

Project Manual

Electrical and ADA Parking Renovation
Services for:

KCDC

**Montgomery Village
Apartments**

Knoxville, Tennessee

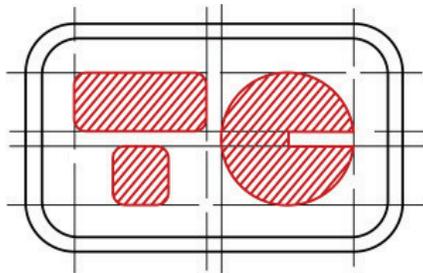
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Comm. No.: 1802

Designer:

Thomas Caldwell, Architect

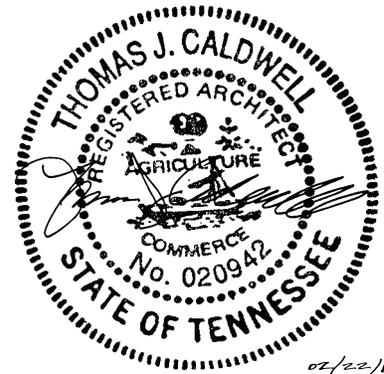
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Set No. _____

ELECTRICAL AND ADA PARKING RENOVATION SERVICES FOR:
KCDC MONTGOMERY VILLAGE APARTMENTS
KNOXVILLE, TENNESSEE

COMM. NO.: 1802

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Bidding Requirements

General Conditions

SECTION 00850 – LIST OF CONTRACT DRAWINGS

The following drawings, identified as “Electrical and ADA Parking Renovation Services For: KCDC Montgomery Village Apartments, Knoxville, Tennessee,” comprise the list of Contract Drawings:

ARCHITECTURAL

C COVER SHEET
SS1 SITE SURVEY 1 OF 2
SS2 SITE SURVEY 2 OF 2
A1 SITE PLAN AND NOTES
A2 ENLARGED PARKING LOT SITE PLANS
A3 ENLARGED PARKING LOT SITE PLANS AND DETAILS
A4 FLOOR PLANS – BUILDING TYPE “A”
A5 FLOOR PLANS – BUILDING TYPE “B”
A6 FLOOR PLANS – BUILDING TYPE “C”
A7 FLOOR PLANS – BUILDING TYPE “D”
A8 FLOOR PLANS – BUILDING TYPE “E”
A9 FLOOR PLANS – BUILDING TYPE “F”
A10 FLOOR PLANS – BUILDING TYPE “G”
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A12 FLOOR PLANS – BUILDING TYPE “J”

ELECTRICAL

E1 ELECTRICAL NOTES, SYMBOLS, LEGENDS AND SCHEDULES
E2 TYPICAL BUILDING “A” ELECTRICAL PLAN
E3 TYPICAL BUILDING “B” ELECTRICAL PLAN
E4 TYPICAL BUILDING “C” ELECTRICAL PLAN
E5 TYPICAL BUILDING “D” ELECTRICAL PLAN
E6 TYPICAL BUILDING “E” ELECTRICAL PLAN
E7 TYPICAL BUILDING “F” ELECTRICAL PLAN
E8 TYPICAL BUILDING “G” ELECTRICAL PLAN
E9 TYPICAL BUILDING “I” ELECTRICAL PLAN
E10 TYPICAL BUILDING “J” ELECTRICAL PLAN

End of Section

Contract Specifications

Division 1:
General Requirements

SECTION 01010 - SUMMARY OF THE WORK

1.1 WORK INCLUDED:

- A. Furnish all labor, materials and equipment, and perform all work to construct " Electrical and ADA Parking Renovation Services For: KCDC Montgomery Village Apartments ", as specified herein and shown on the accompanying drawings. The replacement of existing electrical service panels and meter centers, the removal of non-compliant handicap accessible curb ramps, the restriping of parking areas to add handicap accessible parking spaces, the installation of new sidewalks, ramps and handrails, the installation of new smoke detectors, removal and replacement of smoke existing smoke detectors (Alternate "1") shall be constructed complete and ready for occupancy except for the items specifically excluded in "Work Not Included".
- B. The work shall include painting, installation of metal studs and gypsum board, electrical work; sealants and caulking as specified; and site improvements as shown and specified.
- C. Patch any existing paving, curbs, grass, or existing work damaged by construction.

1.2 WORK NOT INCLUDED:

- A. The following items of work will be provided by the Owner or by others under separate contracts:
 - 1. Relocation of existing television cable wiring and equipment, if necessary.
 - 2. Any other items noted on the drawings as "N.I.C." or "Not In Contract".
- B. The following work in connection with the items listed in paragraph 1.2A preceding shall be part of the General Contract work:
 - 1. Notification of the Owner prior to installation of electrical panels, smoke detectors, and/or meter centers to coordinate relocation or removal of existing telephone and cable wiring, and similar roof or wall mounted television or internet equipment.
 - 2. Coordination of all tree trimming by the Owner as required for all meter center replacement and parking lot and sidewalk renovation work.

1.3 OCCUPANCY OF THE EXISTING BUILDINGS DURING CONSTRUCTION:

- A. The operation of the existing buildings must be maintained continuously during the performance of the contract.
- B. The Contractor shall schedule and organize his work in such a manner and use such methods that will interfere as little as possible with the continuous operation of the existing buildings. The work schedule shall be submitted to the owner or owner's representative for approval and shall be continuously updated as required during the course of the work, keeping the owner apprised of all changes.
- C. Access for service vehicles must be maintained to the existing buildings.

1.4 CONTRACTOR'S USE OF PREMISES:

- A. Before construction is started the Contractor shall confer with the Architect and the Owner and arrange for available trucking and storage space for the delivery of materials, storage space for materials and equipment, and parking space for his workmen.

- B. Construction operations and storage of materials and equipment shall be restricted to areas of the site mutually agreed upon and in such a manner as not to block access of fire fighting equipment to the existing building and facilities.
- C. Construction vehicular traffic and the operation of construction equipment such as cranes, bulldozers, and other similar equipment shall be carefully supervised and controlled to avoid damage to existing structures and facilities which are to remain in place.
- D. Maintain all existing utilities indicated to remain. Do not interrupt existing utilities except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities as acceptable to owner and governing authorities.

1.5 VERIFICATION OF DIMENSIONS:

- A. Dimensions, elevations, and locations shown on the drawings in reference to existing structures and utilities are the best available data obtainable but are not guaranteed by the Architect or the Owner and the Architect and the Owner will not be responsible for their accuracy.
- B. Before proceeding with any work dependent upon the data involved, the Contractor shall field check and verify all dimensions, grades, line levels, or other conditions of limitations at the site and building to avoid construction errors. If any work is performed by the Contractor or by his Subcontractors prior to adequate verification of applicable data, any resultant extra cost for adjustment of work to conform to existing limitations shall be borne by the Contractor without reimbursement or compensation by the Owner.

1.6 CONTROL POINTS AND LAYOUT:

- A. The initial lines, grades, and dimensions necessary for the location and control of the work under the Contract are shown on the Contract Drawings.
- B. The Contractor shall provide for himself all additional and supplementary lines and grades as may be necessary to layout the work and insure proper control of the work until completed. It shall be the Contractor's responsibility to satisfy himself as to the accuracy of all measurements before construction.

1.7 SUBSTANTIAL COMPLETION OF THE WORK:

- A. Upon substantial completion of any phase of the work, the Owner shall assume complete responsibility for the maintenance and operation of the heating, ventilating and air conditioning system and service utilities in that portion of the project.
- B. The Owner shall also become responsible for all other maintenance and damage and ordinary wear and tear and, with the exception of items under guarantee, the cost of repairs or restoration during the period between substantial and final completion.
- C. The Owner shall have the responsibility to have in effect all necessary insurance for protection against any losses not directly attributable to the Contractor's negligence.
- D. Upon substantial completion, payments for work in the substantially complete portion of the work shall be released to the Contractor, except for the retainage and an amount to cover the cost of the incomplete or deficient items included in the punch list made at the inspection to determine substantial completion. This amount shall be approximately the value of the punch list items as estimated by the Architect.

- E. The Contractor shall arrange a schedule so that punch list items are completed in the designated time by working during regular working hours. The Contractor shall be afforded access to the occupied portion of the building to perform this work during regular working hours.

1.8 BUILDING PRODUCTS USE:

- A. It is the responsibility of the Contractor to inform himself concerning the application of the products he uses to follow the directions of the Architect and manufacturer.
- B. In the event of disagreement between the Contract Documents and the manufacturer's directions, the Contractor will obtain written instructions from the Architect before proceeding with the installation.
- C. If the Contractor has knowledge of or reason to believe the likelihood of failure, he will transmit such knowledge to the Architect, and ask for written instructions before proceeding with the work.

1.9 OWNERSHIP OF REMOVED MATERIALS AND EQUIPMENT:

All removed existing materials and equipment designated to be removed which are not to remain the property of the Owner or are not noted to be reused in the new work shall become the property of the Contractor and shall be removed from the premises and site and disposed of by him.

1.10 SEPARATE CONTRACTS:

- A. The Owner may award separate contracts, including but not limited to: temporary relocation and reinstallation of cable television conduit, removal of abandoned cable television conduit and wiring, relocation and painting of internet or cable lines, and removal of abandoned satellite dishes in connection with the project. The work in these separate contracts will proceed simultaneously with the execution of this Contract. The Contractor shall coordinate operations with the separate contractors. The Contractor will be required in the arrangement for the storage of materials and in the detailed execution of the work. The Contractor, including his subcontractors, shall keep himself informed of the progress and the detailed work of the separate contractors and shall notify the owner immediately of the lack of progress or defective workmanship that will interfere with his own operations. Failure of the Contractor to keep informed of the work progressing on the site and failure to give notice of lack of progress or defective workmanship by the separate contractors shall be construed as acceptance of the separate contractor's progress, and of the state of the work as being satisfactory for proper coordination with his own work.
- B. The scope of the work of the Contractor and the separate contractor(s) shall be as follows:

All coordination of new work that must interfere with the work of separate contracts is included in this Contract. The Contractor shall be responsible for coordination and ample notification and scheduling of any and all work of separate contractors in connection with all new construction. The Contractor shall receive and store equipment for the security, telephone and computer equipment subcontractor(s).
- C. The separate contractors will provide competent foreman or supervisors for the installation of their materials and they are to confer with the Contractor and his subs and other separate contractors where required in regard to connections and installations.

End of Section

SECTION 01030 - SPECIAL PROJECT PROCEDURES

1.1 PROGRESS SCHEDULE:

- A. In addition to the progress schedule required by Paragraph A of Clause 6 of the most current edition of General Conditions of the Contract for Construction Public Housing Programs (HUD-5370), the Contractor shall also submit his proposed scheme of work for approval, describing proposed methods and sequences of work from beginning to completion of the work and their correlation with the Owner's requirements.
- B. When the Contractor's proposed sequence of work has been approved by the Owner, it shall become the time schedule for the work and shall be adhered to as closely as possible by both the Contractor and the Owner, except that mutually agreeable modifications may be made from time to time to meet unforeseen exigencies.

1.2 WORK HOURS:

Acceptable work hours are Monday through Friday from 7:30 a.m. until 4:00 p.m. Work on Sundays or holidays will require advance approval by KCDC.

1.3 OBSTRUCTIONS:

All obstructions encountered during the construction of the Contract work shall be overcome by the Contractor by removal or alteration of work in place, by adjustments in the new work, or by temporary removal and reinstallation of existing work.

1.4 CLEANING UP:

- A. Upon completion of the work, remove spots, stains, dirt, and dust from finished surfaces, both new and existing, including the surfaces of all existing machinery, equipment, and exposed piping that have been soiled by the construction.
- B. Clean and mop hard surface flooring and resilient flooring and vacuum clean carpet flooring affected or soiled by the work under this contract.
- C. Wash all glass and clean plumbing fixtures, lighting fixtures, and mechanical equipment affected or soiled by the work under this contract.
- D. Comply with all special cleaning instructions contained in Section 01710 - Cleaning and in the various other sections of the specifications.

End of Section

SECTION 01037 – WEATHER DELAYS

1.1 DESCRIPTION:

- A. Work Included: Prepare and submit request for extensions of Time based on weather conditions.
- B. Related Work:
 - 1. Documents affecting work of this section include, but are not limited to General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Applications for Payment

1.2 EXTENSIONS OF CONTRACT TIME:

If the basis exists for an extension of Time in accordance with Article 8, Paragraph 8.3 of the General Conditions and Supplementary Conditions, an extension of Time on the basis of weather may be granted only for the number of Weather Delay Days in excess of the number of days listed in the Standard Baseline for that month as shown in Article 1.3, Paragraph C of this Section.

