct the contractor.

01002 ARCHITECT AND ENGINEER:

A. The Engineering Firm is Salamone and Associates, P.C., and is located at 116 North Plains Industrial Road, Wallingford, Connecticut 06492. The Engineer representing the firm for this project is Joseph Salamone. Phone: (203) 281-6895 (x3029); E-mail: jsalamone@salamoneassoc.com

1. The Architect and Engineer or their accredited representative is referred to in the Contract Documents as "Architect" or "Architects" or "Engineer" or "Engineers" or by pronouns which imply them. As information for the Contractor, the Architect's or Engineer's status is defined as follows:
    a. The Architect and Engineer will not make interpretations or decisions directly to the Contractor. All interpretations or decisions will be conveyed through the Construction Administrator.
    b. Architect/ Engineer is responsible for review of shop drawings, materials, and equipment intended for the work, in accordance with the "General Conditions", and the "Supplementary Conditions".
2. Wherever the Architect or Engineer is mentioned in the documents in connection with an administrative function, it shall include the Construction Administrator in that function except for shop drawings.

01003 CONSTRUCTION ADMINISTRATOR:

A. The Construction Administrator is James A. Cavanna, AIA, CBO, Construction Specialist, and is located at 360 Broad Street, Hartford, Connecticut 06105. Phone: (860) 548-3279; Fax: (860) 548-3260; E-mail: james.a.cavanna2.nfg@mail.mil.

1. The Construction Administrator is referred to in the Contract Documents as "Construction Administrator" or "Construction Manager" or by pronouns which imply it. All communications concerning the project will be directed through the Construction Administrator or a designated representative(s).

2. As information to the Contractor, the Construction Administrator's status is defined as follows:
    a. The Construction Administrator is the Owner's Agent who will, among other thing's, monitor the General Contractor's performance, scheduling and construction, process shop drawings, material, and equipment submittals, review and process periodic billings, review and recommend cost changes.
    b. The Construction Administrator will process all requests for information, interpretations and decisions regarding the meaning and intent of the Contract Documents, consulting with appropriate parties prior to rendering the interpretations or decisions to the Contractor. All such requests and replies shall be in writing.

01010 SUMMARY OF WORK

A. Summary of Work includes but is not limited to the following:

1. Replacement of the existing grease trap with larger capacity active grease recovery unit.
2. Installation of new packaged pump system dedicated to discharge from active grease recovery unit.
3. Construction of waterproofed fluid containment area.
4. Demolition of limited waste piping and connections to existing grease trap and the

installation of proposed waste piping and connections to active grease recovery unit.

5. Tie-in of active grease recovery unit controls and water alarm to existing DDC control system.

B. The Contractor will include in his bid, all items required in order to carry out the intent of the work as described, shown and implied in the Contract Documents.

C. It shall be the Contractor's responsibility upon discovery to immediately notify the Construction Administrator, in writing, of errors, omissions, discrepancies, and instances of noncompliance with applicable codes and regulations within the documents, and of any work which will not fit or properly function if installed as indicated on the Contract Documents. Any additional costs arising from the Contractor's failure to provide such notification shall be borne by the Contractor.

D. The Work will be constructed under a single lump.

E. Work Sequence - Phase:

1. The entire Project shall be constructed in 1 Phase. Work of this Phase shall be substantially complete, ready for occupancy within 60 Calendar Days of commencement of the Work.

01011 EXAMINATION OF SITE

A. It is not the intent of the Documents to show all existing conditions. All contractors are advised to visit and examine the site with the Construction Administrator prior to submitting bids.

B. Contractors should investigate and satisfy themselves as to the conditions affecting the work, including but no restricted to those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, uncertainties of weather, roads or similar physical conditions of the ground, the character of equipment, and facilities needed preliminary to and during the prosecution of the Work. The Contractor should further satisfy himself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, as well as from information presented by the Contract Documents. Any failure by the Contractor to acquaint himself with the available information shall not relieve him from the responsibility for estimating properly the difficulty and cost of successfully performing the Work.

C. Pre-Bid Conference:

1. A Pre-Bid Conference and tour of the site will be conducted as scheduled in the Invitation to Bid.

This scheduled conference is the only official opportunity for the bidders to tour the site with the Owner, Architect, Engineer, Construction Administrator, and Agency.

01012 PROJECT DOCUMENTS

A. The Specifications and Drawings are intended to describe and illustrate the materials and

labor necessary for the work of this Project.

01013 DOCUMENTS FURNISHED

A. The General Contractor will be given 3 sets of the Contract Documents on or about the time of execution of Contract, free of charge. If additional copies are wanted, they will be available at the direct additional cost of their reproduction, to the contractor.

B. The Contractor shall receive one (1) set of AutoCAD compatible (latest version) Floor Plans on disks at no cost on or about the time of execution of the Contract from the Architect. Additional sets of AutoCAD compatible (latest version) Floor Plans on disks from the Architect at the cost of their reproduction, to the contractor.

01014 CONTRACTOR'S USE OF PREMISES

A. The Contractor shall confine his operations, including storage of apparatus, equipment and materials to designated work area and as directed by the Construction Administrator.

B. The areas and/or spaces, including their access, shall be maintained free and clear throughout the contract term.

C. Parking for Contractor's employees will be limited to a maximum of 2 spaces as designated by the Construction Administrator. The Contractor may be required to provide identification stickers for employees' cars.

01015 OCCUPANCY REQUIREMENTS

A. Full Agency Occupancy During Construction: The Agency will occupy the site and existing building during the entire construction period. Cooperate with the Agency during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with the Agency's operations.

1. Provide adequate building and fire code egress from the buildings during the renovation process. The Contractor will be responsible to maintain and protect egress ways during the construction sequence per the design as supplied by the Architect. Contractor shall be responsible for preparing egress plans for Owner approval and for Office of State Building Official and Office of State Fire Marshal for approval if required.

01019 CONTRACT CONSIDERATIONS

NOT USED

01027 APPLICATION FOR PAYMENT

A. Schedule of Values: Submit the “Schedule of Values” to the Construction Administrator at the earliest possible date but no later than (21) twenty-one Calendar Days after the Contract Start Date. A separate "Schedule of Values" shall be provided for each Phase of the Project identified in Section
01010 Summary of Work, Work Sequence - Phase(s).

1. Format and Content: Use the Project Manual Table of contents as a guide to establish the format for the “Schedule of Values”. Provide at least one line item for each of the Specification Section on electronic media printout.
2. Identification: Project identification on the Schedule of Values shall include, but not be limited to, the following:
   a. Owner
   b. Project
   Number c.
   Project
   Name
   d. Project Location
   e. Contractor's name and address.
3. Arrange the “Schedule of Values” in tabular format as required by the Owner, containing separate columns including, but not limited to, the following Items:
   a. Item Number.
   b. Description of Work with Related Specification Section or Division Number.
   c. Scheduled Values broken down by description number, type material, units of each material.
   d. Name of subcontractor.
   e. Name of manufacturer or fabricator.
   f. Name of supplier.
   g. Retainage.
   h. Contract sum in sufficient detail.
4. Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
5. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Break principal subcontract amounts down into several line items.
6. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.
7. Unit-Cost Allowances: Show the line-item value of unit-cost allowances, as a product of the unit cost, multiplied by the measured quantity. Estimate quantities from the best indication in the Contract Documents.
8. General Conditions: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete. Include he total cost and proportionate share of general overhead and profit margin for each item.
   a. Temporary facilities and other major cost items that are not direct cost of actual work-in- place may be shown either as separate line items in the Schedule of Values

or distributed as general overhead expense, at the Contractor's option.

B. Applications for Payment - General: Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and Construction Administrator and paid for by the Owner.

1. The initial "Application for Payment", the "Application for Payment", at time of "Substantial Completion", and the final "Application for Payment", involve additional requirements.
2. Payment-Application Terms: The Owner will process monthly progress payments. The Contractor may submit applications for payment on a monthly basis.
3. Payment-Application Forms: Use the "Application for Payment" form as required by the Owner. Present the required information on electronic media printout or approved Owner Form, multiple pages should be used if required.
4. For each item, provide a column including but not limited to the following items:
   a. Item Number.
   b. Description of Work and Related Specification Section or Division.
   c. Scheduled Value, break down by units of material and units of labor.
   d. Work completed from previous application.
   e. Work completed this period.
   f. Materials presently stored.
   g. Total completed and stored to date of application.
   h. Percentage of Completion.
   i. Balance to Finish.
   j. Retainage
5. Application Preparation: Complete every entry on the Application form. At the time of Final Payment only, include an executed Application form by a person authorized to sign legal documents on behalf of the Contractor. The Construction Administrator will return incomplete Applications without action.
   a. Entries shall match data on the "Schedule of Values".
   b. Include amounts of Change Orders issued prior to the last day of the construction period covered by the application.
6. Transmittal: Except for final payment, submit to the Construction Administrator by a method ensuring receipt within forty-eight (**48**) hours. One (**1**) complete, signed and notarized original of each Application for Payment, including lien waivers and similar attachments when required, along with six (**6**) copies. For Final Payment, nine (**9**) complete, signed and notarized copies shall be submitted.
   a. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the Architect.

7. Applications for Payment: Administrative actions and submittals, that must precede or coincide with submittal of the first Application for Payment and all subsequent Application for Payments including, but not limited to, the following items:
    a. Schedule of Values.
    b. Contractor's Construction Schedule (preliminary if not final).
    c. Submittal Schedule (preliminary if not final).
    d. Copies of all applicable permits.
    e. Proof that as-built documents are updated as required by Section 01700 "Contract Closeout".
    f. Initial as-built survey and damage report, if required.

C. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion submit an Application for Payment form, use the form as required by the Owner. Present the required information on electronic media printout.

1. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
2. Administrative actions and submittals that shall precede or coincide with this application include, but are not limited to, the following:
    a. Warranties (guarantees) and maintenance agreements.
    b. Test/adjust/balance records.
    c. Maintenance instructions.
    d. Startup performance reports.
    e. Final cleaning.
    f. Final progress photographs.
    g. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.

D. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include, but are not limited, to the following:

1. Completion of Project Closeout requirements.
2. Completion of list of items remaining to be completed as indicated on the attachment to the Certificate of Substantial Completion.
3. Ensure that unsettled claims will be settled.
4. Ensure that incomplete Work is not accepted and will be completed without undue delay.
5. Transmittal of required Project construction records to the Owner (including as-built documents Reference Section 01700 "Contract Closeout".)
6. Removal of temporary facilities and services.
7. Removal of surplus materials, rubbish, and similar elements.

8. The requirements of the General Conditions and Supplementary Conditions for Final Acceptance, Final Completion, Final Inspection, and Final Payment.
9. Completion of "Building Contractor Reporting Form" as supplied by Department of Construction Services, for all Contractors, Subcontractors, Vendors, Suppliers, etc. who work on the Contract. The form includes the following information:
   a. Contractor/Subcontractor name.
   b. Connecticut Tax Registration Numbers
   c. Type of work
   d. Name of business and address
   e. Remittance address.

01030 SUPPLEMENTAL BIDS

NOT USED

01035 MODIFICATION PROCEDURES

A. Summary: This Section specifies administrative and procedural requirements for handling and processing contract modifications.

B. Requests for Information:

1. In the event that the contractor or subcontractor, at any tier, determines that some portion of the drawings, specifications, or other contract documents requires clarification or interpretation by the Architect, the contractor shall submit a "Request for Information" in writing to the Architect via Construction Administrator. "Requests for Information" may only be submitted by the contractor and shall only be submitted on the "Request for Information" forms as required by the owner. In the "Request for Information", the contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed from the Architect.
   a. In the "Request for Information", the contractor shall set forth an interpretation or understanding of the requirement along with reasons why such an understanding was reached.
   b. The Architect will review all "Requests for Information" to determine whether they are "Requests for Information" within the meaning of this term. If it is determined that the document is not a "Request for Information", it will be returned to the contractor, unreviewed as to content, for resubmittal on the proper form and in the proper manner.
   c. "Requests for Information Response" shall be issued within seven (7) Working Calendar Days of receipt of the request from the contractor unless the owner determines that a longer time is necessary to provide an adequate response. If a longer time is determined necessary by the owner, the owner will, within seven (7) Working Calendar Days of receipt of the request, notify the contractor of the anticipated response time. If the contractor submits a "Request for Information" on an activity with seven (7) Working Calendar Days or less of float on the current

project schedule, the contractor shall not be entitled to any time extension due to the time it takes the Architect to respond to the request provided that the Architect responds within the seven (7) Working Calendar Days set forth above.

d. "Requests for Information Response" from Architect will not change any requirement of the contract documents. In the event the contractor believes that the "Requests for Information Response" will cause a change to the requirements of the contract document, the contractor shall immediately give written notice to the Construction Administrator stating that the contractor believes the "Requests for Information Response" will result in "Change Order" and the Contractor intends to submit a "Change Order Proposal" request. Failure to give such written notice immediately shall waive the contractor's right to seek additional time or cost under the requirement these Requirements.

C. Minor Changes in the Work

1. The Architect, through the Construction Administrator, will issue supplemental instruction authorizing minor changes in the Work, not involving adjustment to the Contract Sum or Contract time, on the "Supplemental Instructions" form as required by the Owner.

D. Proposal Request:

1. Architect/Owner-Initiated Requests For Proposals: The Architect or Owner will issue a detailed description of proposed changes in the Work via the Construction Administrator that will require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications. Such requests shall be on a "Proposal Request" form as required by the owner.
2. "Proposal Request" is issued for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.
3. Within Fourteen (14) Working Calendar Days of receipt of a "Proposal Request", submit an "Change Order Proposal" with the required information necessary to execute the change to the Construction Administrator for the Architect's/Owner's review.
4. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
   a. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
   b. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.
   c. The Agency is tax exempt. All Contractor and Subcontractor services provided under your contract with the State of Connecticut may not be exempt from taxes. The Department of Revenue Services can guide you as to which services are exempt and which are not. Please contact the State of Connecticut, Department of Revenue Services at 1-800-382-9463 or 860 541-3280.
   d. Dollar values shown on the Schedule of Values shall not be the governing (or

deciding) final amounts for change orders involving either additional charges or deletions.