1.3 STANDARD BASELINE FOR AVERAGE CLIMATIC RANGE:

- A. The State of Tennessee has reviewed weather data available from the National Oceanic and Atmospheric Administration and determined a Standard Baseline of average climatic range for the State of Tennessee.
- B. Standard Baseline shall be regarded as the normal and anticipatable number of calendar days for each month during which construction activity shall be expected to be prevented and suspended by cause of adverse weather. Suspension of construction activity for the number of days each month as listed in the Standard Baseline is included in the Work and is not eligible for extension of Contract Time.
- C. Standard Baseline for each month of the year is as follows (the anticipatable delay days follow the month):

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
12	11	8	7	7	6	7	5	4	5	6	11

1.4 ADVERSE WEATHER AND WEATHER DELAY DAYS:

- A. Adverse Weather is defined as the occurrence of one or more of the following conditions, substantiated by NOAA data, which prevents exterior construction activity or access to the site within twenty-four (24) hours:
 - 1. Precipitation threshold (rain, snow, ice) in excess of one-tenth inch (0.10") liquid measure. Snow to liquid measure ration is 10:0.
 - 2. Standing snow is excess of one inch (1.00").
- B. Additional extension of Time may be granted for drying days following periods of two or more consecutive days of precipitation for the following conditions:
 - 1. At a rate of one day extension of Time for each period of two or more consecutive days of precipitation of 1.0 inch or more (liquid measure).

2. Only if there is a hindrance to site access or site work, such as excavation, backfill and footings and the like, and then only when no such work is performed.
- C. A Weather Delay Day may be counted only if adverse weather prevents work on the Project for fifty percent (50%) or more of the contractor's scheduled work day, including a weekend day or holiday if contractor has scheduled construction activity that day.

1.5 DOCUMENTATION AND SUBMITTALS:

- A. Contractor shall submit on a monthly basis daily job site work logs (daily reports) showing which, and to what extent, construction activities have been adversely affected by weather.
- B. Submit actual weather data, if requested by Architect to support claim for time extension obtained from NOAA weather reporting station at McGhee-Tyson Airport (Knoxville) or NOAA weather reporting station in Morristown.
- C. Use Standard Baseline data provided in this Section when documenting actual delays due to weather in excess of the average climatic range.
- D. Organize claim and documentation to facilitate evaluation on a basis of calendar month periods, and submit in accordance with the procedures for Claims established in paragraph 4.3 of the General Conditions.
- E. Extensions of Time requested by the Contractor and approved by the Architect on the basis of conditions stated above shall be acknowledged and communicated in writing to the Contractor periodically.
- F. For extensions of Contract Time granted, a modification shall be issued in accordance with the provisions of Article 7 of the General Conditions, and the applicable General requirements. Modifications for extensions of Time may be issued quarterly or held to the end of the Project as appropriate based on Architect's approval of such extensions as noted in Paragraph E above.
- G. Extensions of Time not requested in a timely manner by the Contractor will not be granted at a later time.

End of Section

SECTION 01040 - COORDINATION

1.1 COORDINATION OF WORK OF SUBCONTRACTORS:

- A. It is the responsibility of the Contractor to coordinate the work of his subcontractors. To this end the Contractor shall require that the subcontractors examine and familiarize themselves with the architectural drawings as well as the shop drawings and that they frequently consult with each other and all other trades so that the work can be properly coordinated.
- B. The Contractor shall carefully check the work of his subcontractor in order to deliver to the Owner the contract work complete and properly installed in conformance with the Contract requirements.

1.2 CUTTING AND PATCHING:

- A. Cut and patch existing work that is to remain in place as necessary for the installation of new work.
- B. It is the intention of the Contract that conduit, sleeves, thimbles, and chases for the mechanical (including new roof drain leaders) and electrical work be installed in new concrete, masonry or stud wall work as the work progresses. The applicable subcontractors shall respectively install the required conduit, sleeves and thimbles in concrete forms and in masonry work and shall inform the Contractor of the size and location of any required chases to be formed in the concrete and masonry work. If this procedure is not followed, the subcontractors shall do all cutting of new concrete and masonry work required to install their work.
- C. Cutting of new work shall be held to the minimum necessary and shall be done neatly. The Contractor shall be responsible for the proper patching and finishing of all cut work whether or not cut by his own workmen or by subcontractors.

1.3 PRECONSTRUCTION CONFERENCE:

Prior to beginning work under the Contract, the Contractor, together with representatives of his major subcontractors, shall meet with the Owner's representatives and the Architect to discuss scheduling the work, procedures, use of site and other matters pertaining to construction administration.

End of Section

SECTION 01060 - REGULATORY REQUIREMENTS

1.1 CODES:

- A. Work shall conform to the requirements of the latest edition of the International Building Code, A.C.I., A.I.S.C., A.W.S., A.P.A., and all other applicable codes and standards referenced in this and other sections of the specifications or on the drawings. Whether or not a particular edition is referenced, it is the intention that these be the latest editions as adopted by the governing agency under whose jurisdiction the project is to be constructed. The latest edition in effect on the date approval is granted for construction to begin.
- B. Plumbing and gas piping work shall conform to the requirements of the International Plumbing Code and Fuel and Gas Code and the Southern Standard Plumbing and Gas Codes, latest revisions.
- C. Electrical work shall conform to the requirements of the International Electrical Code and the National Electric Code, NFPA No. 70-2005.
- D. Copies of Regulations: Obtain copies of the following regulations and retain at the Project site to be available for reference by parties who have a reasonable need:
 - 1. 2012 International Building Code
 - 2. 2012 International Plumbing Code
 - 3. 2012 International Mechanical Code
 - 4. 2012 International Fire Prevention Code
 - 5. 2009 ICC/ ANSI A117.1 Accessible Buildings Code (By Reference)
 - 6. 2012 International Existing Building Code
 - 7. 2011 National Electric Code
 - 8. 2012 International Energy Conservation Code

1.2 CODE STANDARDS:

- A. Fire doors shall conform to requirements of NFPA No. 80, Standards for Fire Doors and Windows.
- B. Heating, ventilating and air conditioning work shall conform to requirements of NFPA NO. 90A, Standard for the Installation of Air Conditioning and Ventilating Systems.

1.3 REGULATIONS:

- A. Electrical work shall conform to applicable regulations of the State of Tennessee, Department of Insurance, Division of Fire Prevention; and to applicable regulations of the Local Utility Company.
- B. All coatings shall comply with the Consumer Protection Safety Commission "Ban of Lead Containing Paint" (16CFR1303).
- C. All workmen applying paint shall be equipped with respirators in accordance with the applicable NIOSH/MSHA Schedule.
- D. All work shall be performed in accordance with National Emissions standards, and all local, state, federal, OSHA, EPA, and NIOSH regulations.

1.4 MATERIAL AND TESTING STANDARDS:

Components of the work shall conform to the most current editions of the requirements of American Society for Testing and Materials (ASTM) Standards, American National Standards Institute (ANSI) standards, and Trade Association Standards, as listed in the various other sections of the specifications.

1.5 ASBESTOS REGULATIONS:

- A. The removal, handling, and disposal of all asbestos containing materials shall conform to the requirements of all federal, state, and local agencies, including but not limited to: the United States Environmental Protection Agency (USEPA), the United States Occupational Safety and Health Administration (OSHA), and the Tennessee Occupational Safety and Health Administration (TOSHA). The regulations of the agency having jurisdiction over the project shall take precedence.

1.6 PERFORMANCE STANDARDS:

- A. All ferrous metal surfaces shall be prepared in accordance with all applicable sections of the Steel Structures Painting Council (SSPC), 4400 Fifth Avenue, Pittsburgh, Pennsylvania, 15213.
- B. Application of coatings shall comply with all applicable standards of the National Paint and Coatings Association (NPCA). 1500 Rhode Island Ave., N.W. Washington D.C., 20005.
- C. See Section 260500 for additional performance standards relating to the new electrical work.

1.7 MANUFACTURER'S RECOMMENDATIONS:

- A. When work in accordance with the manufacturer's recommendation is specified, a copy of these recommendations shall be kept in the job site office

1.8 SUBMITTALS:

- A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

End of Section

SECTION 01100 - ALTERNATES

1.1 GENERAL:

Each bidder shall submit a proposal of the following described alternates in the space provided on the Bid Form. The work under the alternates shall conform to all applicable provisions of the drawings and specifications, except as specifically noted otherwise. The amounts quoted for alternates shall include the cost of all incidental omissions, additions, and adjustments required because of each change. All items not specifically identified as alternate items shall be included in the Base Bid.

1.2 PARKING LOT ALTERNATE "1":

If Alternate "1" is accepted, deduct from the base bid cost of all materials and labor for the resealing of Parking Lots "E" and "G" except for the areas designated for accessible parking restriping as specified in the Contract Drawings and Specifications.

1.3 ELECTRICAL ALTERNATE "1":

If Alternate "1" is accepted, deduct from the base bid cost of all materials and labor for removal and replacement of existing smoke alarm devices with new smoke alarm devices as specified in the Contract Drawings and Specifications.

End of Section

SECTION 01200 – PROJECT MEETINGS

1.1 SCHEDULING AND ATTENDANCE:

- A. The Architect, in cooperation with the Owner and the Contractor, will schedule and administer a Pre-Construction Conference.
- B. Periodic Progress Meetings, and other specially called or required meetings shall be administered by the Contractor.
- C. Representatives of the Owner and the Architect will attend.
- D. Representatives of the Contractor, subcontractors, and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

1.2 PRE-CONSTRUCTION CONFERENCE:

- A. A Pre-Construction Conference will be scheduled and conducted at the Project Site prior to the issuance of the Notice to Proceed.
- B. The Pre-Construction Conference shall be attended by the Contractor's:
 - 1. (Office) Job Manager
 - 2. (Field) Job Superintendent
 - 3. Major subcontractor's representatives
 - 4. Major suppliers' representatives
 - 5. Others, as desired.
- C. The Pre-Construction Conference is intended to be an opportunity for the Contractor to review administrative, procedural, and temporary facilities requirement of the Contract documents, and to ask questions concerning the Work including such topics as:
 - 1. Contractor's Construction Schedule
 - 2. Critical Work Sequencing
 - 3. Designation of responsible personnel
 - 4. Procedures for processing field decisions and Change Orders
 - 5. Procedures for processing Applications for Payment
 - 6. Distribution of Documents
 - 7. Submittal of Shop Drawings, Product Data and Samples
 - 8. Use of the premises
 - 9. Work and storage areas
 - 10. Safety procedures
 - 11. Security
 - 12. Housekeeping
 - 13. Working hours
 - 14. Temporary facilities
 - 15. Certificate of Insurance
 - 16. Performance and Payment Bonds
 - 17. Progress meetings schedule
 - 18. Other appropriate topics

1.3 PROGRESS MEETINGS:

- A. Progress Meetings shall be scheduled and conducted at the Project Site monthly, one (1) being prior to the Contractor's submittals of an application for payment, or when deemed advisable by the Architect.
- B. Progress Meetings shall be attended by the Contractor's:
1. (Office) Job Manager
 2. (Field) Job Superintendent
 3. Major subcontractor's representatives
 4. Major suppliers' representatives
 5. Others, as appropriate.
- C. Progress Meetings are intended to be a monthly opportunity for the Contractor to review and submit applications for payment, and attachments, and for a general review of the progress of the Work, aimed at identifying and mitigating impediments to timely completion, including topics for discussion as appropriate to the current status of the Project:
1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relating to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract time.
 2. Review the present and future needs of each entity present, including such items as:
 - a. Safety (bodily injury and property damage)
 - b. Revisions to minutes of previous progress meeting
 - c. Review of Work progress
 - d. If progress is behind schedule, Subcontractor's plan for expediting Work
 - e. Work that will be accomplished next 21 days (Look Ahead Schedule)
 - f. Quality and Work Standards
 - g. Change Orders
 - h. Pay Applications and Schedule of Values Submittals
 - i. Other appropriate topics
- D. Reporting:
1. No later than 3 days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
 2. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

End of Section

SECTION 01300 - SUBMITTALS

1.1 SCHEDULE OF VALUES:

The schedule of values specified in Paragraph C, Clause 27 of the HUD-5370 (01/2014) General Conditions shall be divided into no less than one line item for each section of the specifications (except Division 1 sections).

1.2 APPLICATIONS FOR PAYMENTS:

Applications for payments shall be submitted on AIA Document G702, Application and Certificate for Payment, supported by AIA Document G703, continuation sheet, and by separate lists of materials stored at the site and materials stored off the site.