E. Change Order Proposal:

1. When either a "Request for Information" from the Contractor or a "Proposal Request" from the Architect or Owner results in conditions that may require modifications to the Contract, the Contractor may propose changes by submitting a request for a "Change Order Proposal" to the Architect via the Construction Administrator on forms as required by the Owner. These forms shall also include "Change Order Proposal Worksheets" as required by the Owner.
   a. Include statements outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
   b. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities as directed by Article 13 "Compensation for Changes in the Work" of the General Conditions of the Contract for Construction.
   c. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
   d. Comply with requirements in Section 01631 "Equals and Substitutions" if the proposed change requires an equal or substitution of one product or system for a product or system specified.
2. The State of Connecticut construction contract has the following tax exemptions:
   a. Purchasing of materials which will be physically incorporated and become a permanent part of the project.
   b. Tools, supplies and equipment used in fulfilling the construction contract are not exempt.
   c. Services that are resold by the contractor are exempt, i.e. if a General Contractor hires a plumber, carpenter or electrician, a resale certificate may be issued to the subcontractor because these services are considered to be integral and inseparable component parts of the building contract
3. "Change Order Request" Forms: Use "Change Order Proposal" and "Change Order Proposal
   Worksheets" forms as required by Owner.
4. "Change Order Proposal" cannot be submitted without the Contractor either prior submission of a "Request for Information" from the Contractor or as a response to a "Proposal Request" submitted by the Architect or Owner.
5. Any "Change Order Request " submitted without a prior submittal of a "Request for Information" or as a response to a "Proposal Request" will be immediately rejected and returned to the Contractor.

F. Construction Change Directive:

1. "Construction Change Directive": When the Owner and the Contractor disagree on the terms of a "Change Order Proposal" resulting from either a "Request for Information" or "Proposal Request", then the Architect through the Construction Administrator may issue a "Construction Change Directive" on a "Construction Change Directive" as authorized by the Owner on the form required by the Owner. The "Construction Change Directive" instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a "Change Order".
    a. The "Construction Change Directive" contains a complete description of the change in the Work. It also designates the method to be followed to determine change in the Contract Sum or Contract Time.
2. Documentation: The Contractor shall maintain detailed records on a time and material basis of work required by the "Construction Change Directive".
    a. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.
    b. The final value shall be negotiated based on the supporting data to determine the value of the work.

G. Change Order Procedures:

1. Upon the Owner's approval of a Contractor's "Change Order Proposal", the Construction Administrator will issue a "Change Order" for signatures of the Architect, Owner and the Contractor on "Change Order" form as required by the Owner.

01040 COORDINATION

A. Construction Administrator:

1. The Construction Administrator is identified in Division 1 Section 01003 "Construction Administrator".
2. Construction Mobilization:
    a. Cooperate with the Construction Administrator in the allocation of mobilization areas of the site, for agency facility access, traffic, and parking facilities.
    b. During Construction, coordinate use of site and facilities through the Construction Administrator.
    c. Comply with Construction Administrators procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
    d. Comply with instructions of the Construction Administrator for use of temporary utilities and construction facilities.
    e. Coordinate field engineering layout as specified in Section 01050 "Field Engineering" for work under the instructions of the Construction Administrator.

B. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
3. Make provisions to accommodate items scheduled for later installation.

C. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Construction Administrator, Owner and separate contractors where coordination of their work is required.

D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Project closeout activities.

E. General Coordination Provisions:

1. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed and coordinate such inspections with the Construction Administrator and authorities having jurisdictions. If unsatisfactory conditions exist notify the Construction Administrator immediately. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
2. The Contractor shall coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.
3. The Construction Administrator will meet with the Contractor on all major items of coordination.
4. See also General Conditions Article 7 “Cooperation of Trades”.

01045 CUTTING AND PATCHING

A. The Contractor shall install sleeves, inserts and hangers furnished by the trades needing same.

B. Do cutting and patching to integrate all elements of the work. Provide penetrations of existing surfaces as applicable. Provide samples for testing. Seal penetrations through floors, walls, ceilings and roofs, as applicable; restore or preserve fire-rated and smoke-barrier construction. Construction and finishes shall match original work.

C. The Contractor shall verify dimensions for built-in work and/or work adjoining that of other trades before ordering any material or doing any work. Discrepancies shall be submitted to the Construction Administrator before proceeding with the work.

D. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

01050 FIELD ENGINEERING

NOT USED

01095 REFERENCE STANDARDS & DEFINITIONS

A. For products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. References to standard specifications and codes refer to the editions current at the bid due date. An exception is, buildings exceeding the threshold limit must be in substantial compliance with the requirements of the effective code at the time of receipt of completed application to the Office of State Building Inspector (OSBI). References include their addenda and errata, if any, and shall be considered a part of these specifications as if they were printed herein in full.

C. The manufacturers' standard warranties or guarantees shall apply when their products are used on this project.

D. Flame Spread Ratings - all materials that are required of obligated to meet specified standards shall be submitted to the owner for their records as part of the shop drawing submittal process for their construction records.

01120 RENOVATION/DEMOLITION PROJECT PROCEDURES

A. Inspection- General:

1. Verify that demolition is complete and areas are ready for installation of new Work.
2. Beginning of restoration Work means acceptance of existing conditions.

B. Project Procedures for Work Involving <u>Asbestos Containing Material (ACM):</u>

1. If the Contractor should encounter any material suspect or known to contain ACM, he should immediately notify the Construction Administrator of same. It is the Contractor's responsibility to have the material tested and abated (if necessary).

C. Project Procedures for Work Involving Products Containing Persistent Bioaccumulative Toxic Chemicals" (PBT's) such as Polychlorinated Biphenols (PCB's), Di-2-ethylhexyl Phthalate (DEHP), and Mercury:

1. The Contractor is responsible for abating all PCB's, DEHP, and mercury prior to the start any work involving construction, renovation or demolition (if necessary).
2. Exposure Levels for Products Containing Persistent Bioaccumulative Toxic Chemicals (PBT's) such as PCB's. DEHP, and mercury in the construction industry is

regulated by 29CFR1910.1200 and 29CFR1926.28 et. al. Construction, renovation or demolition activities disturbing Products Containing Persistent Bioaccumulative Toxic Chemicals" (PBT's) such as PCB's and DEHP which are likely to be employed. These materials include but are not limited to fluorescent light fixture & exit sign, ballast's, high density discharge (HID) lamps , and certain types of construction products containing vinyl, and mercury containing electrical switches and thermostats. These activities may expose workers in excess of the respective Permissible Exposure Limit (PEL). Conduct demolition and removal Work specified in the technical sections of these specifications in conformance with these regulations. In addition construction debris/waste may be classified as hazardous waste. Disposal of all hazardous materials shall be in accordance with but not limited to 40CRF Parts 761 Subpart K, 761, and 761.65 and the Connecticut General Hazardous Waste Statute Sec. 22a-454.

3. A Survey for Products Containing Persistent Bioaccumulative Toxic Chemicals (PBT's) such as PCB's, DEHP and Mercury has NOT been conducted at the facility. Examples include but are not limited to fluorescent light fixture & exit sign, ballast's, high density discharge(HID) lamps , and certain types of construction products containing vinyl, and mercury containing electrical switches and thermostats. It is the Contractors responsibility for verification of all material and field conditions prior to construction, renovation, and demolition that may affect the performance of their Work.

D. Preparation:

1. Prepare surface and remove surface finishes to provide for proper installation of new Work and finishes.

E. Installation:

1. Coordinate Work of alterations and renovations to expedite completion and if required sequence Work to accommodate Owner occupancy.
2. Remove, cut and patch Work in a manner to minimize damage and to provide restoring Products and finishes to original and or specified condition in accordance with Section 01045 "Cutting and Patching".
3. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with neat transition to adjacent finishes in accordance with Section
   01045 "Cutting and Patching".
6. Install Products as specified in individual sections.

F. Transitions:

1. Where new Work abuts or aligns with existing, perform a smooth and even transition. Patch work to match existing adjacent Work in texture and appearance.
2. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect/Engineer.

G. Adjustments:

1. Fit Work at penetrations of surfaces as specified in Section 01045 “Cutting and Patching”.

H. Repair of Damaged Surfaces:

1. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing imperfections.
2. Repair substrate prior to patching finish.

I. Finishes:

1. Finish surfaces as specified in individual Product sections.
2. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

J. Cleaning:

1. In addition cleaning specified in Section 01700 “Project Closeout”, clean Agency occupied areas of Work

01121 SALVAGEABLE MATERIALS

NOT USED

01200 PROJECT MEETINGS

A. Pre-construction Conference:

1. The Contractor will attend a Pre-construction Conference before starting construction, as scheduled by the Construction Administrator convenient to the Owner, the Construction Administrator, Architect, and Contractor. This meeting will take place within fourteen (14) Calendar Days after the written Notice to Proceed and before the Contract Start Date. Hold the conference at the Project Site or another convenient location as directed by the Construction Administrator. The Construction Administrator shall conduct the Pre-construction Conference to review the Contractor and Subcontractor responsibilities and personnel assignments.
2. Attendees: Authorized representatives of the Construction Administrator, Owner, Architect, and their consultants; the Contractor and its superintendent; major subcontractors; agency; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:
   a. Tentative construction schedule.
   b. Critical work sequencing.
   c. Progress meeting schedule.
   d. Designation of responsible personnel.
   e. Procedures for processing field decisions and Change Orders.

f. Procedures for processing Applications for Payment.

g. Distribution of Contract Documents.

h. Submittal of Shop Drawings, Product Data, and Samples.

i. Preparation of record documents.

j. Use of the premises.

k. Parking availability.

l. Office, work, and storage areas.

m. Equipment deliveries and priorities.

n. Safety procedures.

o. First aid.

p. Security.

q. Housekeeping.

r. Working hours.

s. Coordination with Audio-Visual and Telecommunications.

B. Progress Meetings:

1. The Construction Administrator will conduct progress meetings, bi-weekly, at the Project Site. The Construction Administrator will notify the Owner, the Architect, and the Contractor of the scheduled Progress Meeting dates. Coordinate dates of Progress Meetings with preparation of Application for Payment requests.

2. Attendees: In addition to representatives of the Contractor, Construction Administrator, Owner and the Architect, subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities may be requested to attend these meetings on an as needed basis. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work. The Contractor shall include the site superintendent as a minimum.

3. Agenda: Progress Meetings shall review and correct or approve minutes of the previous Progress Meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.

   a. Construction Schedule: Review progress since the last Progress Meeting. Determine where each activity is in relation to the required Contractor's "Construction Schedule" and whether each activity is on time or ahead or behind Schedule. Determine how Work that is behind Schedule will be expedited; secure commitments from parties involved to do so. Discuss whether Schedule revisions are required to insure that current and subsequent activities will be completed within the Contract Time.

   b. Review the present and future needs of each entity present

4. Reporting: The Contractor will take minutes of the meeting and distribute minutes of the meeting to each party present, promptly and before the next scheduled

meeting, and to parties who should have been present.

5. A schedule of regular Project Meetings will be established at the Pre-construction Conference.

01300 SUBMITTALS

A. Summary

1. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including but not limited to the following:
   a. Submittal Procedures.
   b. Submittal schedule.
   c. Daily Construction reports.
   d. Shop Drawings.
   e. Shop Drawings for Fire Protection Systems.
   f. Product Data.
   g. Samples.
   h. Quality assurance submittals.
   i. Architects Action.
   j. Submittals shall comply with all requirements in Division 1 Section 01631 "Equals and Substitutions".
   k. Submittals shall comply with all requirements in Division 1 Section 01740 "Warrantees and Bonds".
   l. Submittals shall comply with all requirements in Division 1 Section 01040 "Coordination".
   m. Submittals shall comply with all requirements in Division 1 Section 01730 "Operation & Maintenance Manuals".

B. Administrative Submittals: Refer to other Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:

1. Permits.
2. Applications for Payment.
3. Performance and payment bonds.
4. Contractor's construction schedule.
5. Daily construction reports.
6. Construction Photographs.
7. Insurance certificates.
8. List of subcontractors.

9. Subcontractors/Suppliers FEIN #'s and Connecticut tax registration #.

C. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section 01027 "Application for Payment" specifies requirements for submittal of the Schedule of Values.
2. Division 1 Section 01040 "Coordination" specifies requirements governing preparation and submittal of required Coordination Drawings.
3. Division 1 Section 01200 "Project Meetings" specifies requirements for submittal and distribution of meeting and conference minutes.
4. Division 1 Section 01310 "Construction Schedules".
5. Division 1 Section 01315 "CPM Schedule" specifies requirements for contractor's schedule submittal.
6. Division 1 Section 01380 "Construction Photographs" specifies requirements for submittal of periodic construction photographs.
7. Division 1 Section 01400 "Quality Control" specifies requirements for submittal of inspection and test reports.
8. Division 1 Section 01631 "Equals and Substitutions" specifies requirements for submittal of requests to use products other than those specified.
9. Division 1 Section 01700 "Contract Closeout" specifies requirements for submittal of Project Record Documents and warranties at project closeout.
10. Division 1 Section 01740 "Warranties and Bonds".

D. Definitions

1. Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended and as identified in the Specification Division 2 through 16.
2. Preparation of Coordination Drawings is specified in Division 1 Section "Coordination" and may include components previously shown in detail on Shop Drawings or Product Data
3. Field samples are full-size physical examples erected on-site to illustrate finishes, coatings, or finish materials. Field samples are used to establish the standard by which the Work will be judged.
4. Mockups are full-size assemblies for review of construction, coordination, testing, or operation; they are not Samples.

E. Submittal Procedures

1. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
2. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
3. Coordinate transmittal of different types of submittals for related elements of the

Work so processing will not be delayed by the need to review submittals concurrently for coordination.

a. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.

b. The Architect reserves the right to reject incomplete submitted packages.

4. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.

a. Allow (2) two weeks for initial review. Allow additional time if the Architect must delay processing to permit coordination with subsequent submittals.

b. If an intermediate submittal is necessary, process the same as the initial submittal.

c. Allow (2) two weeks for reprocessing each submittal.

d. Mass Submittals: Six or more submittals in one day or twenty or more submittals in one week. If Mass Submittals are received, Architect's review time stated above may be extended as necessary to perform proper review. Architect will review mass submittals based upon priority determined by architect after consultation with Owner and Contractor.

e. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

F. Submittal Preparation: Place a permanent label, title block or 8-1/2 inches x 11 inches cover page, the Material Approval Submission Sheet, on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

1. The minimum number of copies required for each submittal shall be at a minimum 7 copies or as determine otherwise at the pre-construction conference or by the Construction Administrator.

2. Provide a space approximately 4 inches by 5 inches on the label, beside the title block or on the cover page on Shop Drawings to record the Contractor's review and approval markings and the action taken.

3. Include the following information on the label for processing and recording action taken.

a. Project Name and State of Connecticut Project Number.

b. Date.

c. Name and address of the Architect, Construction Administrator, and Owner Representative.

d. Name and address of the Contractor.

e. Name and address of the subcontractor.

f. Name and address of the supplier.

g. Name of the manufacturer.

h. Number and title of appropriate Specification Section.

i. Drawing number and detail references, as appropriate.

j. Indicate either initial or resubmittal.

k. Indicate deviations from Contract Documents.

l. Indicate if "equal" or "substitution".

G. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Agency using a transmittal form. Copy the Architect on the transmittal. Submittals shall have Material Spproval Submission Sheet. The Agency will return all submittals to the Contractor after action is taken with a complete copy of the submittal package and one complete copy of the submittal package. The Agency will not accept submittals received from sources other than the Contractor.

1. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.

H. Submittal Schedule

1. After development and review by the Owner and Architect acceptance of the Contractor's Construction or CPM schedule prepare a complete schedule of submittals.
2. Coordinate Submittal Schedule with the list of subcontracts, Schedule of Values, and the list of products as well as the contractor’s Construction or CPM Schedule.
3. Prepare the schedule in chronological order. Provide the following information:

a. Schedule date for the initial submittal.

b. Related section number.

c. Submittal category (Shop Drawings, Product Data, or Samples).

d. Name of Subcontractor.

e. Description of the part of Work covered.

f. Scheduled date for resubmittal.

g. Scheduled date for the Architect’s final release of approval.

I. Distribution: Following response to the initial submittal, print and distribute copies to the Construction Administrator, Architect, Owner, subcontractors, and other parties required to comply with submittal dates indicated.

1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned

portion of the Work and are no longer involved in construction activities.

J. Schedule Updating: Revise the schedule after each meeting or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

K. Shop Drawings

1. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.
2. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:
   a. Dimensions.
   b. Identification of products and materials included by sheet and detail number.
   c. Notation of coordination requirements.
   d. Notation of dimensions established by field measurement.
   e. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 36 by 48 inches.
   g. Submit one (1) reproducible media and seven (7) prints as directed by the Construction Administrator. The Contractor's submittal shall identify the specification section and/or drawing number applicable to the submittal.
   h. Details shall be large scale and/or full size.
3. The Contractor shall review the Shop Drawings, stamp with this approval, and submit them with reasonable promptness and in orderly sequence so as to cause no delay in his Work or in the Work of any subcontractor. Shop Drawings shall be properly identified as specified for item, material, workmanship, and project number. At the submission, the Contractor shall inform the Architect, in writing of any deviation in the shop drawings from the requirements of the Contract Documents.
4. The Architect will review and comment on shop drawings with reasonable promptness so as to cause no delay, but only for conformance with the design concept of the project and with the information given in the Contract Documents. Refer to Article 5 of General Conditions. Shop Drawings received by the Architect that indicate insufficient study of drawings and specifications, illegible portions or gross errors, will be rejected outright. Such rejections shall not constitute an acceptable reason for granting the Contractor additional time to perform the work.
5. The Contractor shall make any corrections required by the Architect and shall resubmit the required number of corrected copies of shop drawings until fully reviewed.

6. Upon final review submit four (4) additional prints, same as submitted, to the Construction Administrator for his use.
7. The Architect's review and comments on shop drawings shall not relieve the Contractor of responsibility for any deviation from the requirements of the Contract Documents.
8. Only final reviewed shop drawings are to be used on the project site.
9. The Work installed shall be reviewed in accordance with the shop drawings and the drawings and specifications. Final Review of the shop drawings by the Architect shall constitute acceptance by the State and the Architect of a variation or departure that is clearly identified. Final reviewed shop drawings shall not replace or be used as a vehicle to issue or incorporate change orders.

L. Product Data

1. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, schedules, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.
2. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:
   a. Manufacturer's printed recommendations.
   b. Compliance with trade association standards.
   c. Compliance with recognized testing agency standards.
   d. Application of testing agency labels and seals.
   e. Notation of dimensions verified by field measurement.
   f. Notation of coordination requirements.
3. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
4. Preliminary Submittal: Submit a preliminary single copy of Product Data where selection of options is required.
5. Submittals: Submit 7 copies of each required submittal; submit 5 copies where required for maintenance manuals. The Architect will retain one and will return the other marked with action taken and corrections or modifications required.
   a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
6. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
   a. Do not proceed with installation until a copy of Product Data is in the Installer's possession.

b. Do not permit use of unmarked copies of Product Data in connection with construction.

M. Samples

1. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.

N. Quality Assurance Submittals

1. Submit quality-control submittals, including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.
2. Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.
   a. Signature: Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.
3. Inspection and Test Reports: Requirements for submittal of inspection and test reports from independent testing agencies are specified in Division 1 Section "Quality Control."

O. Architect's Action

1. Except for submittals for the record or information, where action and return is required, the Architect will review each submittal, mark to indicate action taken, and return promptly.
   a. Compliance with specified characteristics is the Contractor's responsibility.
2. Action Stamp: The Architect will stamp each submittal with a uniform, action stamp. The Architect will mark the stamp appropriately to indicate the action taken, as follows:
   a. No exceptions taken: When the Architect marks a submittal "No exceptions taken," the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
   b. Note Markings and Comments Attached: When the Architect marks a submittal "Note Markings," and/or "Comments Attached" the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents, unless said markings and comments appear on a "Rejected" stamp. See Rejected and Resubmit instruction below. Submit corrected copies for record. Final payment depends on that

compliance.

c. Rejected and Resubmit: When the Architect marks a submittal "Rejected, or Resubmit," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
   1) Do not use, or allow others to use, submittals marked "Rejected, or Resubmit" at the Project Site or elsewhere where Work is in progress.
   2) Other Action: Where a submittal is for information or record purposes or special processing or other activity, the Architect will return the submittal marked "Action Not Required."

d. Unsolicited Submittals: The Architect will discard unsolicited submittals without action.

01310 CONSTRUCTION SCHEDULE

A. Definitions:

1. Construction Schedule: A method of planning and scheduling a construction project utilizing a horizontal bar chart with a separate bar for each major portion of the Work or operation to make the schedule an effective tool for planning and monitoring the progress of the work.

01380 CONSTRUCTION PHOTOGRAPHS

NOT USED

01400 QUALITY CONTROL

A. Retesting: The Contractor is responsible for retesting where results of inspections, tests, or other quality-control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether the original test was Contractor's responsibility.

1. The cost of retesting construction, revised or replaced by the Contractor, is the Contractor's responsibility where required tests performed on original construction indicated noncompliance with Contract Document requirements.
2. The Owner will issue a credit change order to cover all costs incurred related to all re-tests/re- inspection due to non-compliance to the contract documents, including but not limited to the Owners costs and the Consultants costs.

B. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:

1. Provide access to the Work.

2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
3. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
4. Provide facilities for storage and curing of test samples.
5. Deliver samples to testing laboratories.
6. Provide an approved design mix proposed for use for material mixes that require control by the testing agency.
7. Provide security and protection of samples and test equipment at the Project Site.

C. Duties of the Testing Agency: The independent testing agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Sections shall cooperate with the Construction Administrator, Architect and the Contractor in performance of the testing agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.

1. The testing agency shall notify the Construction Administrator and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. The testing agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
3. The testing agency shall not perform any duties of the Contractor.

D. Contractor will pay for the services of an independent testing agency laboratory to perform inspections, tests and other services required by the Specifications.

E. Reports of test that are part of the submittal requirements which indicate compliance or non- compliance with the specified standard.

F. See also General Conditions Article 16 “Inspections and Tests”.

G. Fire Alarm/Acceptance Testing Procedures:

1. For buildings exceeding the threshold limit, the fire alarm testing shall be as the authority having jurisdiction shall dictate. This will be as determined by the State Fire Marshals Office.

H. Submittals:

1. Contractor is responsible to submit a certified written report, in duplicate, of each inspection, test, or similar service.
2. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
3. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
   a. Date of issue.
   b. Project title and number.
   c. Name, address, and telephone number of testing agency.

d. Dates and locations of samples and tests or inspections.

e. Names of individuals making the inspection or test.

f. Designation of the Work and test method.

g. Identification of product and Specification Section.

h. Complete inspection or test data.

i. Test results and an interpretation of test results.

j. Ambient conditions at the time of sample taking and testing.

k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.

l. Name and signature of laboratory inspector.

m. Recommendations on re-testing.

I. Quality Assurance:

1. Qualifications for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, that are pre-qualified as complying with the National Voluntary Laboratory Accreditation Program and that specialize in the types of inspections and tests to be performed.
   a. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the Project is located.

J. Repair and Protection:

1. Protect constructions exposed by or for quality-control service activities, and protect repaired construction.
2. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

01505 TEMPORARY ELECTRICITY AND LIGHTING

A. General Contractor shall provide temporary electricity and lighting during construction as required so that the daily operation of the building is not interrupted.

01510 TEMPORARY HEATING, COOLING AND VENTILATING

NOT USED

01515 TEMPORARY TELEPHONE

A. General Contractor shall use a cellular phone. All calls will be paid by the Contractor.

01520 TEMPORARY WATER

NOT USED

01525 TEMPORARY SANITARY FACILITIES

A. Designated existing toilets may be used during construction. It is the responsibility of the Contractor to maintain the facilities in a clean and sanitary condition and return them to their original condition after use. No loitering or smoking will be permitted in these areas.

01530 FIRE PROTECTION

A. The Contractor, during construction, shall be responsible for loss or damage by fire to the work of the Contract until completion. No flammable material shall be stored in the structure in excess of amounts allowed by the authorities. No gasoline shall be stored in or close to the building at any time. The Contractor shall assign a responsible employee to be in charge of fire protection measures.

01535 CONSTRUCTION EQUIPMENT

A. The Contractor shall furnish tools, apparatus and appliances, hoists and/or cranes and power for same, scaffolding, runways, ladders, temporary supports and bracing and similar work or material necessary to insure convenience and safety in the execution of the Contract except where this is otherwise specified in any Specification Section. All such items shall meet the approval of the CTARNG but responsibility for design, strength and safety shall remain with the Contractor. All such items shall comply with Federal OSHA regulations and applicable codes, statutes, rules and regulations, including compliance with the requirements of the current edition of the "Manual of Accident Prevention in Construction" published by the A.G.C. and the standards of the State Labor Department.

B. Staging, exterior and interior, required for the execution of this Contract, shall be furnished, erected, relocated if necessary and removed by the General Contractor. Staging shall be maintained in a safe condition without charge to and for the use of all trades as needed.

01540 BARRIERS AND ENCLOSURES

A. Provide barriers to prevent public entry into construction areas and to protect existing facilities from damage by construction operations.

B. Barriers and enclosures shall be in conformance with code requirements. Do not block egress from occupied buildings unless necessary to further the work of the Contract. In this case, secure the Department's approval of an alternate egress plan.

C. See also General Conditions Article 19 “Protection of the Work, Persons and Property”.

01545 PROTECTION

A. Protect buildings, equipment, furnishings, grounds and plantings from damage. Any damage shall be repaired or otherwise made good at no expense to the State.

B. Provide protective coverings and barricades to prevent damage. The Contractor shall be held responsible for, and must make good at his own expense, any water or other type of damage due to improper coverings. Protect the public and building personnel from injury.

C. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.

D. Provide protective coverings for walls, projections, jambs, sills and soffits of openings. Protect finished floors and stairs from traffic, movement of heavy objects and storage. Prohibit traffic and storage on waterproofed and roofed surfaces and on lawn and landscaped areas.

E. Provide temporary partitions and ceilings to separate work areas from Owner-occupied areas to prevent penetration of dust and moisture into Owner-occupied areas and equipment. Erect framing and sheet materials with closed joints and sealed edges at intersections with existing surfaces.

F. See also General Conditions Article 19 “Protection of the Work, Persons and Property”.

01550 SECURITY

A. The Contractor shall be solely responsible for damage, loss or liability due to theft or vandalism.

01555 TRAFFIC WAYS

A. The Contractor may use on-site paved roads and parking areas but shall not encumber same or their access. Public highways shall not be blocked by standing trucks, parked cars, material storage, construction operations or in any other manner.

B. Public roads and existing paved roads, drives and parking areas on Owner's property shall be kept free from scrap or debris due to construction operations and any damage to their surface caused by the Contractor shall be repaired by him at his own expense.

C. If the work of the Contract affects public use of any street, road, highway or thoroughfare, the G. C. shall confer with the police authority having jurisdiction to determine if and how many police are needed for public safety in addition to any barriers and signals that may be needed. The G.C. will be responsible for payment of any needed police services.

01560 TEMPORARY CONTROLS

A. Temporary Environmental Controls: Contractor is to provide the following controls.

1. Dust Control (construction and demolition).
2. Noise Control.
3. Pollution Control.

01565 STORM WATER CONTROL – NOT USED

01570 CLEANING

A. Maintain areas under Contractor's control free of waste materials, debris and rubbish. Maintain in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces and other closed

or remote spaces before closing the space.

C. Periodically clean interior areas before start of surface finishing and continue cleaning on an as- needed basis.

D. Control cleaning operations so that dust and other particulates will not adhere to wet or newly- coated surfaces.

E. Remove waste materials, debris and rubbish from site daily and dispose of legally off-site. No scrap/debris shall remain inside the building or anywhere on site upon final acceptance of the project.

F. See also General Conditions Article 24 “Cleaning Up”.

01575 PROJECT SIGNS – NOT USED

01580 FIELD OFFICES AND SHEDS – NOT USED

01585 IDENTIFICATION BADGES

NOT USED

01600 MATERIALS AND EQUIPMENT CONTROLS

A. Materials and Equipment: Shall be delivered, stored and handled to prevent intrusion of foreign matter and damage by weather or breakage. Packaged materials shall be delivered and stored in original, unbroken packages.

1. Promptly inspect shipments to assure that products comply with requirements, that quantities are correct and products are undamaged.
2. Packages, materials and equipment showing evidence of damage will be rejected and replaced at no additional cost to the Owner.

B. Storage and Protection:

1. Store products in accordance with manufacturers' instructions with seals and labels intact and legible. Store sensitive products in weathertight enclosures; maintain within temperature and humidity range required by manufacturer.
2. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.
3. Arrange storage to provide access for inspection. Periodically inspect to insure products are undamaged and are maintained under required conditions. Keep log showing date, time and problems, if any.
4. Stone, masonry units and similar materials shall be stored on platforms or dry skids and shall be adequately covered and protected against damage.

01631 EQUALS AND SUBSTITUTIONS

A. Definitions: Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.

1 Equals or Substitutions General: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract.

2 Equal: Any deviation from the specification which is defined as follows: A replacement for the specified material, device, procedure, equipment, etc., which is recognized and accepted as substantially equal to the first listed manufacturer or first listed procedure specified, after review, by the Architect and may be rejected or approved at the sole discretion of the owner. All equals must be substantially equivalent to the first manufacturer or first procedure listed in the Specifications with reference to all of the following areas: the substance and function considering quality, workmanship, economy of operation, durability and suitability for purposes intended; size, rating and cost. The equal does not constitute a modification in the scope of Work, the Schedule or Architect/Engineer's design intent of the specified material, device, procedure, equipment, etc.