1.3 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:

- A. GENERAL: See Paragraphs d, e, f, g, h, and i of Clause 9 of the HUD-5370 (01/2014) General Conditions for provisions pertaining to shop drawings, product data and samples.
- B. IDENTIFICATION: All submittals shall be clearly identified with the name of the project, the supplier's name, the Contractor's name, and the location of material or equipment in the building. All shop drawings shall be dated and numbered. All samples shall have a label or tab containing the required information firmly affixed thereto.
- C. DELIVERY: All submittals shall be accompanied by a letter of transmittal containing an enumeration and description of the submittals and, unless otherwise specified, shall be delivered to:

Thomas Caldwell, Architect
6500 Papermill Drive, Suite 211
Knoxville, Tennessee 37919

Shop drawings shall be submitted to the Architect only through the General Contractor. Samples will be accepted directly from suppliers, provided that the Architect is notified by the Contractor that such delivery has been authorized by the Contractor.

- D. CONTRACTOR'S REVIEW: Shop drawings submitted without evidence that they have been reviewed by the Contractor, as specified in Paragraph e, Clause 9 of the HUD-5370 (01/2014) General Conditions, or without proper identification as specified herein, will be returned to the Contractor without action by the Architect and shall be properly resubmitted. When the phrase "by others" appears on a shop drawing, the Contractor shall indicate on the shop drawing who is to furnish the material or operation so noted, before submitting the drawing.
- E. NUMBER OF SHOP DRAWINGS REQUIRED: Not less than six copies of shop drawings and product data for mechanical and electrical work and not less than five copies of shop drawings for other work shall be submitted to the Architect for approval and a like number of such submittals requiring corrections shall be resubmitted until final approval.

Additional copies of approved shop drawings shall be furnished as required for coordination of the work of the various trades.

- F. SHOP DRAWINGS AND SAMPLES REQUIRED: Shop drawings, product data and samples will be required for items listed hereinafter in the various sections of the specifications. The Architect reserves the right to request samples of proposed substitutions for materials or equipment specified, whether or not samples of the materials and equipment specified are called for.

- G. ARCHITECT'S REVIEW OF SHOP DRAWINGS: In checking shop drawings, the Architect will not check dimension, quantities, electrical characteristics of equipment, details as strictly set forth in the specifications, nor coordination of work between various trades, these being the responsibility of the Contractor. The Architect may call attention to obvious discrepancies between the shop drawings and the Contract Drawings and Specifications concerning such items as dimensions and quantities but shall assume no responsibility for the accuracy thereof.
- H. TIME REQUIRED FOR ARCHITECT'S REVIEW: Shop drawings shall be submitted in time to allow not less than two weeks for processing by the Architect, plus an additional week for mechanical and electrical drawings.
- I. ARCHITECT'S ACTION: The stamps of the Architect on returned shop drawings shall be interpreted as follows:
- (1) PROCEED AS SUBMITTED: No corrections. Proceed with the work.
 - (2) PROCEED AS NOTED: May proceed with work as corrected; shop drawings bearing this stamp must be revised and resubmitted for final approval.
 - (3) REVISE AND RESUBMIT: No work shown shall be fabricated or furnished until shop drawings have been revised and resubmitted for further checking or approval.
 - (4) REJECTED-RESUBMIT: Work shown is not in accordance with Contract requirements and is rejected. Make new submittals.

1.4 RECORD DRAWINGS:

In addition to the record drawings specified in Clause 10 of the HUD – 5730 (01/2014) General Conditions, the Contractor shall assure that the record drawings for the electrical work, as specified under Division 26 are properly maintained by his subcontractor and upon completion of the work shall deliver them to the Architect for the Owner.

1.5 CONTRACT CLOSE-OUT SUBMITTALS:

As a precedent to final acceptance of the work and issuance of Certificate of Final Payment, including the Release of Retainage, certain submittals shall be made as specified in the various sections of the specifications. All such submittals shall be delivered to the Architect, in the form and number of copies specified, prior to or with the Contractor's request for final payment. Submittals shall include but not be limited to:

- (1) General Contractor's Affidavit, Waiver and Release of Lien Statements and Consent of Surety, as specified in Clause 27, Paragraph (i) of the HUD-5370 (01/2014) General Conditions. These documents shall be addressed to the Owner, and shall be original signed documents and not reproduced copies.
- (2) Written guarantees and warranties as specified in the various other sections of the specifications.
- (3) Record drawings as specified in the General Conditions and in Division 26.
- (4) Three copies of operation and maintenance data for mechanical equipment and electrical equipment.
- (5) Contract Close-Out Submittals, except for record drawings, shall be submitted in commercial quality three ring binders with durable plastic covers. Identify the project on the face and side of the binders. Provide a cover sheet giving complete Project Title, Contractor's and Architect's name, address, phone number, name of project superintendent, and related general information. Include a Table of Contents to identify material in the Project Data Binders and a complete listing of subcontractors and material suppliers. Provide copies of all Certificates, Warranties and related documents as well as Product Data, Maintenance and Operation Data and related information required by the Contract Documents or furnished with items included in the Project.

End of Section

SECTION 01400 - QUALITY CONTROL

1.1 QUALITY CONTROL:

The quality of concrete shall be controlled by field testing during construction and laboratory testing prior to start of construction as specified in Section 03300, Cast-In-Place Concrete.

1.2 TESTS:

- A. Tests required to establish compliance with the Contract requirements for quality control shall be made by Foundation Systems Engineering, P.C., or Architect-approved equal with reports certified by the laboratory and furnished in duplicate to the Architect with a copy to the Contractor.
- B. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making the inspection or test.
 6. Designation of the Work and test method.
 7. Identification of product and Specification Section.
 8. Complete inspection or test data.
 9. Test results and an interpretation of test results.
 10. Ambient conditions at the time of sample taking and testing.
 11. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements. .
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting.
- C. Representatives of the testing agency and monitoring shall have access to the work at all times. The Contractor shall provide facilities for such access and samples as necessary so that the testing agency may properly perform its function. 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 the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
 7. Provide security and protection of samples and test equipment at the Project Site.
- D. Duties of the Testing Agency: The independent agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Sections shall cooperate with the Architect and the Contractor in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.

1. The agency shall notify the Architect and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. The 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 agency shall not perform any duties of the Contractor.
- E. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
1. The Contractor is responsible for scheduling times for inspection, tests, taking samples, and similar activities.

1.3 COST OF TESTS:

The cost of the services of the testing agency and monitoring shall be paid by the Contractor. When the tests indicate noncompliance with the Contract requirements, any subsequent and retesting occasioned by noncompliance shall be performed by the same testing agency and the costs shall be borne by the Contractor.

1.4 OTHER TESTS:

- A. See provisions of the General Conditions regarding tests required by governing authorities.
- B. The provisions of Division 26 for tests required for electrical work.

1.5 MANUFACTURERS' INSTRUCTIONS:

Comply with manufacturer's written instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from Architect before processing.

1.6 MANUFACTURERS' FIELD SERVICES:

- A. When specified in individual specification sections, require supplier or manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, or test, adjust, and balance of equipment as applicable, and to make appropriate recommendations.
- B. Representative shall submit written report to Architect listing observations and recommendations.

End of Section

SECTION 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

1.1 UTILITIES SERVICES FOR CONSTRUCTION PURPOSES:

- A. The Contractor may establish temporary utilities as required for construction purposes. The utility costs will be paid by the Contractor.
- B. The Contractor shall furnish and install all temporary piping and wiring required for the use of these services during construction and upon completion of the work shall remove such temporary piping and wiring.
- C. If necessary, with prior approval, the use of existing services shall be in such a manner and by such methods that will not interrupt the services to any of the existing building's facilities that are to remain in operation during construction.

1.2 BARRICADES AND SPECIAL CONTROLS:

- A. Provide temporary barriers, fences, and warning signs around the sites of new buildings to control access of unauthorized persons to work areas, and as required by law. Special care shall be taken to provide adequate barriers and warning signs to prevent access of unauthorized persons to work areas where hazardous work is being performed.
- B. Provide temporary barriers and warning signs at excavations that might be left open during non working hours, including warning lights at night.

1.3 CONSTRUCTION AIDS:

Provide necessary staging, scaffolding, and hoisting equipment and temporary walkways and ladders required for installation of the work under the Contract.

1.4 TEMPORARY BUILDINGS:

- A. Provide temporary field office and storage sheds as required to carry on the work. Adequate space shall be provided in the field office for convenient use and storage of Contract Drawings and Specifications, approved shop drawings, samples, and field records. Truck trailers may be used for temporary field office and storage enclosures.
- B. Upon completion of the work, all temporary buildings shall be removed and the area of the site that they occupied shall be restored to its condition at the commencement of work under the Contract.

1.5 SANITARY FACILITIES:

- A. Provide adequate temporary toilet facilities for the use of workmen, conforming to applicable laws, ordinances, and governmental regulations.
- B. Upon completion of the work, temporary toilet facilities shall be removed from the site.
- C. If approved by the Owner in advance, the Contractor may utilize the existing toilet facilities within the existing building instead of temporary facilities.

1.6 TEMPORARY ENCLOSURES:

Provide temporary weathertight closures for all exterior openings during demolition and replacement of electrical panels, smoke alarms, and electrical meter centers of the existing buildings when it is necessary to protect the work from the weather and to maintain egress from the building. Provide weathertight and security protection of the

existing buildings until such time as the new construction is able to provide weathertightness and security. Provide safety barriers as required to protect the occupants of the existing buildings.

1.7 TEMPORARY HEAT AND VENTILATION:

- A. Provide temporary heat and ventilation as necessary for protection and drying out of the work and to allow work to be prosecuted in cold weather.
- B. Heat shall be provided by means of approved temporary heating equipment which in installation and operation will not damage the work. Provide adequate and proper fuels and all services required to furnish heat as required. Salamanders shall not be used inside the building. Heaters used to dry out or protect freshly placed concrete shall be of a type and shall be so ventilated as to prevent carbon dioxide from damaging concrete.
- C. Costs of providing temporary heat shall be borne by the Contractor.

1.8 RODENT AND VERMIN CONTROL:

- A. Provide on the project site ample and suitable refuse containers with covers. The Contractor shall be responsible for containing and removing from the site all refuse from meals eaten on the site and other rodent or vermin attracting refuse.
- B. During the construction period precaution shall be taken as necessary to control the entry and breeding of rodents and vermin in the existing building.
- C. If, within three months after occupancy of the building, any portion of the new or existing building is found to be infested by rodents or vermin, the Contractor shall bear the cost of extermination.

1.9 PROTECTION:

- A. Weather Protection: Provide at all times protection against rain, wind, storms, frost, or heat so as to maintain all work, materials, equipment and fixtures free from injury or damage. At end of days work, all new work likely to be damaged by weather conditions shall be covered.
- B. Water Protection: Provide at all times protection of excavation, trenches, and building from damage by rain water, spring water, ground water, backing up of drains or sewers, and all other water. Provide all pumps, equipment, temporary drains or dams, and enclosures necessary to provide this protection.

1.10 TELEPHONE:

The Contractor shall provide a single party telephone or cellular telephone for the use of all of the Contractor's personnel concerned with the construction of the project and service shall be maintained from start to completion of the work. The cost of the telephone service shall be paid by the Contractor. The Contractor shall provide the phone number(s) to the Owner and the Architect at the beginning of the project.

End of Section

SECTION 01505 - CONSTRUCTION WASTE MANAGEMENT

1.1 WASTE MANAGEMENT GOALS FOR THE PROJECT

- A. The Owner has established that this Project shall minimize the creation of construction and demolition waste on the job site. Factors that contribute to waste such as over packaging, improper storage, ordering error, poor planning, breakage, mishandling, and contamination, shall be minimized. Of the inevitable waste that is generated, as many of the waste materials as economically feasible shall be reused, salvaged, or recycled. Waste disposal in landfills shall be minimized.

1.2 RELATED SECTIONS SPECIFIED ELSEWHERE:

- A. Cleaning is specified in Section 01710.

End of Section

SECTION 01600 - MATERIALS AND EQUIPMENT

1.1 STORAGE OF MATERIALS AND EQUIPMENT:

- A. Storage of materials and equipment, location of field office, space for truck deliveries and parking of workmen's cars shall be restricted to areas of the site mutually agreed upon by the Contractor and the Owner prior to commencement of construction.
- B. Storage of materials and equipment and truck deliveries shall not interfere with normal pedestrian and vehicular traffic.
- C. Upon completion of the work, all damage to existing ground cover, grass, paving, site improvements, or existing structures resulting from the storage of materials and equipment, construction vehicular traffic, or other construction operations under the Contract shall be repaired by the Contractor to its condition at commencement of work under the Contract.

1.2 PROTECTION OF MATERIALS AND EQUIPMENT:

- A. Materials and equipment stored on the site that are to be incorporated in the work shall be adequately protected from damage by the weather or by construction operations.
- B. Materials subject to damage by water shall be blocked off the ground and protected with waterproof coverings, stored in weathertight floored sheds or in the building after it is enclosed.
- C. Material that is subject to damage by soiling or by exposure shall be stored as to prevent physical damage to the materials and equipment.
- D. Materials and equipment shall be so transported, handled, and stored as to prevent physical damage to the materials and equipment.
- E. Protect finished surfaces, including jambs and soffits of openings used as passageways, through which equipment and materials are handled.
- F. Provide protection for finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved over such surfaces.
- G. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Owner.

1.3 SUBSTITUTIONS:

All materials and equipment incorporated in the work shall be as specified, except such substitutions that are approved as provided by the provisions for substitutions set forth in the General Conditions and in Section 01630 Product Options and Substitutions.

1.4 REPAIRS AND REPLACEMENTS:

- A. In event of damage, promptly make replacements and repairs to the approval of the Architect and at no additional cost to the Owner.
- B. Additional time required to secure replacements and to make repairs will not be considered by the Architect to justify an extension in the Contract Time of Completion.

End of Section

SECTION 01630 – PRODUCT OPTIONS AND SUBSTITUTIONS

1.1 SUMMARY:

- A. This section describes product options available to bidders and the Contractor, plus procedures for securing approval of proposed substitutions.
- B. Related work:
 - 1. Documents affecting work of this section include, but are not necessarily limited to, General Conditions and sections in Division 1 of these specifications.
 - 2. Section 00440 Substitution Listing provides space for the bidders to propose substitutions prior to award of the Contract.
 - 3. The “Substitution Request Form” in Section 01631 shall be used by the Contractor to propose substitutions after award of the Contract. Other types of forms are not acceptable.
 - 4. Make submittals in accordance with pertinent provisions of Section 01300.

1.2 PRODUCT OPTIONS:

- A. The Contract is based on standards of quality established in the Contract Documents.
 - 1. In agreeing to the terms and conditions of the Contract, the Contractor has accepted a responsibility to verify that the specified products will be available and to place orders for all required materials in such a timely manner as is needed to meet his agreed construction schedule.
 - 2. Neither the Owner nor the Architect has agreed to the substitution of materials or methods called for in the Contract Documents, except as they may specifically otherwise state in writing.
- B. Materials and/or methods specified by name:
 - 1. Where materials and/or methods are specified by naming one single manufacturer and/or model number, without stating that equal products will be considered, only the material and/or method named is approved for incorporation into the work.
 - 2. Should the Contractor demonstrate to the approval of the Architect that a specified material or method was ordered in a timely manner and will not be available in time for incorporation into this work, the Contractor shall submit to the Architect such data on proposed substitute materials and/or methods as are needed to help the Architect determine suitability of the proposed substitution.
- C. Where materials and/or methods are specified by name and/or model number, followed by the words “or an equal approved in advance by the Architect”:
 - 1. The material and/or method specified by name establishes the required standards of quality;
 - 2. Materials and/or methods proposed by the Contractor to be used in lieu of materials and/or methods so specified by name shall in all ways equal or exceed the qualities of the named materials and/or methods;
 - 3. Proposed substitutions by bidders shall be described on Section 00440 Substitution Listing submitted at time of General Contract bid.

4. Proposed substitutions by the Contractor shall be described on the "Substitution Request Form" in Section 01631 after the award of the General Contract.
- D. The following products do not require further approval except for interface within the work:
1. Products specified by reference to standard specifications such as ASTM and similar standard;
 2. Products specified by manufacturer's name and catalog model number.
- E. Where the phrase "or equal," or "or "or equal as approved by the Architect," occurs in the Contract Documents, do not assume that the materials, equipment, or methods will be approved as equal unless the item has been specifically so approved for this work by the Architect.
- F. The decision of the Architect shall be final.

1.3 REIMBURSEMENT OF ARCHITECT'S COSTS:

- A. In the event substitutions are proposed to the Architect after the Contract has been awarded, the Architect will record all time used by the Architect and the Architect's consultants in evaluating each such approved substitution.
- B. Whether or not the Architect approves a proposed substitution, the Contractor promptly upon receipt of the Architect's billing shall reimburse the Owner via a credit to the Contract at the direct cost to the Architect and the Architect's consultants for all time spent by them in evaluating the proposed substitution.

1.4 SUBSTITUTIONS PROPOSED AFTER AWARD OF CONTRACT:

- A. Substitutions will not be considered when indicated on shop drawings or product data submittals without separate formal request complying with "submittal procedures" specified in this section.
- B. Substitutions will not be considered unless submitted through the General Contractor.
- C. Additional studies, investigations, submittals, redesign and/or analysis by the Architect caused by the requested substitutions shall be paid by the Contractor at no expense to the Owner via a credit to the Contract.
- D. Substitute products shall not be ordered or installed without written acceptance.
- E. Only one request for substitution for each product will be considered. When substitution is not accepted by the Architect, provide the specified product.
- F. Architect's decision shall be final concerning the acceptability of all substitutions.

1.5 DELAYS:

- A. Delays in construction arising by virtue of the nonavailability of a specified material and/or method will not be considered by the Architect as justifying an extension of the agreed time of completion.

End of Section

SECTION 01631 – SUBSTITUTION REQUEST FORM

GENERAL:

- A. This form is part of the substitution requirements specified in Section 01630. This form shall be utilized for all substitutions proposed by the Contractor **after** award of the contract.

PROJECT TITLE & NO.: _____

TO: Thomas Caldwell, Architect
Attention: Thomas Caldwell
6500 Papermill Drive, Suite 211
Knoxville, TN 37919
Telephone: (865) 588-0860
Fax: (865) 558-9844

ATTENTION: _____

Specified Item: _____

Section: _____ Paragraph: _____

Proposed Substitute: _____

Attach complete description, catalog, spec data, and laboratory tests, if applicable.

1. What effect will substitution have on dimensions, gauges, weights, etc., indicated in Contract Documents?

2. What effect will substitution have on wiring, piping, ductwork, etc., indicated in Contract Documents?

3. What effect will substitution have on other trades? _____

4. What effect will substitution have on construction schedule? _____

5. What are the differences in quality and performance between proposed substitute and specified product? _____

6. Manufacturer's guarantee of the specified products and proposed products are: Same: _____
Different (Explain): _____
7. List (on separate sheet) the availability of maintenance services and replacement materials for proposed substitute.
8. List (on separate sheet) names, addresses, and phone numbers of fabricators and suppliers for proposed substitutes.
9. If the substitution request is accepted, it will result in: No cost impact: _____
Credit (How Much): _____ Added cost (How Much): _____
10. There are _____ are not _____ license fees and royalties pending on the proposed substitute (to comply with HUD Form 5370, General Conditions of the Contract for Construction (Explain)):

11. The undersigned shall pay the Owner via a credit to the contract for additional studies, investigations, submittals, redesign, and/or analysis by the Architect/Engineer caused by the request substitutions.

SUBMITTED BY: (Supplier or Subcontractor)

Firm: _____

Address: _____

Signature: _____

Telephone No.: _____ Date: _____

REVIEWED AND APPROVED FOR SUBCONTRACTOR BY: (General Contractor):

Firm: _____

Address: _____

Signature: _____

Telephone No.: _____ Date: _____

ARCHITECT/ENGINEER'S REVIEW COMMENTS:

_____ Accepted

_____ Accepted as Noted
(See attached copy)

_____ Rejected due to incomplete form
(Resubmit)

_____ Not Accepted

_____ Received Too Late

Signature: _____

Date: _____

Remarks: _____

End of Substitution Request Form

SECTION 01710- CLEANING

1.1 SUMMARY:

- A. Throughout the period of work under this contract, maintain the building and site in a standard of cleanliness as described in this Section.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions and Sections in Division 1 of these Specifications.
 - 2. In addition to standards described in this Section, comply with requirements for precleaning, preparation, and final cleaning as described in Section 09900 - Painting, and in pertinent other Sections of these Specifications.

1.2 QUALITY ASSURANCE:

- A. Conduct daily inspection, and more often if necessary, to verify that requirements for cleanliness are being met.
- B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

1.3 CLEANING MATERIALS AND EQUIPMENT:

- A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

1.4 COMPATIBILITY:

- A. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

1.5 PROGRESS CLEANING:

- A. General:
 - 1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.
 - 2. Do not allow accumulation of scrap, debris, waste materials, and other items not required for construction of the Work.
 - 3. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.
 - 4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.
- B. Site:
 - 1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designed for their storage.

2. Weekly, and more often if necessary, inspect all arrangements of subparagraph 1.5-a-1 above.
3. Maintain the site in a neat and orderly condition at all times.

C. Structures:

1. Weekly, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
2. Weekly, and more often if necessary, sweep interior spaces clean.
 - a. "Clean," for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand-held- broom.
3. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.
4. Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials are installed.
 - a. "Clean," for the purpose of this subparagraph, shall be interpreted as meaning free from foreign material which, in the opinion of the Architect, may be injurious to the finish floor material.

1.6 FINAL CLEANING:

- A. "Clean," for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.
- B. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Article 1.5 above.
- C. Site:
 1. Unless otherwise specifically directed by the Architect, broom clean paved areas on the site and public paved areas adjacent to the site.
 2. Completely remove resultant debris.
- D. Structures:
 1. Exterior:
 - a. Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges, paint droppings, paint overspray, and other foreign matter.
 - b. Remove all traces of splashed materials from adjacent surfaces.

- c. If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.
 - d. In the event of stubborn stains not removable with water, the Architect may require light sandblasting or other cleaning at no additional cost to the Owner.
 - 2. Interior :
 - a. Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
 - b. Remove all traces of splashed material from adjacent surfaces.
 - c. Remove paint droppings, spots, stains, and dirt from finished surfaces.
 - 3. Glazing: Clean outside surface of all glass, plexiglass, etc. inside surfaces that have been soiled as a direct result of work under this contract.
 - 4. Polished Surfaces: To surfaces requiring routine application of buffed polish, apply the polish recommended by the manufacturer of the material being polished.
- E. Schedule final cleaning as approved by the Architect to enable the Owner to accept a completely clean work.

End of Section

Division 2:
Site Work

SECTION 02110 – GENERAL DEMOLITION

2.1 GENERAL:

Applicable provisions of the General Conditions, and Division 1, General Requirements, apply to the work under this section.

2.2 WORK INCLUDED:

- A. Do all demolition work required to remove all existing sidewalks, handrails, ramps, vegetation and topsoil for new site sidewalks, ramps, and parking lot striping, existing meter centers, existing interior electrical panels, gypsum board and metal studs, and any other necessary items to install the new work.
- B. Contractors submitting proposals shall determine the quantities of demolition work required by personal observation at the building and on the site.

2.3 RELATED WORK SPECIFIED ELSEWHERE:

- A. Remodeling construction work and patching is included within the respective sections of specifications, including removal of materials for re-use and incorporated into remodeling or new construction.
- B. Relocation of pipes, conduits, ducts, other mechanical and electrical work are specified by respective trades.

2.4 REQUIREMENTS OF REGULATORY AGENCIES:

Demolition work shall conform to requirements of the International Building Code, all Federal Regulations, and Requirements, and regulations of the City of Knoxville.

2.5 JOB CONDITIONS:

- A. Coordinate with Owner and Architect and provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on site operations. The Owner will be continuously occupying areas of the existing building and site immediately adjacent to areas of selective demolition. Conduct selective demolition work in a manner that will minimize need for disruption of the building's normal operations. Provide a minimum of 72 hours advance notice to Owner of demolition activities which will severely impact the Owner's normal operations.
- B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished. Conditions existing at time of commencement of contract will be maintained by the Owner insofar as practicable. However, variations within structure may occur by Owner's removal and salvage operation prior to start of selective demolition work.
- C. Provide temporary barricades, warning signs, and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition work.

Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to and from occupied portions of the existing building.

Erect temporary covered passageways as required by authorities having jurisdiction.

Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished, and adjacent facilities or work to remain.

Protect from damage existing finish work in the existing building that is to remain in place during demolition operations.

Construct temporary insulated solid dustproof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip temporary partitions with dustproof doors and security locks if required.

- D. Damages: Promptly repair damages caused to adjacent facilities by demolition work at no cost to the Owner.
- E. Traffic: Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with road, streets, walks, and other adjacent occupied or used facilities.

Do not close, block, or otherwise obstruct streets, walks, or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations. No removed debris shall be deposited or temporarily stored on walks, drives, adjacent buildings, or roofs.

- F. Utility Services: Maintain existing utilities indicated to remain and protect against damage during demolition operations. Do not interrupt existing utilities except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities and the Owner.

2.6 PREPARATION:

- A. Verify that areas to be demolished are unoccupied and discontinued in use and that any active utilities supported by the structures have been relocated.
- B. Arrange for and verify termination of utility services that are to be discontinued in use, including removing meters and capping lines.
- C. Verify that the Owner has removed all equipment that they intend to salvage themselves.