3 Substitution: Any deviation from the specified requirements, which is defined as follows: A replacement for the specified material, device, procedure, equipment, etc., which is not recognized or accepted as equal to the first manufacturer or procedure listed in the Specification after review by the Architect and may be rejected or approved by the Owner. The Substitution is not equal to the specified requirement in comparison to the first manufacture or first procedure listed in the Specifications in one or more of the following areas: the substance and function considering quality, workmanship, economy of operation, durability and suitability for purposes intended; size; cost and rating. The Substitution constitutes a modification in the scope of Work, the Schedule or the Architect/Engineer's design intent of the specified material, device, procedure, equipment, etc.

4 The following are not considered to be requests for Equals or Substitutions:

a. Revisions to the Contract Documents requested by the Owner or Architect.

b. Specified options of products and construction methods included in the Contract Documents.

c. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities having jurisdiction.

B. Submittals:

1. Equals and Substitution Request Submittals: The Owner will consider requests for equals or substitutions if received within time period designated in the General Conditions Article 15 "Materials; Standards". Requests received more than the days specified in Article 15 after the start date of the contract will be rejected.

a. The Contractor is required to prepare and submit 3 copies of the required data for the first manufacturer listed or procedure listed in the specifications section with reference to all of the following areas: the substance and function considering quality, workmanship, economy of operation, durability and suitability for purposes intended including the size, rating and cost. All submissions must include all the

required data for the first listed manufacturer or procedure as specified, as well as the required data for the proposed Equal or Substitution. This will enable the Owner and Architect to determine that the proposed Equal or Substitution is or is not substantially equal to the first listed manufacturer or procedure.

2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
3. Provide complete documentation showing compliance with the requirements for equals or substitutions, and the following information, as appropriate on a "Substitution Request" form as required by the Owner:
   a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors, that will be necessary to accommodate the proposed Equal or Substitution.
   b. A detailed comparison chart of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
   c. Product Data, including Shop Drawings and descriptions of products and fabrication and installation procedures.
   d. Samples, where applicable or requested.
   e. A statement indicating the effect on the Contractor's Construction Schedule or CPM Schedule compared to the schedule without approval of the Equal or Substitution. Indicate the effect on overall Contract Time.
   f. Cost information, broken down, including a proposal of the net change, if any in the Contract Sum.
   g. The Contractor's certification that the proposed Equal or Substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.
   h. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the Equal or Substitution to perform adequately.
4. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation within one week of receipt of the original request for equal or substitution request. The Architect will notify the Construction Administrator who will notify the Owner of recommended acceptance or rejection of the proposed equal or substitution, within two (2) weeks of receipt of the request, or one (1) week of receipt of additional information or documentation, whichever is later. The Construction Administrator will give final acceptance or rejection by the Owner not less than one (1) week after notification.
   a. Any request deemed an "Equal" and accepted by the Construction Administrator, Architect, Owner, and Agency will result in written notification to the Contractor and will <u>not</u> be in the form of a change order for an "Equal".
   b. Any request deemed a "Substitution" and rejected or approved by

Construction Administrator, Architect, and Owner may result in written notification to the Contractor and may be in the form of a change order if the "Substitution" is approved.

C. Equal or Substitutions:

1. Conditions: The Architect will consider the Contractor's request for Equal or Substitution of a product or method of construction when one or more of the following conditions are satisfied, as determined by the Architect. If the following conditions are not satisfied, the Architect will return the requests to the Construction Administrator without action except to record noncompliance with these requirements.
   a. The proposed request does not require extensive revisions to the Contract Documents.
   b. The proposed request is in accordance with the general intent of the Contract Documents.
   c. The proposed request is timely, fully documented, and/or properly submitted.
   d. The proposed request can be provided within the Contract Time. However, the Architect will not consider the proposed request if it is a result of the Contractor's failure to pursue the Work promptly or coordinate activities properly.
   e. The proposed request will offer the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. However, if the proposed request requires the Owner to incur additional responsibilities, including but not limited to, additional compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or similar considerations, then the Owner will have just cause to reject the request for Equal or Substitution.
   f. The proposed request can receive the necessary approvals, in a timely manner, required by governing authorities having jurisdiction.
   g. The proposed request can be provided in a manner that is compatible with the Work as certified by the Contractor.
   h. The proposed request can be coordinated with the Work as certified by the Contractor.
   i. The proposed request can uphold the warranties required by the Contract Documents as certified by the Contractor.
2. The Contractor's submission and the Architect's review of Submittals, including but not limited to, Samples, Manufacturer's Data, Shop Drawings, or other such items, which are not clearly identified as a request for an Equal or Substitution, will not be considered or accepted as a valid request for an Equal or Substitution, nor does it constitute an approval.

01650 STARTING OF SYSTEMS

A. General:

1. Coordinate schedule for start-up of various equipment and systems.
2. Provide written notification the Construction Administrator seven (7) Calendar Days

prior to start-up of each item.

3. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, and for other conditions that may cause damage.
4. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
5. Verify in wiring and support components are complete and tested.
6. Execute the start-up under supervision of manufacturer's representative, in accordance with manufacturer's instructions.
7. When referenced in individual specification sections, require manufacturer to provide an authorized representative to be present at the site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
8. Submit a written report in accordance Section 01400 "Quality Control" that the equipment or system has been properly installed and is functioning properly.

B. Demonstration and Instructions:

1. Demonstrate operation and maintenance of Products to Owner and Agency Personnel two (2) weeks prior to substantial completion.
2. Demonstrate Project equipment and instruct in a classroom environment at location designated by the Construction Administrator and instructed by a qualified manufacturer's representative who is knowledgeable about the project.
3. For equipment or systems requiring seasonal operation perform demonstration for season within six (6) months.
4. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner and Agency Personnel in detail to explain all aspects of operation and maintenance.
5. Demonstrate start-up, operation, control, adjustment, troubleshooting, servicing, and maintenance, and shutdown of each item at agreed upon scheduled time and at equipment or designated location.
6. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during demonstration.

C. Testing Adjusting, and Balancing:

1. The Contractor to verify the testing, adjusting, and balancing.
2. Reports will be submitted indicating observations and results of tests and indicating compliance or non- compliance with the requirements of the Contract Documents.
3. The Owner may employ and pay for the services of an independent consultant to verify testing, adjusting, and balancing which was performed by the Contractor.

A. Substantial Completion:

1. Preliminary Procedures: Before requesting inspection for Certification of Substantial Completion, complete the following. List exceptions in the request.

a. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.

1) Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.

2) If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.

b. Advise the Owner of pending insurance changeover requirements.

c. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.

d. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

e. Submit record drawings, maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.

f. Deliver tools, spare parts, extra stock, and similar items.

g. Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions.

h. Demonstration, thru operation and testing, the functions of all systems and/or equipment to the satisfaction of the Owner for compliance to the contract. Complete testing of systems, and instruction of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.

i. Complete final cleanup requirements, including touchup painting.

j. Touch up and otherwise repair and restore marred, exposed finishes.

k. DD Form 1354 Transfer and Acceptance of DoD Real Property.

l. NGB 593 Project Inspection Report.

2. Inspection Procedures: The Contract shall be ready and prepared when they request a Substantial Completion inspection. If the inspection reveals that the work is not complete, there are extensive punchlist items and as the items listed above are not complete, the Construction Administrator, Architect, and Owner will determine the inspection has failed.

3. The Contractor is responsible for all costs to re-inspect due to a failed inspection. The Owner will issue a deduct change order to cover all costs for re-inspection.

a. The Architect will repeat inspection when requested and assured that the Work is substantially complete.

b. Results of the completed inspection will form the basis of requirements for final acceptance.

B. Final Acceptance:

1. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.
   a. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
   b. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
   c. Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, endorsed and dated by the Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Architect.
   d. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of the Work.
   e. Submit consent of surety to Final Payment.
   f. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
2. Reinspection Procedure: The Inspection Group will re-inspect the Work upon receipt of notice from the Construction Administrator that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Owner.
   a. Upon completion of reinspection, the Construction Administrator will prepare a certificate of final acceptance. If the Work is incomplete, the Construction Administrator will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

C. As Built Document Submittals:

1. **General:** Do not use record documents for construction purposes. Protect Record Documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the Architect's reference during normal working hours. Keep documents current; do not permanently conceal any work until required information has been recorded. Failure to keep documents current is sufficient cause to withhold progress payments.
   a. The Contractor shall also hire the services of a Surveyor registered in the

State of Connecticut to conduct a final survey to determine the location of exterior underground utility lines and to record the results, and update existing electronic media

b. The record of exterior underground utilities shall be made at the time of installation on Mylar film drawing and AutoCAD (latest version) compatible disks. The drawing shall bear the seal of the Land Surveyor and a statement of accuracy.

2. **As-built Drawings:** The Contractor shall maintain one clean, complete undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

   a. Mark record sets with erasable pencil to distinguish between variations in separate categories of the Work.

   b. Mark all new information that is not shown on Contract Drawings.

   c. Note related change-order numbers where applicable.

   d. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.

   e. Upon completion of the work, the Contractor shall submit Record Drawings to the Construction Administrator for the Owner's Records who will pass them on to the Architect or Engineer for transferring the changes to the Record Drawing Mylar Tracings.

   f. Submit electronic format data of all Coordination Drawings as required by the owner, at no additional cost.

   g. Refer to Section 01400 “Quality Control” Section 1.3 for required as built drawings and specifications for fire alarm systems.

3. **Record Specifications:** The Contractor shall maintain one complete copy of the Project Manual, including Addenda. Include with the Project Manual one copy of other written construction documents, such as Change Orders and modifications issued in printed form during construction.

4. **Record Product Data:** The Contractor shall maintain one copy of each Product Data submittal.

   Note related Change Orders and markup of record drawings and Specifications.

   a. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.

   b. Give particular attention to concealed products and portions of the Work that cannot

otherwise be readily discerned later by direct observation.

c. Upon completion of markup, submit complete set of Record Product Data to the Construction Administrator for the Owner's records.

5. **Miscellaneous Record Submittals:** Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to the Construction Administrator for the Owner's records.

6. **Maintenance Manuals:** Organize operation and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-inch, 3-ring, vinyl- covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder according to section 01730 “Operations & Maintenance Data”. Included but not limited to the following types of information:

   a. Emergency instructions.

   b. Spare parts list.

   c. Copies of warranties.

   d. Wiring diagrams.

   e. Recommended "turn-around" cycles.

   f. Inspection procedures.

   g. Shop Drawings and Product Data.

   h. Fixture lamping schedule.

D. Closeout Procedures:

1. Operation and Maintenance Instructions: Arrange for each Installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:

   a. Maintenance manuals.

   b. Record documents.

   c. Spare parts and materials.

   d. Tools.

   e. L ubricants.

   f. Fuels.

   g. Identification systems.

h. Control sequences.

i. Hazards.

j. Cleaning.

k. Warranties and bonds.

l. Maintenance agreements and similar continuing commitments.

2. As part of instruction for operating equipment, demonstrate the following procedures:

a. Startup.

b. Shutdown.

c. Emergency operations.

d. Noise and vibration adjustments.

e. Safety procedures.

f. Economy and efficiency adjustments.

g. Effective energy utilization.

E. **Final Cleaning**:

1. **General**: The General Conditions requires general cleaning during construction. Regular site cleaning is included in Division 1 Section 01570 “Cleaning”".

2. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion and Certification of Occupancy.

3. **Interior:**

a. Remove labels that are not permanent labels.

b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Remove paint spots; wash and polish glass

c. Clean exposed interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.

d. Wash washable surfaces of mechanical, electrical equipment and fixtures and replace filters, clean strainers on mechanical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.

e. Clean and polish finish hardware.

f. Clean and polish tile and other glazed surfaces.

g. Clean floors; wax and buff resilient tile. Clean vinyl or rubber base.

h. Vacuum and/or dust walls, ceilings, lighting fixtures, ceiling diffusers and other wall and ceiling items.

i. Remove defacements, streaks, fingerprints and erection marks.

4. **Pest Control:** Engage an experienced, licensed exterminator to make a final inspection and rid the work of rodents, insects, and other pests.

5. **Removal of Protection:** Remove temporary protection and facilities installed for protection of the Work during construction.

6. **Compliance:** Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.

   a. Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Construction Administrator.

   b. Leave building clean and ready for occupancy. If the Contractor fails to clean up, the Owner may do so, with the cost charged to the Contractor. The Owner will issue a credit change order to cover the costs.

01730 OPERATION AND MAINTENANCE DATA

A. The Contractor shall instruct the State's designated personnel in the operation of new equipment and shall provide manuals and if required, provide video of this basic maintenance of the equipment for training purposes. Provide qualified personnel for as long as necessary to instruct the State's personnel.

B. Submit manual in an organized pdf format to the Architect/Engineer for approval. Upon completion and approval, 3 copies will be forwarded to the State and one copy retained by the Architect/Engineer.

C. Manuals shall include:

1. Operating Procedures:

   a. Typewritten procedures for each mode of operation of each piece of equipment. Procedures shall indicate the status of each component of a system in each operating mode.

   b. Procedures shall include names, symbols, valve tags, circuit numbers, schematic wiring diagrams, locations of thermostats, manual starters, control cabinets and other controls of each system.

D. Emergency shut-down procedures for each piece of equipment or system, both automatic and manual, as appropriate.

1. Maintenance Schedule:

a. Typewritten schedule describing manufacturers schedule of maintenance and maintenance procedures.

2. Catalog Cuts:

a. To illustrate each piece of installed equipment, including options.

b. Include equipment descriptions including physical, electrical and mechanical; performance characteristics; installation or erection diagrams.

c. Include spare parts numbers and names, address and phone number of manufacturer;
name, address and phone number of local representative or service department.

d. Typewritten list of all subcontractors on the project, including name, address and phone number of local representative or service department.

3. Manuals shall be indexed with dividers indicating each system or piece of equipment.

01740 WARRANTIES AND GUARANTEES

A. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

B. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.

C. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

D. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

E. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.

1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

F. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments

are willing to do so.

G. The Contractor shall guarantee all materials and workmanship for a period of eighteen months from the date of acceptance of the Work. In addition, the Contractor shall furnish the warranties listed below. Submit four copies of each to the Construction Administrator in the supplier's standard form or in the form given below if there is no standard form available.

H. The Contractor shall guarantee all materials and workmanship for a period of eighteen months from the date of acceptance of the Work. In addition, the Contractor shall furnish the warranties listed below. Submit four copies of each to the Construction Administrator in the supplier's standard form or in the form given below if there is no standard form available.