2.7 DEMOLITION:

- A. Perform demolition in such a manner and by such methods that will avoid and prevent spread of dust and flying particles and hazard to persons and property. Do not use explosives for any demolition work.
- B. Wet debris as necessary to limit dust to lowest practicable level. Do not use water to extent causing flooding, contaminated runoff, or icing.
- C. All existing fixtures designated for relocation should be removed and stored in such a manner as to preserve the finish and condition so that the fixtures can be relocated without damage.

2.8 DISPOSAL OF DEBRIS

- A. Provide for disposal of all existing materials designated to be removed.
- B. Remove demolition debris from the site and premises as soon as practicable.
- C. Transport demolition debris to an off-site disposal area, or make arrangements with local waste disposal company for on-site trash receptacles.
- D. Do not burn, store, or dispose of demolition debris on the site.

End of Section

SECTION 02490 - SEEDING

2.1 GENERAL:

Applicable provisions of the General Conditions and Division 1, General Requirements, apply to the work under this section.

2.2 WORK INCLUDED:

Furnish all labor, materials, equipment and services to seed all areas indicated on the site plan to be grass and any areas disturbed by construction.

2.3 RELATED WORK SPECIFIED ELSEWHERE:

- A. Cleaning is specified in Section 01710.
- B. General Demolition is specified in Section 02110.
- C. Electrical work and demolition is specified in Division 26

2.4 SEED:

Seed mix shall be 100% Kentucky 31 Fescue (95% pure). Seed mix shall be free from noxious weed seeds, and recleaned; Grade A recent crop seed; treated with appropriate fungicide at time of mixing. Deliver seed to site in sealed containers with dealer's guaranteed analysis.

2.5 SEEDING:

- A. Remove stones, clods, debris, and other refuse from surface of area to be seeded and do all additional grading and trimming required to remove surface irregularities. Then rake and harrow to loosen soil to a depth of not less than 3".
- B. Apply a mixture of one part commercial fertilizer and two parts ground limestone at a rate of 50 pounds per 1,000 square feet and mix into topsoil. Spread grass seed uniformly at a rate of 4 pounds per 1,000 square feet. Lightly cover the seed by raking and compact the surface by rolling. Cover seeded areas with a light layer of straw and sprinkle with water. Keep areas watered and moist until grass is established.
- C. Protect turf areas by erecting temporary fences, barriers, signs, and similar protection as necessary to prevent trampling.

2.6 MAINTENANCE:

Maintain seeded areas for not less than 60 days after sowing and then until final completion of the Contract if the Contract is not completed within the 60-day period.

End of Section

SECTION 02575 - PAVING REPAIR AND RESURFACING

2.1 GENERAL:

Applicable provisions of the General Conditions, Supplementary Conditions, and Division 1 -General Requirements, apply to the work under this section.

2.2 WORK INCLUDED:

Furnish all labor, materials, and equipment, and perform all work to repair and resurface the existing paving as shown on the drawings and specified herein.

2.3 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 02110 - General Demolition
- B. Section 02577 - Pavement Marking
- C. Section 03300 - Cast-in-Place Concrete

2.4 REFERENCES:

- A. Tennessee Department of Highways Standard specifications for Road and Bridge Construction. Section 303 and 411, dated January 1, 1968, or most recent edition.

2.5 SUBMITTALS:

- A. Submit a detailed sieve analysis of proposed aggregate, proposed asphalt type and content, and other pertinent design information to the architect prior to construction.

2.6 DATUM'S / SKETCHES / LAYOUT:

- A. The contractor is responsible for laying out the work in accordance with the Contract Documents.

2.7 SITE CONDITIONS / PROPERTY LINES:

- A. The paving contractor shall be responsible for verification of all site conditions prior to beginning the work under this section. If conditions are not acceptable to perform the work specified herein, the fact shall be brought to the attention of the general contractor, and correction of improper conditions will be made by the contractor. Do not proceed until unsatisfactory conditions are corrected.

2.8 PRODUCTS:

- A. Asphalt Pavement:

All resurfacing asphalt to be 1" thick 3/8" fine asphalt mix conforming to Tennessee Highway Department Specifications.

- B. Base Materials:

- 1. Base and sub-base gravel material shall be uniformly graded between the following limits:

PIT RUN		3/4" GRAVEL	
Size	% Passing	Size	% Passing
6"	100	#200	2 - 9
1 1/2"	55 - 100	3/4"	100
3/4"	40 - 85	3/8"	60 - 100
#4	20 - 60	#4	40 - 80
#100	0 - 15	#20	15 - 43
#200	0 - 9	#40	10 - 32
		#100	5 - 18

2. Gravel materials to be free from organic or other deleterious substances. Shale or other materials, which break, up or crush under weather or traffic action not acceptable.

C. Tack Coat: 85/100 pen. or equivalent.

D. Seal Coat: Nultex Grs. sealer manufactured by Koch Asphalt Co. Jencoat 2101 manufactured by Insul-Mastic or equivalent.

E. Line Paint: Alkyd traffic marking paint as specified in Section 02577.

F. Weed Killer: Roundup.

2.9 EXECUTION:

A. Asphalt Resurfacing Areas:

Furnish all labor, material, plant, equipment and all other services by the Contract to supply and install Asphalt Resurfacing as specified herein, as outlined in Section 01010 - Summary of Work, and as shown on the drawings.

1. Preparation:

- a. Remove all precast concrete parking curbs, (where applicable), and stack on site for reinstallation.
- b. Treat all cracks with weed killer and remove weeds.
- c. Repair all alligatored areas, cracked areas, and remove any roots causing the asphalt surface to heave. Repaired areas must be excavated to a minimum 12" depth and have a base course of 8" of pit run gravel and 4" of 3/4" rinsed gravel.
- d. Power broom entire surface of existing asphalt.
- e. Power wash all areas needing further cleaning to remove moss and other organic materials.
- f. Fill smaller cracks where base is not damaged.

2. Asphalt Placing:

- a. Supply and install tack coat.

- b. Supply and install level course to fill all pockets and depressions, and to provide adequate drainage
- c. Supply and install 1" surfacing course to entire area.
- d. Raise existing manhole lids to new grade elevations.

.B. General:

- 1. Slope: All finished asphalt paving shall slope a minimum of 1/8" per foot towards drain as indicated on the drawing.
- 2. Surface: Shall be smooth and true to established grades. Dips or pockets which collect water are unacceptable.
- 3. Asphalt Bumps: Supply and install new speed bumps where existing are. Where these are required they will be 2'-0" in width, 4" in height and convex in shape.

C. Inspection:

- 1. The asphalt surface when tested with a 10'-0" straight edge - at any point -shall not allow any space between the edge of the straight edge and the asphalt surface, exceeding 1/4".
- 2. No asphalt shall be laid during rainy weather.
- 3. No asphalt shall be laid at air temperature below 50 degrees F, without the owner's permission.
- 4. Hot tampers shall be used to compact asphalt in areas inaccessible to power equipment or hand rollers.
- 5. Protect the asphalt until it has set sufficiently to take pedestrian and vehicle traffic.
- 6. Install precast parking curbs using 5/8" rebar and leaving a minimum of 4" asphalt showing behind curbs.
- 7. Repaint all existing markings on pavement for parking stall lines, no parking areas, visitor spaces, speed bumps, etc.

D. Restoration of Grounds:

- 1. All damage to grounds surfaces, because of the work, shall be made good by the Contractor; using topsoil and sod, which he removed to do the work.
- 2. All ordinary soil and other items of no value, excavated from the site shall be removed completely from the owner's property by the Contractor and disposed of.

End of Section

SECTION 02576 – PAVEMENT SEALING

2.1 GENERAL:

Applicable provisions of the General Conditions, Supplementary Conditions, and Division 1 -General Requirements, apply to the work under this section.

2.2 WORK INCLUDED:

Furnish all labor, materials, and equipment, and perform all work to repair and resurface the existing paving as shown on the drawings and specified herein.

2.3 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 02575 - Paving Repair and Resurfacing
- B. Section 02577 - Pavement Marking
- C. Section 03300 - Cast-in-Place Concrete

2.4 REFERENCES:

- A. American Society for Testing Materials (ASTM)
 - 1. D 2939-03 Standard Test Methods for Emulsified Bitumens Used as Protective Coatings
 - 2. The following ASTM test methods: D140, D466, D529, D244, C88, C131, C117, C127, C123, D1310, D2170, D95, D402, D2171, D5, D113, D2042, D711, D969, D1475, D3960, D2486, E70, D562, D3583, D3236, D5249, D6690, B117, D977
 - 3. MasterSeal Asphalt Pavement Sealer meets ASTM D8099/D8099M-17 Standard Specification for Asphalt Emulsion Pavement Sealer.
- B. South Coast Air Quality Management District
 - 1. SCAQMD Method 304 – Determination of Volatile Organic Compounds (VOC) In Various Materials.
- C. Federal Specifications for Waterborne Traffic and Airfield Marking Paints
 - 1. TT-P-1952E Types I, II, and III
 - 2. TT-P-1952D
 - 3. TT-P-1952B

2.5 SUBMITTALS:

- A. Product Data
 - 1. Submit manufacturer's Product Data Sheet.

2.6 PROJECT / SITE CONDITIONS:

- A. Ambient Conditions
 - 1. Both surface and ambient temperature must be a minimum of 50°F and rising before applying cold applied crack fillers, oil spot primers, pavement sealers or traffic paints (materials). Ambient and surface temperature shall not drop below 50°F for a 24 hour period following application of materials.
 - 2. Apply materials during dry conditions when rain is not imminent or forecast for at least 24 hours after application.
- B. Pavement/Surface Conditions
 - 1. Newly placed (paved) asphalt pavement surfaces should be allowed to cure a minimum of four (4) weeks under ideal weather conditions (70°F) before applying coatings.

2. New pavement surfaces shall be free of residual oils or chemicals associated with the placement of new asphalt pavement.
3. Aged pavement surfaces shall be cleaned and prepared as recommended in this specification under Sections 2.10 thru 2.15 of this specification.

2.7 PRODUCTS:

- A. SealMaster Pavement Products and Equipment. SealMaster has a nationwide network of manufacturing and distribution facilities. Phone: 800-395-7325. Website: www.sealmaster.net. E-mail: info@sealmaster.net.

2.8 MATERIALS:

- A. SealMaster Petro Seal Oil Spot Primer (Concentrate).
- B. SealMaster Prep Seal Oil Spot Primer (Ready-To-Use)
- C. SealMaster FlexMaster Crack Sealant (Cold-applied pourable crack sealant)
- D. SealMaster CrackMaster Parking Lot Grade (Hot Pour Rubberized Crack Sealant)
- E. SealMaster Trowel Grade Crack Filler
- F. SealMaster GatorPave Patching Material
- G. SealMaster Pothole Patch (Cold Patch)
- H. SealMaster Asphalt Binder Plus
- I. MasterSeal
- J. SealMaster Top Tuff Polymer Additive
- K. SealMaster Liquid Thermoplastic Traffic Marking Paint (White and Yellow)
- L. SealMaster Fast-Dry Traffic Paint (White and Yellow)
- M. SealMaster TTP-1952B Traffic Paint (White and Yellow)
- N. SealMaster Handicap Blue Traffic Paint
- O. SealMaster Firelane Red Traffic Paint
- P. SealMaster Line Block-Out Paint (Black)

2.9 EXAMINATION:

- A. Examine pavement surface prior to performing work
- B. Notify architect or project engineer of any adverse or unacceptable conditions that would affect successful repair efforts or application of materials
- C. Do not commence work until unacceptable conditions are corrected.

2.10 SURFACE PREPARATION:

- A. Surface must be clean and free from all loose material and dirt. Remove grass along edge of pavement to find true edge of pavement. Power blowers, mechanical sweeping devices and push brooms are acceptable cleaning methods.

2.11 CRACK REPAIR:

A. Hot Applied Crack Sealant/Filling Materials and Methods

1. Cracks must be free from dust, dirt, vegetation and moisture. Clean cracks with mechanical wire brush followed by a compressed air heat lance to remove loose debris and moisture.
2. For all cracks up to 1" wide apply either SealMaster CrackMaster Parking Lot Grade crack sealant or SealMaster Crackmaster Supreme crack sealant.
3. SealMaster CrackMaster Parking Lot Grade crack sealant shall be melted in a conventional oil-jacketed unit equipped with an agitator.
4. Apply heated CrackMaster Parking Lot Grade crack sealant using a pump and wand system, a crack banding unit or a pour pot.
5. Contractor or other Entity Responsible for performing work shall refer to Manufacturer's Product Data Sheet for more detailed application instructions for CrackMaster Parking Lot Grade Crack Sealant.

2.12 ALLIGATORED PAVEMENT REPAIR:

A. Repair Alligator Cracks with SealMaster GatorPave

1. Remove all dirt, dust and vegetation on alligatored areas
2. Apply GatorPave with trowel, squeegee or straightedge.
3. Allow to dry before sealcoating.
4. Contractor or other Entity Responsible for performing work shall refer to Manufacturer's Product Data Sheet for more detailed application instructions for GatorPave.

2.13 POTHOLE REPAIR:

A. Fill Potholes with SealMaster PatchMaster Pothole Patch

1. Remove loose material, debris and standing water from pothole prior to application.
2. Apply PatchMaster directly from bag into pothole
3. Compact PatchMaster with a hand tamper, vibratory-plate compactor or asphalt roller. Finished patchwork shall be flush and level with adjoining pavement.
4. Contractor or other Entity Responsible for performing work shall refer to Manufacturer's Product Data Sheet for more detailed application instructions for SealMaster PatchMaster Pothole Patch.

2.14 OIL SPOT PRIMING:

A. Prime Oil Spots with SealMaster Prep Seal or SealMaster Petro Seal

1. Wipe or scrape excessive build-up of oil, grease, and gasoline spots. A torch may be used to burn away any residual.
2. Apply oil spot primer with brush, roller or sprayer.
3. Allow to dry before sealcoating.
4. Contractor or other Entity Responsible for performing work shall refer to Manufacturer's Product Data Sheet for more detailed application instructions for SealMaster Prep Seal or SealMaster Petro Seal.

2.15 LINE BLOCK-OUT PAINT:

A. Applying SealMaster Line Block-Out Paint

1. Remove all loose material and dirt from existing traffic markings.
2. Apply SealMaster Line Block-out paint with pressurized spray equipment, brush or roller.
3. Allow to dry before sealcoating.
4. Contractor or other Entity Responsible for performing work shall refer to Manufacturer's Product Data Sheet for more detailed application instructions for SealMaster Line Block-Out Paint.

2.16 SEALER APPLICATION:

A. Applying Pavement Sealer:

1. Remove all loose material and dirt from pavement surface. Remove grass along edge of pavement to find true edge of pavement. Power blowers, mechanical sweeping devices and push brooms are acceptable cleaning methods.
2. Equipment used to apply MasterSeal shall have continuous agitation or mixing capabilities to maintain homogeneous consistency of pavement sealer mixture throughout the application process. Spray equipment shall be capable of mixing and spraying pavement sealer with sand added. Self-propelled squeegee equipment with mixing capability shall have at least 2 squeegee or brush devices (one behind the other) to assure adequate distribution and penetration of sealer into pavement surface. Hand squeegees and brushes shall be acceptable in areas where practicality prohibits the use of mechanized equipment.
3. MasterSeal shall be mixed in accordance with the following mix design (based on 100 gallons of MasterSeal for ease of calculation):
 - MasterSeal 100 gallons
 - Water..... 15-25 gallons
 - Top Tuff..... 1 gallon
 - Sand (40 to 70 mesh AFS fineness gradation).....300-500 lbs.
4. Apply two coats of mixed MasterSeal at a rate of .11 to .13 gallon per square yard per coat to entire pavement area. Allow first coat to dry thoroughly before applying second coat.
5. Apply a third coat of mixed MasterSeal at a rate of .11 to .13 gallon per square yard to high traffic areas including parking area entrances, exits and drive lanes (or as specified in additional diagrams or drawings). Allow second coat to dry thoroughly before applying a third coat to these areas.
6. Allow final coat of pavement sealer to dry 24 hours prior to applying Traffic Paint.

End of Section

SECTION 02577 - PAVEMENT MARKING

2.1 GENERAL:

Applicable provisions of the General Conditions, Supplementary Conditions, and Division 1 -General Requirements, apply to the work under this section.

2.2 DESCRIPTION:

- A. Provide contractor grade acrylic, striping paint for new asphalt or coated asphalt.
- B. Provide contractor grade acrylic, alkyd, or chlorinated rubber striping paint for existing asphalt and concrete pavements or restriping.

2.3 SUBMITIALS:

- A. Product Data:
 - 1. Submit manufacturer's printed Product Data Sheets.

2.4 PROJECT/SITE CONDITIONS:

- A. Environmental Requirements:
 - 1. Apply marking paint in dry weather when pavement and atmospheric temperatures are fifty (50) degrees F. or above (or mfg. Specification) and are anticipated to remain above fifty (50) degrees F. for four (4) hours after completing application.

2.5 MATERIALS:

- A. Marking paint:
 - 1. Equal to Pittsburgh Traffic and Zone Marking Paint as manufactured by PPG Architectural Finishes, Inc., Pittsburgh, PA, (800) 441-9695.
 - 2. Vinyl Acrylic Latex
 - 3. Colors: white, yellow, blue or as selected.

2.6 EQUIPMENT:

- A. Commercial compressed air spray striping machine capable of applying an even coating at the manufacturer's recommended thickness in an even width across the stripe.
- B. Commercial airless spray striping machine capable of applying an even coating at the manufacturer's recommended thickness in an even width across the stripe.

2.7 EXAMINATION:

- A. Inspect existing pavement surfaces for conditions and defects that will adversely affect quality of work, and which cannot be put into an acceptable condition through normal preparatory work as specified.
- B. Do not place marking over unsound pavements. If these conditions exist, notify Architect prior to beginning work under this section.

- C. Starting installation constitutes contractor's acceptance of surface as suitable for installation.
- D. Verify that new asphalt is complete, has been accepted by the Architect, and cured a minimum of fourteen (14) days. If there is any doubt regarding the sufficient curing time, apply a small stripe of paint to an area and allow to cure and observe the results before striping the entire area.

2.8 PREPARATION:

- A. Provide qualified technician to supervise equipment and application of marking. Layout markings using guidelines, templates and forms. Stencils and templates shall be professionally made to industry standards. "Free hand" painting of arrows, symbols, or wording shall not be allowed.
- B. Thoroughly clean surfaces free of dirt, sand, gravel, oil and other foreign matter.
- C. Protect adjacent curbs, walks, fences, and other items from receiving paint.
- D. Verify that any new pavement coating has been accepted by the Architect and has cured a minimum of twenty-four (24) hours under good drying conditions.
- E. New concrete surfaces should be allowed to cure for at least 28 days before painting. The presence of concrete sealers or efflorescence may interfere with adhesion and can be removed by weathering or mechanical means.
- F. While the specified products are not formulated with any lead containing ingredients, many traffic and zone marking paints do contain lead. Warning: Removing existing coatings from the surface to be painted by sweeping, sanding, scraping, or other mechanical means may create dust or particles containing lead, a hazardous substance. Avoid creating and breathing dust and other debris. Thoroughly clean all surfaces before and after painting. Breathing or eating leadcontaining dust or debris can cause health problems especially in children or pregnant women.

2.9 APPLICATION:

- A. Apply marking paint at a rate of one (1) gallon per three to four hundred (300-400) lineal feet of four (4) inch wide stripes (or to mfg. specification). If it is necessary to paint new asphalt surfaces, apply two thin coats 7-8 mils wet each. Allow first coat to thoroughly dry before applying the second coat.
- B. Apply stripes straight and even in accordance with schedules.
- C. Apply stripes and other markings in widths and colors detailed in schedule.

2.10 PROTECTION:

- A. Barricade marked areas during installation and until the marking paint is dried and ready for traffic.

End of Section

Division 3:
Concrete

SECTION 03100 - CONCRETE FORMWORK

3.1 GENERAL:

Applicable provisions of the General Conditions, Supplementary Conditions and Division 1, General Requirements, apply to the work under this section.

3.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 03200 - Concrete Reinforcement
- B. Section 03300 - Cast-in-Place Concrete

3.3 DESIGN REQUIREMENTS:

- A. Design, construct and erect formwork per ACI 347-78, Recommended Practice for Concrete Formwork.
- B. Build in anchors, inserts, bolts, hangers, sleeves, ferrules, and other accessories.

3.4 ALLOWABLE TOLERANCES:

- A. In accordance with ACI 301-84 as listed in table 4.3.1 - Tolerances for Formed Surfaces.

3.5 MATERIALS:

- A. Concealed concrete: No. 2 Common Southern Pine, S4S, or better.
- B. Exposed concrete: B-B Plyform, Class I or II, EXT-APA, Metal or fiberglass forms may be used.
- C. Construction joint forms for slabs-on-grade: Key type steel formers, Vulcan Screed Joints, Burke Keyed Kold Joint Form, Dayton Sure-Grip G-20, or equal.
- D. Expansion joint filler: Asphalt, impregnated, premolded fiberboard by full thickness of slab or joint. ASTM D994-71.
- E. Form coating: Non-staining mineral oil.
- F. Form ties: Snap-off type, which will break off at least 1/2" below surface of concrete.

3.6 EARTH FORMS:

- A. Where soil is firm enough to permit cutting to true size, concrete may be placed without forms. Remove loose dirt and debris before placing concrete.
- B. If soil is unstable, over excavate and erect forms.

3.7 ERECTING:

- A. Erect forms to obtain shapes, designs and dimensions indicated. Caulk forms to prevent leakage. Brace, shore and tie forms together to maintain position without sagging or bulging.
- B. Provide 3/4" chamfering at corners (exposed or unexposed).

- C. Prepare insides of forms so that concrete will have a smooth, uniform finish, free from fins, stone pockets, voids and other surface defects.
- D. For slabs-on-grade, provide construction joint forms where concrete placement terminates at the end of day or because of other reasons.
- E. For structural members, provide bulkheads, with reinforcing steel penetrating bulkheads, where concrete placement stops at end of day or for other reasons.
- F. Where soil conditions are such that concrete cannot be placed without forms, and where other conditions cause trenches to be opened wider than footing or slab widths, erect forms for footing or slabs.
- G. Install items furnished by others for installation in concrete. Use templates to locate anchor bolts and other critical items.

3.8 PREPARING:

- A. Prepare insides of forms so that concrete will have a smooth, uniform finish free of surface defects.
- B. Coat forms before reinforcement steel is placed. Where mill-oiled forming material is used, follow manufacturer's instructions for recoating. Where forming material is not mill-oiled, coat forms before each use.
- C. Before reusing forms, thoroughly clean them and remove projecting nails or similar devices.

3.9 FORM REMOVAL:

- A. Remove forms in such manner and such times as to insure safety of structure and to avoid chipping and spalling of concrete. Refer to Section 6.2 of ACI 318-83, Section 6.2 of the Commentary to ACI 318-83, and Section 3.6.2.3 of ACI 347-78 for form removal requirements.
- B. Design of the formwork, shoring and its removal is the responsibility of the Contractor.

End Of Section

SECTION 03200 - CONCRETE REINFORCEMENT

3.1 GENERAL:

Applicable provisions of the General Conditions, Supplementary Conditions and Division 1, General Requirements, apply to the work under this section.

3.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 03100 - Concrete Formwork
- B. Section 03300 - Cast-in-Place Concrete

3.3 SUBMITTALS:

- A. Submit warranty from mill or supplier stating that materials meet requirements of referenced ASTM and ACI Standards.
- B. Detail reinforcing steel in accord with ACI 315-95, "Details and Detailing of Concrete Reinforcement," and ACI 318-95, "Building Code Requirements for Reinforced Concrete." Submit shop drawings indicating bending and placement of reinforcement as well as sleeve and built-in work locations.

3.4 PRODUCT DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials to project site in bundles marked with metal tags for easy identification.
- B. Handle and store materials to prevent contamination.
- C. Deliver and store welding electrodes in accord with American Welding Society D 1.4- Latest Edition.

3.5 REINFORCEMENT STEEL:

- A. ASTM A615-Latest Edition, Grade 60, deformed bars.

3.6 REINFORCEMENT WIRE:

- A. Welded steel wire fabric, ASTM A185-Latest Edition.

3.7 BAR SUPPORTS:

- A. Bar supports and spacing of same shall be as per recommendations set forth by Chapter 3 of the CRSI Manual of Standard Practice, Latest Edition.
- B. Steel wire bar supports in concrete where soffits are exposed to view, weather, or liquid shall be Class 1 or Class 2, Types A or B; Class is acceptable for other uses.

3.8 OTHER SUPPORTS:

- A. Concrete brick may be used to support reinforcement to obtain proper clearance from earth and rigidity of reinforcement under concreting operations.

3.9 TIE WIRE:

- A. Wire shall be 16-1/2 gauge or heavier, black annealed.

3.10 FABRICATING :

- A. In accordance with CRSI Manual of Standard Practice, Latest Edition.