1. Section 221323 Grease Interceptor .

I. Form of Guarantees and Warranties:

Commissioner
Military Department
360 Broad Street Hartford,
Connecticut 06105 (Grease
Trap Replacement At Hartford
Armory BI-Q-698)

I (We) hereby guarantee and
warranty)

the _____work on the referenced project for a period of ____years

from _____, 20__against failures of workmanship and materials in

accordance with the requirements of Section _____, Page _____,

Paragraph _____, of the Specifications.

Signed _____

3) General Contractor _____
(or authorized agent)

K. Bonds shall be by approved Surety Companies, made out to the Commissioner, Department of Public Works on companies' standard form.

L. Guarantees, warranties or bonds supplied by Subcontractors, Suppliers or Manufacturers shall reference the project name, number, and location and be certified by the General Contractor to be for the product and installation on the project and must be countersigned by the General Contractor.

M. Submittals:

1. Submit written warranties prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.
2. Forms for special warranties are included in this Section. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Submit a draft to the Owner, through the Construction Administrator, for approval prior to final execution.
   a. Refer to Divisions 2 through 17 Sections for specific content requirements and particular requirements for submitting special warranties.
3. Form of Submittal: At Final Completion compile 2 copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
4. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2- by-11-inch paper.
   a. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the Installer.
   b. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.
   c. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

END OF DIVISION 1- GENERAL REQUIREMENTS

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01 01 00 – SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Grease Trap Replacement

B. Owner: Connecticut Military Department

C. Engineer Identification: The Contract Documents, dated June 26, 2019, were prepared for this Project by Salamone and Associates, P.C.

D. Project Directory

1. The Owner's Representative is:
   Elizabeth Tracey
   Army National Guard
   360 Broad Street
   Hartford, CT 06105
   (860) 548-3202

2. The Engineer is:
   Joseph Salamone
   Salamone & Associates, P.C.
   116 North Plains Industrial Road
   Wallingford, CT 06492
   (203) 281-6895

E. The Base Bid includes:

1. Demolition of existing grease trap and limited waste piping.

2. Replacement of existing grease trap with new larger capacity active grease recovery unit.

3. Installation of new packaged pump system dedicated to discharge from active grease recovery unit.

4. Waterproofed fluid overflow containment area.

5. Tie-in og AGRU controls and water alarm to existing DDC control system.

1.3 CONTRACT

A. Project will be constructed under a general construction contract.

1.4 USE OF PREMISES

A. Minimize damage to all access routes and restore damaged areas to their original conditions.

B. If removal of walls, fences, structures, utility lines, poles, guy wires or anchors, or other improvements is necessary for passage of the Contractor's equipment, restore to original condition. Notify the Engineer, the Owner, and all utilities of any intended modification or disruption to their property prior to the start of construction and cooperate with them in the scheduling and performing operations.

C. The Contractor shall be responsible for and reimburse the Owner and others for any and all losses, damage or expense which the Owner or others may suffer, either directly or indirectly or through any claims of any person or party, for any trespass outside the spaces and rights-of-way provided by the Owner to the Contractor or any violation or disregard of the terms and conditions established for the use or occupancy of those rights or for negligence in the exercise of those rights. The Owner may retain or deduct from any sum or sums due or to become due to the Contractor such amount or amounts as may be proper to insure the Owner against loss or expense by reason of the failure of the Contractor to observe the limits and conditions of the rights-of-way and rights of access provided by the Owner.

1.5 WORK HOURS

Typical hours are 7:30 a.m. - 3:30 p.m. Coordinate work hours with CTARNG such that any work affecting the Officer's Club kitchen operations shall be performed during off hours.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PROJECT MEETINGS

A. Pre-construction Conference: Prior to the start of construction, attend mandatory pre- construction conference with the representatives of the Engineer, Owner and other interested parties. The time and place shall be arranged by the Owner.

B. Progress Meetings: During the progress of the Work, attend meetings with the Engineer and Owner to address scheduling and overall job coordination. The

frequency of these meetings will be at the discretion of the Engineer and Owner but, no less than bi-weekly until substantial completion.

END OF SECTION 01 01 00

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04 22 00 - CONCRETE MASONRY UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete Masonry Units:

1.2 REFERENCES

A. ASTM International (ASTM):
1. ASTM C 140 - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
2. ASTM C 270 - Standard Specification for Mortar for Unit Masonry.
3. ASTM C 476 - Standard Specification for Grout for Masonry.

1.3 SUBMITTALS

A. Submit under provisions of Division 1.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Storage and handling requirements and recommendations.
2. Installation methods.

C. Shop Drawings: Provide shop drawings indicating details of construction, and installation requirements.

D. Certificates: Letter of compliance to specified performance requirements.

E. Test Reports: Submit manufacturer's Material Test Report (ASTM C140).

F. Verification Samples: For each product, two samples, representing type to be installed.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations.

B. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

C. Delivery: Deliver units in manufacturer's unopened, labeled, packaging. Units shall be inspected upon delivery. Defective units shall be removed immediately.

D. Storage: Store materials off the ground and keep free from groundwater, soil contamination, mud and dust. Materials shall be protected from precipitation and harmful weather conditions.

Product with visible frozen moisture shall not be installed.

E. Handling: Units shall be handled in a manner that prevents breakage and damage.

PART 2 -PRODUCTS

2.1 MANUFACTURERS

A. Westbrook

B. Cemex

C. Approved equal

2.2 CONCRETE MASONRY UNITS

A. Basis of Design:
1. Description: CMU, grout filled
2. Size: 8 x 8 x 16.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Examination:
1. Verify field conditions are acceptable and ready to receive masonry.

B. Preparation: Prepare surfaces and materials in accordance with mfg instructions.

C. Do not proceed with installation until substrates have been properly prepared.

3.2 INSTALLATION - CONCRETE MASONRY UNITS

A. Concrete Masonry Units:
1. Install concrete masonry units in accordance with standard masonry practices and manufacturer's instructions.
2. Bond Pattern for Exposed Masonry: Running Bond.
3. Lay units by selecting product from more than one pallet at a time during installation.
4. All cutting shall be done with masonry saw to provide, clean, sharp, unchipped edges.
5. Do not use masonry units with broken corners and edges.
6. Hollow cores shall be filled. Provide uniform, clean, level finished surface.
7. Masonry shall receive waterproof coating. See Section 07 16 16.

B. Mortar and Mortar Joints:
1. Mortar Mixing.
   a. Mix mortar ingredients in accordance with mfg instructions.
2. Mortar Joints
   a. Tool exposed joints when mortar is thumbprint hard, using jointer larger than joint thickness.

b. Remove excess mortar smears as work progresses.

C. Keep concrete masonry units clean during construction. Prevent grout or mortar from staining the face of masonry. Mortar and grout soiling (droppings, spatters, and smears) shall be removed at the end of each day following standard masonry practices.

END OF SECTION 04 22 00

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07 16 16 – CRYSTALLINE WATERPROOFING

PART 1 GENERAL

1.1 SECTION INCLUDE

A. Cementitious Crystalline Waterproofing on concrete structures and surfaces as shown on drawings and as specified in this section.

1.2 RELATED SECTIONS

A. Section 04 22 00 - Concrete Masonry Units.

1.3 SUBMITTALS

A. Product Data:
1. Submit manufacturer's description literature and specifications for proposed products.
2. Submit manufacturer's technical product specifications for proposed products.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in the manufacturing of components/products specified herein whose products have been in satisfactory use in similar service for not less than ten (10) years.

B. Installer's Qualifications: Individuals trained and certified by the product manufacturer with a minimum of five (5) years' experience.

C. Codes, References and Standards:
1. ASTM C 109 – Standard Test Method for Compressive Strength of Hydraulic Cement Mortars.
2. ASTM C 321 – Standard Test Method for Bond Strength of Chemical Resistant Mortars.
3. ASTM C 348 – Standard Test Method for Flexural Strength Hydraulic Cement Mortars.
4. ASTM C 596 – Standard Test Method for Drying Shrinkage of Mortar Containing Hydraulic Cement.
5. COE CRD-C 48-92 – Method of Test for Water Permeability of Concrete, US Army Corps of Engineers.
6. NSF/ANSI Standard 61 – Drinking Water System Components – Health Effects.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Product shall be covered, delivered and stored off the ground. Product shall be protected from moisture per manufacturer's requirements.

B. Materials shall be new and delivered in the manufacturer's unopened container/packaging. Container/packaging shall incorporate manufacturer's name, brand of product, type, grade and

class and all other qualifying information. Material safety data sheet shall accompany each respective product.

1.6 PROJECT CONDITIONS

A. Do not apply when surface temperature or weather conditions conflict with manufacturer's published requirements.

B. Coordinate waterproofing work with other trades.

C. Keep flammable products away from spark or flame. Do not allow the use of spark producing equipment during application and until all vapors have dissipated. Post "NO SMOKING" signs.

D. Maintain work area in a neat and orderly condition, removing empty containers, rags, and rubbish daily from the site.

1.7 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which the manufacturer and Installer agrees to repair or replace components of crystalline waterproofing that fail in materials or workmanship within specified warranty period stated below.

1. Failures include, but are not limited to, the following:
   a. Failure to maintain watertight conditions within specified warranty period.

2. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include the following:
   1. Aquafin
   2. Kryton
   3. Xypex
   4. Engineer approved equal

2.2 MATERIALS

A. Crystalline Waterproofing: A prepackaged, (white or gray colored) proprietary blend of Portland cement, specially treated sand, and active chemicals that, when mixed with water and applied, penetrates by capillary action into concrete or masonry and reacts chemically with free lime in the presence of water to develop crystalline growth within concrete or masonry

capillaries to produce an impervious, dense, waterproof concrete or masonry with the following properties.

1. Compression Strength (ASTM C-109): >3,000 PSI at 28 Days.
2. Adhesion bond (ASTM C-321): >220 PSI at 28 Days.
3. Flexural Strength (ASTM C-348): >700 PSI at 28 Days.
4. Shrinkage (ASTM C-596): -0.02% at 28 Days.
5. Permeability (CRD-C 48-92): No measurable water at 460 feet.
6. Potable water (NSF/ANSI 61): Certification of potable water as per NSF 61.

B. Fast Setting Patching Compound: Cementitious waterproofing and repair mortar for filling and patching tie holes, honeycombs, reveals, seal strips and other imperfections; with properties meeting or exceeding the following criteria:
1. Compression Strength (ASTM C-109): 4,000 PSI at 28 Days.
2. Flexural Strength (ASTM C-348): 800 PSI at 28 Days.
3. Shrinkage (ASTM C-596): 0.04%.
4. Potable water (NSF/ANSI 61): Certification of potable water as per NSF 61.

C. Plugging Compound: Cementitious compound with hydrophobic properties; resistant to water and moisture but vapor permeable for all standard applications (vertical, overhead and horizontal surfaces not exposed to vehicular traffic); with properties meeting or exceeding the following criteria:

1. Compression Strength (ASTM C-109): 2,800 PSI at 24 Hours.
2. Flexural Strength (ASTM C-348): 320 PSI at 24 Hours.
3. Potable water (NSF/ANSI 61): Certification of potable water as per NSF 61.

D. Water: Clean, clear, non-alkaline, free of salts and other harmful elements (potable).

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates and adjoining construction, and conditions under which work is to be performed. Do not proceed with work until any unsatisfactory conditions are corrected.

B. Verify the following substrate conditions before application of capillary/crystalline waterproofing:

1. Substrate condition is satisfactory and in accordance with manufacturer's instructions.
2. Pores of concrete surfaces have been opened.
3. Concrete surfaces are free of voids, spalled areas, loose aggregate and sharp protrusions, and no visible coarse aggregate.
4. Curing compounds or surface hardeners incompatible with waterproofing have not been used on concrete.

3.2 PREPARATION

A. Protect adjacent surfaces not designated to receive waterproofing.

B. Substrate preparation:
1. Remove any remaining concrete fins and projections, and general surface dirt.
2. Remove grease, oil and other contaminants. Use steam cleaning, high-pressure water blasting, wet or dry sand blasting, wire brush or other methods recommended by waterproofing manufacturer to produce surfaces suitable (“tooth and suction”) for application of waterproofing, minimum ICRI CSP 3 profile. Do not apply to smooth slabs.
3. Follow manufacturer's instructions to clean and prepare surfaces and seal cracks and joints.
4. Rout out faulty construction joints and visible cracks not subject to movement, exceeding 0.02" (0.4 mm) in width to approx. 3/4" (20 mm) width and minimum 1" (25 mm) depth.
5. Remove all protrusions, work back to sound concrete and chisel out any spalled or honeycombed areas.

C. Rinse surfaces to be waterproofed several times so that the concrete is thoroughly saturated. Surfaces shall be moist but not wet when waterproofing system is applied. Remove any surface water on horizontal surfaces.

3.3 INSTALLATION

A. Mix waterproofing material in proportions recommended by manufacturer.

B. Apply waterproofing material in quantities as per manufacturer's specifications and recommendations.

C. Cavity Fill:
1. Prime cavities at cleaned and prepared faulty construction joints, cracks, form tie holes, etc. with waterproofing material and fill flush to surface with patching compound in mortar consistency.

D. Horizontal surfaces:
1. Brush or spray apply waterproofing material in slurry consistency, in one coat on existing slabs.
   a. For standard applications, apply at rate of 2.0 lb/sq.yd. (1.0 kg/sq.m).
   b. For applications in contact with salt or waste water, apply at rate of 2.5 - 2.8 lb/sq.yd. (1.4 to 1.5 kg/sq.m).
   c. Spread material evenly and work it well into the surface.

E. Vertical Surfaces:
1. Apply base coat of waterproofing material in slurry consistency at uniform rate of 1.25 - 1.4 lb/sq.yd. (0.7 to 0.75 kg/sq.m). Apply using appropriate compressed-air spray equipment, stiff masonry brush or stiff broom.
2. After base coat has reached initial set but is still "green" (tacky), apply finish slurry coat of waterproofing material at 1.25 - 1.4 lb/sq.yd. (0.7 to 0.75 kg/sq.m). Apply so that final brush

or broom strokes leave parallel, uniform texture. Use light pre-watering between coats when rapid drying conditions occur.

3.4 CURING

A. Follow manufacturer's general instructions for curing and hardening of waterproofing material.

3.5 ACCEPTANCE

A. Remove left over materials and any foreign material resulting from the work from the site.

B. Clean adjacent surfaces and materials.

END OF SECTION 07 16 16

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22 13 16 – SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes building sanitary and vent piping systems, including drains and drainage specialties.

1.2 DEFINITIONS

A. Building Drain: That part of the lowest piping of a drainage system which receives the discharge from soil, waste, and other drainage pipes inside the walls of the building and conveys it to the building sewer.