3.11 CONDITION OF SURFACES :

- A. Maintain reinforcement surfaces free of mud, oil or other coatings which might impair concrete bond as described in Section 7.4 of ACI 318-Latest Edition. Rust or mill scale is acceptable provided the minimum dimensions are not less than applicable ASTM Standards. Loose rust scale to be removed with wire brush.

3.12 INSTALLING REINFORCING STEEL

- A. Handle, place and tie reinforcement steel in accord with "Building Code Requirements for Reinforced Concrete," ACI 318-83 and CRSI publication "Placing reinforcing Bars, " Latest Edition.

- B. All reinforcement bars shall be supported and secured as directed in ACI 315-80 and CRSI Manual of Standard Practice, Latest Edition.

- C. For all splices, unless noted otherwise, provide the following lap splice length of reinforcement steel:

In concrete member : Class B
In masonry member : 48 bar diameters

Do not splice reinforcement steel except as authorized by Architect.

- D. Accomplish welding in accordance with American Welding Society publication "Recommended Practices for Welding Reinforcing Steel, Metal Inserts, and Connections in Reinforced Concrete Construction," AWS D 1.4-79.

- E. Bend bars cold. Do not field bend bars partially embedded in concrete except as specifically permitted by Architect. Do not heat or cut bars with a torch.

3.13 INSTALLING WELDED WIRE FABRIC :

- A. For Slabs-on-Grade :

has 1. Install welded wire fabric after vapor barrier (or under floor waterproofing, if applicable) been placed.

2. Locate welded wire fabric in center third of slabs.

- B. For Slabs on Metal Form :

1. Provide W.W.F. 6x6 - W1.4xW1.4, unless noted otherwise.

2. Locate welded wire fabric at mid-depth of slab measured between top of slab and top of metal form.

C. Lap side one full mesh plus 2 inches. Lap ends two full meshes. Offset end laps in adjacent width to prevent continuous laps.

3.14 CONCRETE PROTECTION FOR REINFORCEMENT :

A. Protect reinforcing by thickness of concrete indicated on Contract Drawings.

B. Variation from clear cover shall conform to section 7.5 ACI 318-83.

End Of Section

SECTION 03300 - CAST-IN-PLACE CONCRETE

3.1 GENERAL:

Applicable provisions of the General Conditions, Supplementary Conditions, and Division 1, General Requirements, apply to all work specified under this section.

3.2 WORK INCLUDED:

This section includes materials, mixing, proportioning, transporting, sampling, testing, placing, finishing and curing of all plain and reinforced cast-in-place, normal weight concrete.

3.3 QUALITY ASSURANCE:

Materials and work shall conform to the requirements of standards, codes and recommended practices required in this section. In conflicts between industry standards and this specification, or this specification and local building code, the more stringent requirements shall govern.

A. Applicable Standards:

1. "Specifications for Structural Concrete for Buildings" ACI 301-Latest Edition.
2. "Building Code Requirements for Reinforced Concrete" ACI 318-Latest Edition.
3. "Standard Specification for Ready-Mixed Concrete" ASTM C 94- Latest Edition.
4. C 311- Latest Edition. "Standard Methods of Sampling and Testing Fly Ash for Use as an Admixture in Portland Cement Concrete".
5. C 618- Latest Edition. "Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete".
6. ACI 315-80, Details and Detailing of Concrete Reinforcement.
7. ACI 306R-78 (Latest Edition), Cold Weather Concreting.
8. ACI 305R-77 (Latest Edition.), Hot Weather Concreting.
9. ACI 302.1R-80, (Latest Edition). Guide for Concrete Floor and Slab Construction.

B. Field Reference Manual (ACI Publication SP-15-1984):

1. Contractor shall have available in the field office a copy of the ACI Field Reference Manual SP-15- Latest Edition.

3.4 TESTING AND INSPECTION:

- A. Materials and operations shall be tested and inspected as work progresses. Failure to detect defective work shall not prevent rejection when defect is discovered, nor shall it obligate the Owner for final acceptance.
- B. Testing agencies shall meet the requirements of "Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials As Used in Construction," ASTM E 329- Latest Edition.

- C. The following testing service shall be performed by the designated agency and shall be paid by the Contractor. A representative of the agency shall observe the placing of all designated concrete.
1. Secure composite samples in accordance with "Standard Method of Sampling Fresh Concrete," ASTM C 172- Latest Edition.
 2. Mold and cure three specimens from each test required in accordance with "Standard Method of Making and Curing Concrete Test Specimens in the Field," ASTM C 31- Latest Edition.
 3. Test specimens in accordance with "Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens," ASTM C 39- Latest Edition. Two specimens shall be tested at 28 days for acceptance and one shall be tested at 7 days for information.
 4. Make one strength test for each 100 cu. yd. (76.5 m³) or fraction thereof, of each mix design of concrete placed in any one day.
 5. Determine slump of normal-weight concrete sample for each strength test in accordance with "Standard Test Method for Slump of Portland Cement Concrete," ASTM C 143- Latest Edition.
 6. Determine total air content of normal-weight concrete sample for each strength test in accordance with "Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method," ASTM C 231-82 or "Standard Test Method for air content of freshly mixed concrete by the Volumetric Method," C-173- Latest Edition.
 7. Determine temperature, unit weight, yield and air content (gravimetric) of concrete sample for each strength test in compliance with ASTM C 138- Latest Edition, "Standard Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete."
 8. No water will be added at the site with out the approval of the designated agency. If water is added at the site, the designated agency shall retest the concrete in accordance with "Standard Test Method for Slump of Portland Cement Concrete" plus whatever other tests the designated agency feels are necessary.
 9. Qualification of proposed materials and the establishment of mix designs in accordance with "Building Code Requirements for Reinforced Concrete," ACI 318- Latest Edition.
 10. Testing services needed or required by the Contractor.
 11. Test results will be reported to the Architect and Contractor in writing on the same day that the test is made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in the structure, design compressive strength at 28 days, concrete mix proportions and materials, and compressive breaking strength and type of break for both 7 day tests and 28 day tests.
 12. Perform additional tests of in-place concrete when the test results indicate that the required strength level has not been achieved and other characteristics have not been attained in the structure, as directed by the Architect, The testing service may conduct tests to determine the adequacy of concrete by cored cylinders that comply with ASTM C42 or by such other methods as are directed by the Architect. The Contractor shall pay for such tests and any additional testing that may be required when concrete is verified to be unacceptable.

D. To facilitate testing and inspection, the Contractor shall:

1. Furnish labor to assist testing agency in obtaining and handling samples at the job site.
2. Advise testing agency in advance of operations to allow for the assignment of testing personnel and testing.
3. Provide and maintain for the use of the testing agency adequate facilities for proper curing of concrete test specimens on the project site in accordance with ASTM C 31- Latest Edition.

3.5 EVALUATION AND ACCEPTANCE:

- A. Strength level of concrete will be satisfactory if 90% of strength test results and averages of all sets of three consecutive strength tests equal or exceed specified strengths and no individual test result is below specified strength by more than 500 psi (3.4 MPa). Should evidence of low-strength concrete exist, or if test results indicate non-conformance with these specifications, additional investigation, as outlined in ACI 318-83, Section 4.7.4 may be directed by the Architect. All such investigation including the cost if the Architect's and/or Structural Engineer's time, shall be at the Contractor's expense.
- B. If, after additional investigation, evidence of low-strength concrete still exists, load tests in accordance with Chapter 20 of ACI 318- Latest Edition. may be inadequate by the Architect, the Contractor will remove it from the Project and replace it with concrete conforming to these specifications subject to all testing requirements herein. All such remedial work shall be at the Contractor's expense.
- C. The Contractor shall be fully responsible for ensuring that all concrete and concrete placement are in accordance with the Project Specifications. Failure of Architect or Testing Laboratory to detect defective work, workmanship, or materials shall in no way prevent rejection, and the Contractor taking approved corrective action when such defects are discovered. The Architect or the Testing Laboratory shall not, thereby, be obligated to make a final acceptance.

3.6 SUBMITTALS:

- A. When requested, submit samples of materials proposed, names, sources and descriptions.
- B. Submit two copies of laboratory's trial mix designs proposed in accordance with Method 1, ACI 301- Latest Edition or one copy each of 30 consecutive test results and the mix design used from a record of past performance in accordance with ACI 301, Method 2.
- C. Submit a sample ready-mixed concrete delivery ticket in accordance with the requirements of ASTM C94- Latest Edition.

3.7 MATERIALS:

- A. Portland Cement, Type I conforming to ASTM C 150- Latest Edition, "Standard Specification for Portland Cement." Cement shall correspond to that upon which the selection of concrete proportions was based.
 1. Only one brand and manufacturer of approved cement shall be used for exposed concrete.
 2. Type III cement shall be used only with prior written approval from the Architect.

- B. Aggregates conforming to ASTM C 33- Latest Edition., "Standard Specification for Concrete Aggregates." Local aggregates not complying with this standard may be used providing it can be shown by special test or a record of past performance these aggregates produce concrete of adequate strength and durability.
1. Fine aggregate, clean, sharp, natural, or manufactured sand, free from loam, clay lumps or deleterious substances, within allowable standards.
 2. Coarse aggregate, clean, uncoated, graded aggregate containing no clay, mud, loam or foreign matter.
- C. Water shall be clean and free from deleterious materials.
- D. Concrete Admixture - Provide admixtures produced and serviced by established, reputable manufacturer, used in compliance with manufacturer's recommendations.
1. Air-entraining admixture, conforming to ASTM C 260- Latest Edition., "Standard Specification for Air-Entraining Admixtures for Concrete," MBAE-10, or Micro Air manufactured by Master Builders.
 - a. Certification attesting to compliance with ASTM C 260 shall be furnished.
 2. Water-reducing, set-controlling admixture, conforming to ASTM C 494- Latest Edition, Type A (water-reducing) Type D (water-reducing retarder), Type E (water reducing accelerating).
 - a. Field Service: When requested, a qualified concrete technician employed by the manufacturer shall be available to assist in proportioning concrete materials for optimum use, to advise on proper use of admixture and adjustment of concrete mix proportions to meet job site and climatic conditions.
 - b. Where construction requirements dictate, flowable concrete, designed and proportioned specifically for this project may be used. Flowable concrete shall be produced by using either a blend of Master Builders water-reducing/set-controlling admixtures, Types A, D & E; or Type F, high range water reducer. Strict adherence to manufacturer recommendations shall be followed. Where flowable concrete is used, reference slump shall be 3-4 in. and final slump shall not exceed 8-1/2 in. Prior approval is required for use of flowable concrete.
 3. Fly Ash, conforming to ASTM C 618, Class F, ignition loss shall not exceed six percent (6%). Only one source of fly ash shall be used.
- E. Metal reinforcement shall be provided in accordance with the working drawings and conform to specification listed.
1. Deformed Bars - ASTM A 615- Latest Edition, "Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement."
 2. Welded Wire Fabric - ASTM A 185- Latest Edition, "Standard Specification for Welded Steel Wire Fabric for Concrete Reinforcement." ("Fiber mesh 1" may be substituted for welded wire fabric) as stipulated below.

3. Fabricating, tolerances, and placing in accordance with requirements of ACI 301- Latest Edition, "Specification for Structural Concrete for Buildings."
- F. Metal accessories shall conform to the requirements of the Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice for Reinforcing Concrete Construction."
- G. Expansion Joint, conforming to ASTM D 1751- Latest Edition, "Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)."
- H. Curing Materials, exceeding requirements of ASTM C 309- Latest Edition, "Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete." "KureNSeal" manufactured by Sonneborn Building Products, or Rez- Seal by Euclid Chemical Co.
- I. Material providing water retention not exceeding loss of 0.55 kg/m^2 when tested in accordance with ASTM C 156-Latest Edition, "Standard Test Method for Water Retention by Concrete Curing Materials."
- J. Alkali resistant polypropylene fibers, as manufactured by Fibermesh Company, Chickamunga, Georgia, may be used for reinforcing in place of welded wire fabric in interior, non-exposed floor slabs upon prior approval by Architect.

3.8 SELECTION OF PROPORTIONS:

A. General:

Concrete shall be composed of Portland cement, fine aggregate, coarse aggregate, water, admixtures, and as specified, Air Entraining Admixture. Fly Ash may be used with prior approval, provided producer can provide sufficient background data on fly ash mixes. Proportions of ingredients shall produce concrete that will work readily into corners and angles of forms, bond to reinforcement, without segregation or excessive bleed water forming on the surface. Proportions of materials shall be in accordance with ACI 211.1-81, (Latest Edition) "Recommended Practice for Selecting Proportions for Normal, Heavy and Mass Weight Concrete."

1. Proportions of ingredients shall be selected by past field experience or, in lieu of past performance, laboratory trial mixes to produce placeability, durability, specified strength and properties specified.