B. Building Sewer: That part of the drainage system which extends from the end of the building drain and conveys its discharge to a public sewer, private sewer, individual sewage disposal system, or other point of disposal.

C. Drainage System: Includes all the piping within a public or private premises which conveys sewage, rain water or other liquid wastes to a point of disposal. It does not include the mains of public sewer systems or a private or public sewage treatment or disposal plant.

D. Vent System: A pipe or pipes installed to provide a flow of air to or from a drainage system, or to provide a circulation of air within such system to protect trap seals from siphonage and back pressure.

1.3 SUBMITTALS

A. Product data for the following products:

1. Drainage piping specialties

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: comply with the provisions of the following:

1. International Plumbing Code.

PART 2 - PRODUCTS

2.1 ABOVE GROUND DRAINAGE AND VENT PIPE AND FITTINGS

A. **A.** Cast-Iron Soil Pipe: ASTM A74, Service weight, hub-and-spigot soil pipe and fittings.

2.2 DRAINAGE PIPING SPECIALTIES

A. Cleanout Plugs: Cast-bronze or brass, threads complying with ANSI B2.1, countersunk head.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing inverts, utilities, and obstacles prior to installations.

B. Examine rough-in requirements for equipment having drain connections to verify actual locations of piping connections prior to installation.

3.2 PIPE APPLICATIONS - ABOVE GROUND, WITHIN BUILDING

A. Install hub and spigot, service weight, cast-iron soil pipe and fittings for larger than 3 inch drainage and vent pipe.

3.3 INSTALLATION

A. General Locations and Arrangements: Drawings indicate the general location and arrangement of the piping systems. Location and arrangement of piping layout take into account many design considerations. So far as practical, install piping as required.

B. Use fittings for all changes in direction and all branch connections.

C. Install exposed piping at right angles or parallel to building walls. Diagonal runs are not permitted.

D. Install piping free of sags or bends.

E. Make changes in direction for drainage and vent piping using appropriate 45 degree wyes, half-wyes, or long sweep quarter, sixth, eighth, or sixteenth bends. Straight tees,

elbows, and crosses may be used on vent lines. No change in direction of flow greater than 90 degrees shall be made. Where different sizes of drainage pipes and fittings are connected, use proper size, standard increasers and reducers. Reduction of the size of drainage piping in the direction of flow is prohibited.

3.4 HANGERS AND SUPPORTS

A. Install hangers for horizontal piping within the maximum spacing and minimum rod sizes as required by current International Plumbing Code and requirements of Governing Authorities.

3.5 INSTALLATION OF PIPING SPECIALTIES

A. Above Ground Cleanouts: Install in above ground piping and building drain piping as required, and:

1. as required by plumbing code;
2. at each change in direction of piping greater than 45 degrees;
3. at minimum intervals of 50' for piping 4" and smaller and 100' for larger piping;
4. at base of each vertical soil or waste stack.

3.6 FIELD QUALITY CONTROL

A. Inspections

1. Do not put into operation drainage and vent piping system until it has been inspected and approved by the authority having jurisdiction.

2. During the progress of the installation, notify the plumbing official having jurisdiction, at least 24 hours prior to the time such inspection must be made. Perform tests specified below in the presence of the plumbing official.

a. Rough-in Inspection: Arrange for inspection of the piping system after system is roughed-in, and prior to setting fixtures.

b. Final Inspection: Arrange for a final inspection by the plumbing official to observe the tests specified below and to insure compliance with the requirements of the plumbing code.

3. Re-inspections: Whenever the piping system fails to pass the test or inspection, make the required corrections, and arrange for re-inspection by the plumbing official.

4. Reports: Prepare inspection reports, signed by the plumbing official.

B. Piping System: Test drainage and vent system in accordance with IPC 312 and the procedures of the authority having jurisdiction.

1. Test for leaks and defects all new drainage and vent piping systems and parts of existing systems, which have been altered, extended or repaired. If testing is performed in segments, submit a separate report for each test, complete with a diagram of the portion of the system tested.
2. Repair all leaks and defects using new materials and retest system or portion thereof until satisfactory results are obtained.
3. Prepare reports for all tests and required corrective action.

3.7 ADJUSTING AND CLEANING

A. Clean interior of piping system. Remove dirt and debris as work progresses.

3.8 PROTECTION

A**.** Place plugs in ends of uncompleted piping at end of day or whenever work stops

END OF SECTION 22 13 16

22 13 23 – GREASE INTERCEPTOR

PART 1 -GENERAL

1.1 SECTION INCLUDES

A. Grease interceptors

1.2 SUBMITTALS

A. Submit under provisions of Division 01.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum five (5) years of experience manufacturing similar products.

B. Installer Qualifications: Minimum two (2) years of experience installing similar products.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Handling: Handle materials to avoid damage.

1.5 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.6 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.7 WARRANTY

A. Manufacturer standard warranty

PART 2-PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Highland Tank

2. Grease Guardian

3. Thermaco

4. or equal approved by MDC and Engineer

2.2 GREASE INTERCEPTORS

A. Interceptor shall be provided with the following:

1. Average Efficiency % (ASME 112.14.3): > 98%.
2. Connection size (mechanical): 4 inches
3. Flow Control

PART 3-EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. The interceptor as an appurtenance shall be isolated for the purposes of leak testing the upstream and downstream drainage system when verifying the system operation.

3.2 FIELD QUALITY CONTROL

A. Provide inspection certificates of Authority Having Jurisdiction (AHJ).

3.3 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 22 13 23

26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

1.2 SUMMARY

A. This Section includes general administrative, procedural, and other requirements for electrical installations. The following requirements are included in this Section to expand the requirements specified in other Divisions.
1. Submittals.
2. Quality control.
3. Definitions and abbreviations.
4. Scheduling.
5. Coordination drawings.
6. Record documents.
7. Maintenance manuals.
8. Delivery, storage, and handling.
9. Products.
10. Rough-ins.
11. Electrical installations.
12. Permits and instructions.
13. Field quality control.
14. Protection.
145. Additional work.
156. Electrical schedules.
17. Cutting and patching.

1.3 SUBMITTALS

A. General: Follow the procedures specified in Division 1.

B. Increase, by the quantity listed below, the number of electrical related shop drawings, product data, and samples submitted, to allow for required distribution plus two copies of each submittal required, which will be retained by the Electrical Consulting Engineer.

1. Shop Drawings - Initial Submittal: 1 additional blue- or black-line prints.
2. Shop Drawings - Final Submittal: 1 additional blue- or black-line prints.
3. Product Data: 1 additional copy of each item.
4. Samples: 1 addition as set.

C. Additional copies may be required by individual sections of these Specifications.

1.4 QUALITY CONTROL

A. Functional and Operational Test Procedure:
1. Test procedure to completely test all systems as to their functional and sequential operation.
2. Submit two (2) draft copies for review before conducting test.

3. Certify that the test procedure was used and testing completed, and that all systems are operational and functioning properly.
4. Submit certified Test Procedure for review prior to the date of final inspection.
5. Systems to be covered by test procedure:
a. Power Distribution

1.5 DEFINITIONS AND ABBREVIATIONS

A. Electrical Definitions: As defined by NEC, Article 100.

B. The term "indicated" shall mean "as shown on contract documents (specifications, drawings, and related attachments)".

C. The term "provide" shall mean "to furnish, install and connect completely".

D. The term "size" shall mean one or more of the following: "length, current and voltage rating, number of poles, NEMA size, and other similar electrical characteristics".

E. The term "space" on panelboard and switchboard schedules shall mean "provide space to install the number of poles and size of the protective device indicated with all the necessary buss and fittings to install the device at some future date".

1.6 SCHEDULING

A. Coordinate electrical work with other divisions of this project.

B. Coordinate electrical work with Owner.

C. The building shall be continuously occupied during construction and the Contractor shall not cause any interruption of electrical servies without prior authorization from the Owner. Written requests for approval for planned shutdowns or interruption of Owner's electrical services or equipment shall be made a minimum of seven (7) days prior to the start of the requested shut periods.

D. All interruptions of electrical service to the building shall take place on weekends. Shutdowns may commence on Friday evening at 6:00 pm. Electrical service must be restored to building by 6:00 am Monday. Contractor shall install all equipment, components, wiring, conduit, etc. as possible prior to shutdown. Contractor shall provide all material and labor to complete all shutdown work within the allotted shutdown time frame.

D. Written notification for on site training of Owner's personnel shall be made one (1) week prior to the start of the requested training period.

1.7 COORDINATION DRAWINGS

A. Prepare coordination drawings in accordance with Division 1 to a scale of 1/4"=1'-0" or larger; detailing major elements, components, and systems of electrical equipment and materials in relationship with other systems, installations, and building components. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:

1. Indicate the proposed locations of major raceway systems, equipment, and materials. Include the following:

a. Clearances for servicing equipment, including space for equipment disassembly required for periodic maintenance.

b. Fire-rated wall and floor penetrations.

c. Equipment connections and support details.

2. Indicate scheduling, sequencing, movement, and positioning of large equipment into the building during construction.

3. Prepare floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.

1.8 RECORD DOCUMENTS

A. Prepare record documents in accordance with the requirements in Division 1. In addition to the requirements specified in Division 1, indicate installed conditions for:
   1. Major raceway systems, size and location; locations of control devices; distribution and branch electrical circuitry; and fuse and circuit breaker size and arrangements.
   2. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
   3. Approved substitutions, Contract Modifications, and actual equipment and materials installed.

1.9 MAINTENANCE MANUALS

A. Prepare maintenance manuals in accordance with Division 1. In addition to the requirements specified in Division 1, include the following information for equipment items:
   1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
   2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
   3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
   4. Servicing instructions and lubrication charts and schedules.

1.10DELIVERY, STORAGE, AND HANDLING

A. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Unless otherwise indicated, all electrical equipment has been based on General Electric products.

B. As specified under other RELATED SECTIONS. Comparable manufacturers which may be utilized are the following:
1. Eaton Corp.
2. Siemens
3. Schneider Electric (Square D)

C. As specified on Drawings.

2.2 MATERIAL

A. General:
1. Unless otherwise indicated, all raceways for service, feeders, branch and control wiring shall be EMT for all interior locations. See Section 26 05 33 for further requirements.
2. Unless otherwise indicated, wiring to equipment and motors shall be installed in liquid tight flexible conduit, or in interior locations in flexible metal conduit, with a maximum length of six (6) feet.
3. Unless otherwise indicated, all conductors to be copper THHN/THWN-2.
4. Unless otherwise indicated, all outlet and switch boxes to be cast iron with threaded hubs in interior damp or exterior locations. See Section 26 05 33 for further requirements.
5. In interior protected locations, where recessed in ceiling and walls, outlet and switch boxes may be stamped steel.
6. Unless otherwise indicated, provide heavy duty grade, 20 ampere, receptacles and switches. Plates shall be 302 stainless steel, satin finish. Plates for surface mounted interior boxes may be stamped steel. Plates exposed to weather or water to be metal, weatherproof type. Receptacles, switches and associated cover plates color by Architect/Owner.

B. As specified on Drawings.

2.3 EQUIPMENT

A. General:
1. Unless otherwise indicated, externally operated safety switches are unfused, solid neutral, heavy duty, and selected to meet the load requirements.

B. As specified on Drawings.

2.4 FABRICATION

A. General:
1. Unless otherwise indicated, all enclosures are NEMA Type 1. NEMA Type 3R shall be used for wet/damp locations.

B. As specified on Drawings.

PART 3 - EXECUTION

3.1 ROUGH-IN

A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.

B. Contractor is to provide connections, both power and control as noted, for equipment. Equipment indicated on drawings is to be supplied by others. Division 26 shall coordinate the respective installations with the supplier and agency.

3.2 ELECTRICAL INSTALLATIONS

A. General: Sequence, coordinate, and integrate the various elements of electrical systems, materials, and equipment. Comply with the following requirements:
1. Coordinate electrical systems, equipment, and materials installation with other building components. Electrical plans and details do not show all interferences and conditions, visible and/or hidden, that may exist. Before selecting material and equipment, and proceeding with work, inspect areas where material and equipment are to be installed to insure suitability, and check needed space for placements, clearances and interconnections. Before cutting or drilling into building elements inspect and layout work to avoid damaging structural elements or building utilities.
2. Electrical plans, details, and diagrams show the general location and arrangement of electrical systems. They are diagrammatic and do not show all conduit bodies, connectors, bends, fittings, hangers, and additional pull and junction boxes which the Contractor must provide to complete the electrical system.
3. Verify all dimensions by field measurements.
4. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for electrical installations.
5. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.

6. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building. Verify dimensional constraints of building door openings and passageways, and the maximum floor loadings, for the movement of selected material and equipment. Order equipment and material, broken down as may be required, to meet these constraints.

7. Measurement from above finished floor (AFF) shall be taken from the finished floor surface to the top of wall receptacles and switch boxes, to the top of wall mounted equipment enclosures, to the centerline of top most switch handle.

a. Unless otherwise indicated, wall switch boxes shall be 44 inches AFF. Refer to Architectural drawings.

c. Verify connection mounting heights with equipment.

8. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.

9. Coordinate connection of electrical systems with incoming utilities and services. Comply with requirements of governing regulations. Provide power connection to equipment. Coordinate with other Divisions.

10. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Engineer.

11. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.

12. Conduit Sizing:

a. Unless otherwise indicated, conduit size for indicated conductor shall be based on Chapter 9 of NEC.

b. Conduit: 1/2 inch minimum size.

13. Install electrical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations. Measure and locate placement of equipment and materials in relation to building structure and surfaces, and between equipment to be installed and wired. Maintain required minimum access spacing for equipment and enclosures.

14. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

3.3 PERMITS AND INSPECTIONS

A. Obtain and pay for all required permits and arrange for all required inspections in accordance with state and local governing authorities.

B. Final Electrical Inspection Certificate from inspection agency or governing authority.

3.4 FIELD QUALITY CONTROL

A. Perform field tests as specified under other electrical sections.

B. Arrange for local Inspection Authorities to inspect work performed prior to burial, closing-in behind wall and above ceiling, or encased in concrete. Also arrange for final inspection of work and obtain Final Inspection Certificate before final inspection of work by Owner or his representative.

3.5 PROTECTION

A. Protect personnel from coming in contact with live parts.

B. During remodeling or alteration work, maintain fire ratings of walls, floors and ceilings when work is left unattended.

C. Protect from damage and theft equipment and materials provided or supplied by others in accordance with manufacturer's recommendation and warranties, and with electrical standards and practices.

END SECTION 26 05 00

26 05 19 - LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division Specification Sections, apply to this Section.

B. Requirements of other specified Division 26 Sections apply to this section.

1.2 SUMMARY

A. This Section includes wires, cables, and connectors for power, lighting, signal, control and related systems rated 600 volts and less.

1.3 SUBMITTALS

A. Product Data for electrical wires, cables and connectors.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with provisions of the following code:

B. NFPA 70 "National Electrical Code."
- **1**. Conform to applicable codes and regulations regarding toxicity of combustion products of insulating materials.

C. UL Compliance: Provide components which are listed and labeled by UL under the following standards.
- **1**. UL Std. 83 Thermoplastic-Insulated Wires and Cables.
- **2**. UL Std. 486A Wire Connectors and Soldering Lugs for Use with Copper Conductors.

D. NEMA/ICEA Compliance: Provide components which comply with the following standards:
- **1**. WC-5 Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

E. IEEE Compliance: Provide components which comply with the following standard.
- **1**. Std. 82 Test procedures for Impulse Voltage Tests on Insulated Conductors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include the following:

1. Wire and Cable:

a. American Insulated Wire Corp.
b. Republic Wire Inc.
c. Southwire Company.

2. Connectors for Wires and Cable Conductors:

a. AMP
b. 3M Company
c. O-Z/Gedney Co.
d. Square D Company.

2.2 WIRES AND CABLES

A. General: Provide wire and cable suitable for the temperature, conditions and location where installed.

B. Conductors: Provide stranded conductors for power and lighting circuits no. 10 AWG and smaller. Provide stranded conductors for sizes no. 8 AWG and larger.

C. Conductor Material: copper for all wires and cables.

D. Conductor sizes indicated are based on copper.

E. Insulation: Provide THHN/THWN-2 insulation for all conductors size 500MCM and larger, and no. 8 AWG and smaller. For all other sizes provide, THHN/THWN-2 or XHHW insulation as appropriate for the locations where installed.

F. Color Coding for phase identification in accordance with Table 1 in Part 3 below.

G. Jackets: Factory-applied nylon or PVC external jacketed wires and cables for pulls in raceways over 100-feet in length, for pulls in raceways with more than three equivalent 90 deg. bends, for pulls in conduits underground or under slabs on grade, and where indicated.

2.3 CONNECTORS FOR CONDUCTORS

A. Provide UL-listed factory-fabricated, solderless metal connectors of sizes, ampacity ratings, materials, types and classes for applications and for services indicated. Use connectors with temperature ratings equal to or greater than those of the wires upon which used.

PART 3 - EXECUTION

3.1 WIRING METHOD

A. Use the following wiring methods as indicated:
1. Wire: install all wire in raceway.

3.2 INSTALLATION OF WIRES AND CABLES

A. General: Install electrical cables, wires, and connectors in compliance with NEC.

B. Coordinate cable installation with other Work.

C. Pull conductors simultaneously where more than one is being installed in same raceway. Use UL listed pulling compound or lubricant, where necessary.

D. Use pulling means including, fish tape, cable, rope, and basket weave wire/cable grips which will not damage cables or raceways. Do not use rope hitches for pulling attachment to wire or cable.

E. Conceal all cable in finished spaces.

F. Keep conductor splices to minimum.

G. Install splice and tap connectors which possess equivalent or better mechanical strength and insulation rating than conductors being spliced.

H. Use splice and tap connectors which are compatible with conductor material.

I. Provide adequate length of conductors within electrical enclosures and train the conductors to terminal points with no excess. Bundle multiple conductors, with conductors larger than no 10 AWG cabled in individual circuits. Make terminations so there is no bare conductor at the terminal.

J. Tighten electrical connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A and UL 486B.

3.3 FIELD QUALITY CONTROL

A. Prior to energizing, check installed wires and cables with megohm meter to determine insulation resistance levels to assure requirements are fulfilled.

B. Prior to energizing, test wires and cables for electrical continuity and for short-circuits.

C. Subsequent to wire and cable hook-ups, energize circuits and demonstrate proper functioning. Correct malfunctioning units, and retest to demonstrate compliance.

D. TABLE 1: Color Coding for Phase Identification:

1. Color code secondary service, feeder, and branch circuit conductors with factory applied color as follows:

208Y/120Volts	Phase	120/240Volts
Black	A	Black
Red	B	Red
Blue	C	-
White	Neutral	White
Green	Ground	Green

END OF SECTION 26 05 19

26 05 29 - SUPPORTING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Requirements specified in other Division 26 Sections apply to this section.

1.2 SUMMARY

A. This Section includes secure support from the building structure for electrical items by means of hangers, supports, anchors, sleeves, inserts, seals, and associated fastenings.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for each type of product specified.
1. Hanger and support schedule showing manufacturer's figure number, size, spacing, features, and application for each required type of hanger, support, sleeve, seal, and fastener to be used.

C. Shop drawings indicating details of fabricated products and materials.

D. Engineered Design consisting of details and engineering analysis for supports for the following items:
1. Fastener supporting systems.

1.4 QUALITY ASSURANCE

A. Electrical Component Standard: Components and installation shall comply with NFPA 70 "National Electrical Code."

B. Electrical components shall be listed and labeled by UL, ETL, CSA, or other approved, nationally recognized testing and listing agency that provides third-party certification follow-up services.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include the following:

1. Slotted Metal Angle and U-Channel Systems:
- **a**. Allied Tube & Conduit
- **b**. B-Line Systems, Inc.
- **c**. GS Metals Corp.
- **d**. Unistrut Diversified Products

2. Conduit Sealing Bushings:
- **a**. Bridgeport Fittings, Inc.
- **b**. Cooper Industries, Inc.
- **c**. O-Z/Gedney
- **d**. Producto Electric Corp.
- **e**. Raco, Inc.
- **f**. Spring City Electrical Mgf. Co.
- **g**. Thomas & Betts Corp.

2.2 COATINGS

A. Coating: Supports, support hardware, and fasteners shall be protected with zinc coating or with treatment of equivalent corrosion resistance using approved alternative treatment, finish, or inherent material characteristic. Products for use outdoors shall be hot-dip galvanized.

2.3 MANUFACTURED SUPPORTING DEVICES

A. Raceway Supports: Clevis hangers, riser clamps, conduit straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring steel clamps.

B. Fasteners: Types, materials, and construction features as follows:

1. Expansion Anchors: Carbon steel wedge or sleeve type.

2. Toggle Bolts: All steel springhead type.

C. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for nonarmored electrical cables in riser conduits. Provide plugs with number and size of conductor gripping holes as

required to suit individual risers. Construct body of malleable-iron casting with hot-dip galvanized finish.

D. U-Channel Systems: 16-gage steel channels, with 9/16-inch-diameter holes, at a minimum of 8 inches on center, in top surface. Provide fittings and accessories that mate and match with U-channel and are of the same manufacture.

2.4 FABRICATED SUPPORTING DEVICES

A. General: Shop- or field-fabricated supports or manufactured supports assembled from U-channel components.

B. Steel Brackets: Fabricated of angles, channels, and other standard structural shapes. Connect with welds and machine bolts to form rigid supports.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install supporting devices to fasten electrical components securely and permanently in accordance with NEC requirements.

B. Coordinate with the building structural system and with other electrical installation.

C. Raceway Supports: Comply with the NEC and the following requirements:

1. Conform to manufacturer's recommendations for selection and installation of supports.

2. Strength of each support shall be adequate to carry present and future load multiplied by a safety factor of at least four. Where this determination results in a safety allowance of less than 200 lbs, provide additional strength until there is a minimum of 200 lbs safety allowance in the strength of each support.

3. Install individual and multiple (trapeze) raceway hangers and riser clamps as necessary to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assembly and for securing hanger rods and conduits.

4. Support parallel runs of horizontal raceways together on trapeze-type hangers.

5. Support individual horizontal raceways by separate pipe hangers. Spring steel fasteners may be used in lieu of hangers only for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings only. For hanger rods with spring steel fasteners, use

1/4-inch-diameter or larger threaded steel. Use spring steel fasteners that are specifically designed for supporting single conduits or tubing.

6. Space supports for raceways in accordance with Table I of this section. Space supports for raceway types not covered by the above in accordance with NEC.

7. Support exposed and concealed raceway within 1 foot of an unsupported box and access fittings. In horizontal runs, support at the box and access fittings may be omitted where box or access fittings are independently supported and raceway terminals are not made with chase nipples or threadless box connectors.

8. In vertical runs, arrange support so the load produced by the weight of the raceway and the enclosed conductors is carried entirely by the conduit supports with no weight load on raceway terminals.

D. Vertical Conductor Supports: Install simultaneously with installation of conductors.

E. Miscellaneous Supports: Support miscellaneous electrical components as required to produce the same structural safety factors as specified for raceway supports. Install metal channel racks for mounting cabinets, panelboards, disconnects, control enclosures, pull boxes, junction boxes, transformers, and other devices.

F. In open overhead spaces, cast boxes threaded to raceways need not be supported separately except where used for fixture support; support sheet metal boxes directly from the building structure or by bar hangers. Where bar hangers are used, attach the bar to raceways on opposite sides of the box and support the raceway with an approved type of fastener not more than 24 inches from the box.

G. Fastening: Unless otherwise indicated, fasten electrical items and their supporting hardware securely to the building structure, including but not limited to conduits, raceways, cables, cable trays, busways, cabinets, panelboards, transformers, boxes, disconnect switches, and control components in accordance with the following:

1. Fasten by means of wood screws or screw-type nails on wood, toggle bolts on hollow masonry units, concrete inserts or expansion bolts on concrete or solid masonry, and machine screws, welded threaded studs, or spring-tension clamps on steel. Do not weld conduit, pipe straps, or items other than threaded studs to steel structures. In partitions of light steel construction, use sheet metal screws.

2. Holes cut to depth of more than 1-1/2 inches in reinforced concrete beams or to depth of more than 3/4 inch in concrete shall not cut the main reinforcing bars. Fill holes that are not used.

3. Ensure that the load applied to any fastener does not exceed 25 percent of the proof test load. Use vibration- and shock- resistant fasteners for attachments to concrete slabs.

H. TESTS: Test pull-out resistance of one of each type, size, and anchorage material for the following fastener types:
1. Expansion anchors.
2. Toggle bolts.

I. Provide all jacks, jigs, fixtures, and calibrated indicating scales required for reliable testing. Obtain the structural Engineer's approval before transmitting loads to the structure. Test to 90 percent of rated proof load for fastener. If fastening fails test, revise all similar fastener installations and retest until satisfactory results are achieved.

3.2 TABLE I: SPACING FOR RACEWAY SUPPORTS

HORIZONTAL RUNS

Raceway Size (Inches)	Conductors in Run	No. of Location	IMC (1)	RMC & EMT (1)
1/2,3/4	1 or 2	Flat ceiling or wall.	5	5
1/2,3/4	1 or 2	Where it is difficult to provide supports except at intervals fixed by the building construction.	7	7
1/2,3/4	3 or more	Any location.	7	7
1/2-1	3 or more	Any location.		
1 & larger	1 or 2	Flat ceiling or wall.	6	6
1 & larger	1 or 2	Where it is difficult to provide supports except at intervals fixed by the building construction.	10	10
1 & larger	3 or more	Any location.	10	10
Any	....	Concealed.	10	10

VERTICAL RUNS

Raceway Size (Inches)	No. of Conductors in Run	Location	RMC & IMC (1,2)	EMT (1)
1/2,3/4	....	Exposed.	7	7
1,1-1/4	....	Exposed.	8	8
1-1/2 & larger	....	Exposed.	10	10
Up to 2	....	Shaftway.	14	10
2-1/2	....	Shaftway.	16	10
3 & larger	....	Shaftway.	20	10
Any	....	Concealed.	10	10

NOTES:

(1) Maximum spacing of supports (feet).
(2) Maximum spacings for IMC above apply to straight runs only. Otherwise the maximums for EMT apply.

Abbreviations: EMT Electrical metallic tubing.
IMC Intermediate metallic conduit.
RMC Rigid metallic conduit.

END OF SECTION 26 05 29

26 05 33 – RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Requirements specified in other Division 26 Sections apply to this section.

1.2 SUMMARY

A. This Section includes raceways for electrical wiring. Types of raceways in this section include the following:
- **1**. Rigid metal conduit.
- **2**. Intermediate metal conduit.
- **3**. Liquidtight flexible conduit.
- **4**. Flexible metal conduit.
- **5**. Electrical Metallic Tubing (EMT).
- **6**. Wireways.

B. This section includes cabinets, boxes, and fittings for electrical installations and certain types of electrical fittings not covered in other sections. Types of products specified in this Section include:
- **1**. Outlet and device boxes.
- **2**. Pull and junction boxes.
- **3**. Cabinets.
- **4**. Hinged door enclosures.

C. Related Sections: The following Division 26 Sections contain requirements that relate to this Section:
- **1**. "Low Voltage Electrical Power Conductors and Cables" for other wiring methods.
- **2**. "Supporting Devices" for raceway supports.

1.3 DEFINITIONS

A. Cabinets: An enclosure designed either for surface or for flush mounting and having a frame, or trim in which a door or doors may be mounted.

B. Device Box: An outlet box designed to house a receptacle device or a wiring box designed to house a switch.

C. Enclosure: A box, case, cabinet, or housing for electrical wiring or components.

D. Outlet Box: A wiring enclosure where current is taken from a wiring system to supply utilization equipment.

E. Wiring Box: An enclosure designed to provide access to wiring systems or for the mounting of indicating devices or of switches for controlling electrical circuits.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections:

1. Product data for Raceway systems.

2. Product data for cabinets and enclosures with classification higher than NEMA 1.

3. Shop drawings for boxes, enclosures and cabinets that are to be shop fabricated, (nonstock items). For shop fabricated junction and pull boxes, show accurately scaled views and spatial relationships to adjacent equipment. Show box types, dimensions, and finishes.

1.5 QUALITY ASSURANCE

A. UL Listing and Labeling: Items provided under this section shall be listed and labeled by UL.

B. Nationally Recognized Testing Laboratory Listing and Labeling (NRTL): Items provided under this section shall be listed and labeled by a NRTL. The term "NRTL" shall be as defined in OSHA Regulation 1910.7.

C. National Electrical Code Compliance: Components and installation shall comply with NFPA 70 "National Electrical Code."

D. NEMA Compliance: Comply with NEMA Standard 250, "Enclosures for Electrical Equipment (1000 Volts Maximum)."

E. NEMA Compliance: Comply with applicable requirements of NEMA standards pertaining to raceways.

F. Provide raceway products and components listed and labeled by UL, ETL, or CSA.

1.6 SEQUENCING AND SCHEDULING

A. Coordinate with other Work, including metal and concrete deck installation, as necessary to interface installation of electrical raceways and components with other Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include the following:

B. Conduits:
- **1.** Allied Tube and Conduit
- **2.** Carlon
- **3**. Republic Conduit
- **4.** Wheatland

C. Conduit Bodies:
- **1**. Allied Tube and Conduit
- **2**. Carlon
- **3**. Killark Electric Mfg. Co.
- **4**. O Z/Gedney
- **5**. Spring City Electrical Mfg. Co.
- **6.** Wheatland

D. Wireways:
- **1**. Erickson Electric Equipment Co.
- **2**. GS Metals Corp.
- **3**. Hoffman Engineering Co.

E. Cabinets:
- **1**. Erickson Electrical Equipment Co.
- **2**. Hoffman Engineering Co.
- **3**. Spring City Electrical Mfg. Co.
- **4**. Square D Co.

2.2 METAL CONDUIT AND TUBING

A. Rigid Steel Conduit: ANSI C80.1.

B. Intermediate Steel Conduit: UL 1242.

C. Electrical Metallic Tubing and Fittings: ANSI C80.3

D. Flexible Metal Conduit: UL 1, zinc coated steel.

E. Liquid-tight Flexible Metal Conduit and Fittings: UL 360. Fittings shall be specifically approved for use with this raceway.

2.3 CONDUIT BODIES

A. General: Types, shapes, and sizes as required to suit individual applications and NEC requirements. Provide matching gasketed covers secured with corrosion resistant screws.

B. Metallic Conduit and Tubing: Use metallic conduit bodies. Use bodies with threaded hubs for threaded raceways.

C. Conduit Bodies 1 Inch and Smaller: Use bodies with compression type threaded connectors.

2.4 WIREWAYS

A. General: Electrical wireways shall be of types, sizes, and number of channels indicated. Fittings and accessories including but not limited to couplings, offsets, elbows, expansion joints, adapters, hold-down straps, and end caps shall match and mate with wireway as required for completed system. Where features are not indicated, select to fulfill wiring requirements and comply with applicable provisions of NEC.

B. Wireway covers to be hinged type.

2.5 CABINETS, BOXES, AND FITTINGS, GENERAL

A. Electrical Cabinets, Boxes, and Fittings: Of indicated types, sizes, and NEMA enclosure classes. Where not indicated, provide units of types, sizes, and classes appropriate for the use and location. Provide all items complete with covers and

accessories required for the intended use. Provide gaskets for units in damp or wet locations. This applies to kitchen areas.

B. Materials and finish
- **1**. Sheet Steel: Flat-rolled, code-gage, galvanized steel.
- **2**. Fasteners for General Use: Corrosion resistant screws and hardware including cadmium and zinc plated items.
- **3**. Fasteners for Damp or Wet Locations: Stainless steel screws and hardware.
- **4**. Cast Metal for Boxes, Enclosures, and Covers; Copper-free aluminum except as otherwise specified.
- **5**. Exterior Finish: Gray baked enamel for items exposed in finished locations except as otherwise indicated.
- **6**. Painted Interior Finish: Where indicated, white baked enamel.
- **7**. Fittings for Boxes, Cabinets, and Enclosures: Conform to UL 514B. Malleable iron or zinc plated steel for conduit hubs, bushings and box connecters.

2.6 METAL OUTLET, DEVICE, AND SMALL WIRING BOXES

A. General: Conform to UL 514A, "Metallic Outlet Boxes, Electrical," and UL 514B, "Fittings for Conduit and Outlet Boxes." Boxes shall be of type, shape, size, and depth to suit each location and application.

B. Steel Boxes: Conform to NEMA OS 1, "Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports." Boxes shall be sheet steel with stamped knockouts, threaded screw holes and accessories suitable for each location including mounting brackets and straps, cable clamps, exterior rings and fixture studs.

C. Cast-Iron Boxes: Iron alloy, waterproof, with threaded raceway entries and features and accessories suitable for each location, including mounting ears, threaded screw holes for devices and closure plugs.

2.7 PULL OR JUNCTION BOXES

A. General: Comply with UL 50, "Electrical Cabinets and Boxes", for boxes over 100 cubic inches volume. Boxes shall have screwed or bolted on covers of material same as box and shall be of size and shape to suit application.

B. Steel Boxes: Sheet steel with welded seams. Where necessary to provide a rigid assembly, construct with internal structural steel bracing.

C. Hot-Dipped Galvanized Steel Boxes: Sheet steel with welded seams. Where necessary to provide a rigid assembly, construct with internal structural steel bracing. Hot-dip galvanized after fabrication. Cover shall be gasketed.

D. Stainless-Steel Boxes: Fabricate of stainless steel conforming to Type 302 of ASTM A 167, "Specification for Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet, and Strip." Where necessary to provide a rigid assembly, construct with internal structural stainless steel bracing. Cover shall be gasketed.

E. Cast-Iron Boxes: Molded of cast iron alloy with gasketed cover and integral threaded conduit entrances.

2.8 CABINETS

A. Comply with UL 50, "Electrical Cabinets and Boxes."

B. Construction: Sheet steel, NEMA 4 class except as otherwise indicated. Cabinet shall consist of a box and a front consisting of a one piece frame and a hinged door. Arrange door to close against a rabbet placed all around the inside edge of the frame, with a uniformly close fit between door and frame. Provide concealed fasteners, not over 24-inches apart, to hold fronts to cabinet boxes and provide for adjustment. Provide flush or concealed door hinges not over 24-inches apart and not over 6-inches from top and bottom of door. For flush cabinets, make the front approximately 3/4 inch larger than the box all around. For surface mounted cabinets make front same height and width as box.

C. Doors: Double doors for cabinets wider than 24-inches.

D. Locks: Combination spring catch and key lock, with all locks for cabinets of the same system keyed alike. Locks may be omitted on signal, power, and lighting cabinets located within wire closets and mechanical-electrical rooms. Locks shall be of a type to permit doors to latch closed without locking.

2.9 STEEL ENCLOSURES WITH HINGED DOORS

A. Comply with UL 50, "Cabinets and Enclosures" and NEMA ICS 6,

B. "Enclosures for Industrial Controls and Systems."

C. Construction: Sheet steel, 16 gage, minimum, with continuous welded seams. NEMA class as indicated; arranged for surface mounting.

D. Doors: Hinged directly to cabinet and removable, with approximately 3/4-inch flange around all edges, shaped to cover edge of box. Provide handle operated, key locking latch. Individual door width shall be no greater than 24-inches. Provide multiple doors where required.

E. Mounting Panel: Provide painted removable internal mounting panel for component installation.

F. Enclosure: NEMA 4 except as indicated. Where door gasketing is required, provide neoprene gasket attached with oil-resistant adhesive, and held in place with steel retaining strips. For all enclosures of class higher than NEMA 1, use hubbed raceway entrances.

PART 3 - EXECUTION

3.1 RACEWAY WIRING METHOD

A. Indoors: Use the following wiring methods:

1. Connection to Vibrating Equipment: Including transformers and hydraulic, pneumatic or electric solenoid or motor operated equipment: Flexible metal conduit. Maximum length six (6) feet.

2. Exposed/Concealed: branch circuits: EMT.

3. Connection to vibrating equipment and hydraulic, pneumatic, or electric solenoid or motor driven equipment in moist or humid location or corrosive atmosphere, or where subject to water spray or dripping oil, grease, or water: Liquidtight flexible metal conduit. Maximum length six (6) feet.

4. Exposed in moist or humid location or corrosive atmosphere, or where subject to water spray or dripping oil, grease, or water: Intermediate metal conduit, Rigid metal conduit.

3.2 RACEWAY INSTALLATION

A. General: Install electrical raceways in accordance with manufacturer's written installation instructions, applicable requirements of NEC, and as follows:

B. Conceal Conduit, unless indicated otherwise, within finished walls, ceilings, and floors. Keep raceways at least 6 inches away from parallel runs of flues and hot water pipes. Install raceways level and square and at proper elevations.

C. Elevation of Raceway: Where possible, install horizontal raceway runs above water and sanitary piping.

D. Complete installation of electrical raceways before starting installation of conductors within raceways.

E. Provide supports for raceways as specified elsewhere in Division 26.

F. Prevent foreign matter from entering raceways by using temporary closure protection.

G. Protect stub ups from damage where conduits rise from floor slabs. Arrange so curved portion of bends is not visible above the finished slab.

H. Make bends and offsets so the inside diameter is not effectively reduced. Unless otherwise indicated, keep the legs of a bend in the same plane and the straight legs of offsets parallel.

I. Use raceway fittings that are of types compatible with the associated raceway and suitable for the use and location. For intermediate steel conduit, use threaded rigid steel conduit fittings except as otherwise indicated.

J. Run concealed raceways with a minimum of bends in the shortest practical distance considering the type of building construction and obstructions except as otherwise indicated.

K. Install exposed raceways parallel and perpendicular to nearby surfaces or structural members and follow the surface contours as much as practical.

L. Run exposed, parallel, or banked raceways together. Make bends in parallel or banked runs from the same center line so that the bends are parallel. Factory elbows may be used in banked runs only where they can be installed parallel. This requires that there be a change in the plane of the run such as from wall to ceiling and that the raceways be of the same size. In other cases provide field bends for parallel raceways.

M. Join raceways with fittings designed and approved for the purpose and make joints tight. Where joints cannot be made tight, use bonding jumpers to provide electrical continuity of the raceway system. Make raceway terminations tight. Where terminations are subject to vibration, use bonding bushings or wedges to assure

electrical continuity. Where subject to vibration or dampness, use insulating bushings to protect conductors.

N. Tighten set screws of threadless fittings with suitable tool.

O. Terminations: Where raceways are terminated with locknuts and bushings, align the raceway to enter squarely and install the locknuts with dished part against the box. Where terminations cannot be made secure with one locknut, use two locknuts, one inside and one outside the box.

P. Where terminating in threaded hubs, screw the raceway or fitting tight into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align the raceway so the coupling is square to the box, and tighten the chase nipple so no threads are exposed.

Q. Install pull wires in empty raceways. Use no. 14 AWG zinc coated steel or monofilament plastic line having not less than 200 lb tensile strength. Leave not less than 12 inches of slack at each end of the pull wire.

R. Install raceway sealing fittings in accordance with the manufacturer's written instructions. Locate fittings at suitable, approved, 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 and elsewhere as indicated:

1. Where conduits pass from warm locations to cold locations, such as the boundaries of conditioned spaces and mechanical spaces.

2. Where required by the NEC.

S. Flexible Connections: Use short length (maximum of 6 ft.) of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for all motors. Use liquidtight flexible conduit in wet locations. Install separate ground conductor across flexible connections.

3.3 CABINETS AND BOXES INSTALLATION, GENERAL

A. Locations: Install items where indicated and where required to suit code requirements and installation conditions.

B. Cap unused knockout holes where blanks have been removed and plug unused conduit hubs.

C. Support and fasten items securely in accordance with Division 16 Section "Supporting Devices."

D. Sizes shall be adequate to meet NEC volume requirements, but in no case smaller than sizes indicated.

E. Remove sharp edges where they may come in contact with wiring or personnel.

3.4 APPLICATIONS

A. Cabinets: Flush mounted, NEMA enclosure Type 1 except as otherwise indicated.

B. Hinged Door Enclosures: NEMA Type 1 enclosure except as indicated.

C. Hinged Door Enclosures Outdoors: Install drip hood, factory tailored to individual units.

D. Outlet Boxes and Fittings: Install outlet and device boxes and associated covers and fittings of materials and NEMA types suitable for each location and in conformance with the following requirements:
1. Interior Dry Locations: NEMA Type 1, sheet steel or as permitted by local code.
2. Locations Exposed to Weather, Dampness, or Wet Locations: NEMA Type 3R enclosures.

E. Pull and Junction Boxes: Install pull and junction boxes of materials and NEMA types suitable for each location except as otherwise indicated.

3.5 INSTALLATION OF OUTLET BOXES

A. Gasketed Boxes: At the following locations use cast metal, threaded hub type boxes with gasketed weatherproof covers:
1. Where surface mounted on unfinished walls, columns or pilasters. (Cover gaskets may be omitted in dry locations).
2. Where exposed to moisture laden atmosphere.
3. Where indicated.

B. Cast-Iron Boxes: Iron alloy, waterproof, with threaded raceway entries and features and accessories suitable for each location, including mounting ears, threaded screw holes for devices and closure plugs.

C. Mounting: Mount outlet boxes for switches with the long axis vertical or as indicated. Mount boxes for receptacles either vertically or horizontally but consistently either way. Three or more gang boxes shall be mounted with the long axis horizontal. Locate box covers or device plates so they will not span different types of building finishes either vertically or horizontally. Locate boxes for switches near doors on the side opposite the hinges and close to door trim, even though electrical floor plans may show them on hinge side.

D. Cover Plates for Surface Boxes: Use plates sized to box front without overlap.

E. Protect outlet boxes to prevent entrance of plaster, and debris. Thoroughly clean foreign material from boxes before conductors are installed.

3.6 INSTALLATION OF PULL OR JUNCTION BOXES

A. Box Selection: For boxes in main feeder conduit runs, use sizes not smaller than 8-inches square by 4-inches deep. Do not exceed 6 entering and 6 leaving raceways in a single box. Quantities of conductors (including equipment grounding conductors) in pull or junction box shall not exceed the following:

Size of Largest Conductors in Box	Maximum no. of Conductors in Box
No. 4/0 AWG	30
250 MCM	20
500 MCM	15
Over 500 MCM	10

1. Cable Supports: Install clamps, grids, or devices to which cables may be secured. Arrange cables so they may be readily identified. Support cable at least every 30-inches inside boxes.

2. Mount pull boxes in inaccessible ceilings with the covers flush with the finished ceiling.

3. Size: Provide pull and junction boxes for telephone, signal, and other systems at least 50 percent larger than would be required by or as indicated. Locate boxes strategically and provide shapes to permit easy pulling of future wires or cables of types normal for such systems.

3.7 INSTALLATION OF CABINETS AND HINGED DOOR ENCLOSURES

A. Mount with fronts straight and plumb.

B. Install with tops 78-inches above floor.

C. Set cabinets in finished spaces flush with walls.

3.8 GROUNDING

A. Electrically ground metallic cabinets, boxes, and enclosures. Where wiring to item includes a grounding conductor, provide a grounding terminal in the interior of the cabinet, box or enclosure.

3.9 RACEWAY ADJUSTING AND CLEANING

A. Upon completion of installation of raceways, inspect interiors of raceways; clear all blockages and remove burrs, dirt, and construction debris.

3.10CLEANING AND FINISH REPAIR

A. Upon completion of installation, inspect components. Remove burrs, dirt, and construction debris and repair damaged finish including chips, scratches, abrasions and weld marks.

B. Galvanized Finish: Repair damage using a zinc-rich paint recommended by the tray manufacturer.

C. Painted Finish: Repair damage using matching corrosion inhibiting touch-up coating.

END OF SECTION 26 05 33

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