B. Required Average Strength Above Specified Strength:

Determinations of required average strength (f 'c) shall be in accordance with ACI 318- Latest Edition, "Building Code Requirements for Reinforced Concrete," and evaluations of compressive strength results of field concrete shall be in accordance with ACI 214-77, (Latest Edition.), "Recommended Practice for Evaluation of Strength Test Results of Concrete."

1. Past Field Experience - Proportions shall be established on the actual field experience of the ready-mix producer with the materials proposed to be employed. Standard deviations shall be determined by 30 consecutive tests (or 2 groups of tests totaling 30 or more).
 - a. Average strength (f 'c) shall exceed specified strength (f 'c) by at least:

400 psi (2.8 MPa)-standard deviation is less than 300
550 psi (3.8 MPa)-standard deviation is 300 to 400
700 psi (4.8 MPa)-standard deviation is 400 to 500

900 psi (6.2 MPa)-standard deviation is 500 to 600
1200 psi (8.3 MPa)-standard deviation is above 600 or unknown

2. Trial Mixes - When the ready-mix producer does not have a record of past performance, the combination of materials and the proportions selected shall be selected from trial mixes having proportions and consistencies suitable for the work based on ACI 211.1-81, using at least three different water-cement ratios which will produce a range of strengths encompassing those required.

- a. Average strength (f 'c) required shall be:

Specified compressive strength: Required average compressive strength:

<u>f 'c psi</u>		<u>f 'c psi</u>
Less than 3000	--	f 'c + 1000
3000 to 5000	--	f 'c + 1200
Over 5000	--	f 'c + 1400

3.9 CONCRETE QUALITIES REQUIRED:

A. Specified Compressive Strength:

Specified Compressive (f 'c) Strength @ 28 days, unless noted higher on the drawings, shall be:

4000 psi (MPa) -- All concrete.

1. Average strength shall exceed specified compressive strength as required in accordance with ACI 318- Latest Edition.

B. Air Entrainment:

Concrete subject to exposure shall be air-entrained. Total air content required (air-entrained and entrapped air) shall be:

<u>Nominal Max. Size Coarse Aggregate</u>		<u>Total Air Content</u>
3/4"	(19 mm)	6% ± 1.5
1"	(25 mm)	6% ± 1.5
1-1/2"	(38 mm)	5% ± 1.5

1. Air content shall be measured by ASTM C 231- Latest Edition, "Standard Test Method for Air Content of Freshly Mixed Concrete by Pressure Method," or "C 173- Latest Edition." Air Content of Freshly Mixed Concrete by the Volumetric Method."
2. Maximum total air content on troweled flatwork receiving a surface hardener shall be 3%.

C. Slump:

Consolidation by vibration, 3 in. (76 mm) not to exceed 4 in. (102 mm).

Consolidation by other methods, 4 in. (102 mm) not to exceed 5 in. (127 mm).

1. Flowable concrete, with prior written approval from the Engineer, 8-1/2 in. slump.

2. Slump shall be determined by ASTM C 143- Latest Edition, "Standard Test Method for Slump of Portland Cement Concrete."

D. Aggregate Size:

Maximum size of coarse aggregate shall not exceed:

1. One-fifth narrowest dimension between forms.
2. Three-fourths minimum clear spacing between reinforcing bars.
3. One-third the thickness of slabs.

E. Control of Set:

Concrete may be adjusted to produce the required rate of hardening for varied climatic and job site conditions.

1. Under 50° F (10° C) ambient temperature-Accelerate (Type C and E admixture - ASTM C 494- Latest Edition).
 - a. Calcium chloride or admixtures containing chloride from other than impurities from admixture ingredients are not permitted.
2. Over 90° F (27° C) ambient temperature-Retard (Type B & D admixture ASTM C 494- Latest Edition).
3. Between 50° F and 90 F (10° C and 27° C) - Normal Rate of Hardening (Type A admixture - ASTM C 494- Latest Edition).

3.9 FORMWORK:

A. Forms used to confine and shape concrete to required dimensions shall have sufficient strength to withstand forces from placement, vibration, and sufficient rigidity to maintain specified tolerances.

1. Design, engineering and construction of the formwork shall be the responsibility of the contractor.
2. Work shall be designed for loads, lateral pressure and allowable stresses in accordance with ACI 347- Latest Edition, "Recommended Practice for Concrete Formwork."
3. All tolerances, preparation of form surfaces, removal of forms, reshoring and removal strength shall be in accordance with ACI 301- Latest Edition, "Specification for Structural Concrete for Buildings."

3.10 REINFORCEMENT:

A. Details of reinforcement and accessories shall be in accordance with ACI 315-74, "Manual of Standard Practice for Detailing Reinforced Concrete Structures" (Latest Edition).

B. Shop drawings showing fabrication dimensions and locations of placing reinforcing steel and accessories shall be submitted for Architect's review prior to fabrication.

- C. Reinforcement shall conform to specification listed.
 - 1. Deformed Bars - ASTM A 615- Latest Edition, "Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement."
 - 2. Welded Wire Fabric - ASTM A 185- Latest Edition, "Standard Specification for Welded Steel Wire Fabric for Concrete Reinforcement."
- D. Reinforcement shall be secured against displacement by using annealed wire ties of not less than 16 gage, or suitable metal clips at intersections, and shall be supported in a manner that will keep all metal away from surfaces of concrete. Nails shall not be driven into the outside forms to support reinforcement, nor shall any other device for this purpose come in contact with the outside form, except that temporary wood spacers may be used to maintain the required clear distance between the steel and the outside face form. Such wood spacers shall be pulled up and removed from the concrete as the level of concrete rises.
- E. Bars in wall footings to be continuous and lapped per ACI 31.8 requirements for Class B tension splices. Any other splices shall also conform to Class B tension splices unless noted otherwise on the drawings.
- F. Wall and partition footings shall have corner bars with 2'-0" legs of size and number of wall footing reinforcing.
- G. Provide two #4 bars in top of wall footings under doors and other openings 4'-0" or more in width. These bars shall be 4'-0" longer than the opening.
- H. Fabricating, tolerances, and placing in accordance with requirements of ACI 301- Latest Edition, "Specifications for Structural Concrete for Buildings."

3.11 JOINTS AND EMBEDDED ITEMS:

- A. Construction Joints not shown on working drawings shall be made and located to least impair strength of structure and shall be approved by Owner.
 - 1. Reinforcement shall be continued across joints, keys and inclined dowels provided as directed by Owner.
- B. Expansion Joints - Premolded expansion joint filler shall conform to one of the following:
 - 1. ASTM D 1751- Latest Edition, "Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Non-Bituminous Types)."
 - 2. Install isolation joints between walks and sidewalks and abutting building walls and other structures. Install transverse expansion joints in walks, sidewalks, and curbs at intervals not over 30 feet apart, and between existing sidewalks and new sidewalks. Isolation and expansion joints shall be formed with 1/2" thick bituminous joint filler extending thru full thickness of slab and curb.
 - 3. ASTM D1752- Latest Edition."Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction."
- C. Contraction and Construction Joints: Locate where on the drawings and as directed by the Architect.

1. Contraction joints may be formed, tooled or sawed approximately equal to 1/3 the thickness of slab.
 2. Construction joints not indicated on the drawings shall be so made and located as to least impair the strength of the structure. Where a joint is to be made, the surface of the previously placed concrete shall be roughened, thoroughly cleaned, and all laitance removed.
 3. Contraction and construction joints in supported floor slabs shall be located near the middle of the span of slabs, beams, and girders.
 4. Formed joints in floor slabs on grade shall be formed with keyed steel joint forms. Steel forms shall be supported in place with special steel stakes provided by the form manufacturer. The top of steel stakes shall be set below slab surface so that when keyed joint form is placed on the stakes the top edge is at finished floor elevation. A minimum of five stakes per 10-foot length of form shall be used. Finish the concrete flush with top of joint form.
- D. Other Embedded Items - Sleeves, inserts, anchors, embedded items required for adjoining work or support shall be placed prior to concreting, positioned accurately and supported against displacement.

3.12 PRODUCTION OF CONCRETE:

- A. Concrete shall be ready-mixed, batched, mixed and transported in accordance with ASTM C 94- Latest Edition, "Standard Specification for Ready-Mixed Concrete." (Latest Edition)
1. Plant equipment and facilities shall conform to the "Checklist for Certification of Ready-Mixed Concrete Production Facilities" of the National Ready-Mixed Concrete Association.

3.13 PLACING:

- A. Preparation - Notify Testing Laboratory at least 48 hours before starting concrete placement. Contractor shall provide access for delivery, provide sufficient equipment and manpower to rapidly place all concrete.
1. Work shall be in accordance with ACI 304-73, "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete" (Latest Edition.)
 2. Formwork shall have been completed and snow, ice, water and debris removed from within forms.
 3. Expansion joint material, anchors and all embedded items shall have been positioned and secured.
 4. Subgrades shall be sprinkled sufficiently with water to eliminate water loss from concrete.
 5. Concrete shall not be placed on frozen ground.
- B. Conveying - Concrete shall be placed rapidly by methods to prevent segregation or loss of quality.
- C. Placement - Concrete shall be deposited continuously or, when continuous placement is not possible, construction joints shall be located as approved by Owner or Architect. Concrete shall be placed as nearly as possible to its final position. Avoid rehandling.

1. Concrete shall be consolidated by vibration, spading, rodding, or forking. Work concrete around reinforcement embedded items and into corners; eliminate air or stone pockets and other causes of honeycombing, pitting or planes of weakness.
2. Internal vibration shall have a minimum frequency of 8000 v/min. with amplitude to consolidate effectively.
 - a. Vibrators shall be operated by competent workmen.
 - b. Use of vibrators to transport concrete shall not be allowed.
 - c. Vibrators shall be inserted and withdrawn approximately every 18 inches (456-mm) for 5 to 15 seconds each time.

3.14 WEATHER CONDITIONS:

- A. Cold Weather - Concrete shall conform to ACI Committee 306R- Latest Edition, Report on "Cold Weather Concreting." The following minimum concrete temperatures as placed and maintained shall apply, depending on section, size and dimension.

<u>Section Size Min. Dimension - Inches (cm)</u>	<u>Minimum Concrete Temperature</u>
Less than 12 (29 cm)	55 ° F. (13 ° C.)
12 - 36 (29 - 88 cm)	50 ° F. (10 ° C.)
36 - 72 (88 - 176 cm)	45 ° F. (7 ° C.)
More than 72 (176 cm)	40 ° F. (4 ° C.)

Water heated to above 140° F. (60° C.) shall be combined with the aggregates before cement is added. Work shall be in accordance with ACI Committee 306 Report, "Cold Weather Concreting."

1. When outdoor temperature is less than 40° F (4° C) temperature of the concrete in place shall be maintained according to Table 1.4.1 ACI 306R- Latest Edition.
 - a. Arrangements shall be made before placement to maintain required temperature without injury from excessive heat.
 - b. Combustion heaters shall not be used during the first 48 hours without precautions to prevent exposure of concrete and workmen to exhaust gases.
- B. Hot Weather - Temperature of concrete delivered at job site shall be determined in accordance with ACI 305R- Latest Edition Committee Report on "Hot Weather Concreting."
1. Provisions shall be made for windbreaks, shading, fog spraying, sprinkling or wet cover when necessary.
 2. Use an evaporation retardant and finishing aid, equal to "Confilm," by Master Builders.

3.15 CURING AND PROTECTION:

- A. Immediately following placement, concrete shall be protected from premature drying, hot and cold temperatures, rain, flowing water and mechanical injury.
- B. Material and method of curing shall be approved by the Owner. Final curing shall continue for not less than 7 days.

1. Approved methods include: ponding or continuous sprinkling, continuous wet mats coated with resin-base liquid curing compound or sand kept continuously wet.
 - a. Applications of waterproof sheet material shall conform to ASTM C 171- Latest Edition, "Standard Specification for Sheet Materials for Curing Concrete."
2. Material shall maintain a maximum moisture loss of 0.55 kg/m^2 tested in accordance with ASTM C 156- Latest Edition, "Standard Test Method for Water Retention by Concrete Curing Materials."
3. Application of resin-base liquid curing compound shall be strictly in accordance with the manufacturer's instructions. Apply a minimum of one complete coat. Apply a minimum of 2 coats at areas of exposed interior concrete slabs.

3.16 FINISHING FLOOR SLABS:

- A. Exposed concrete surfaces shall have as-cast finish with imperfections patched to match as-cast surface as closely as possible in color and texture.
- B. Floor slabs to have exposed concrete finish and floor slabs to receive vinyl composition, ceramic tile, or carpet finish flooring and shall have smooth steel troweled finish. Strike off to true surface at the proper elevations and profiles and, before free water has appeared on the surface, compact thoroughly with floats or tampers to force the coarse aggregate below the surface. After free water has dissipated and just before water sheen has disappeared from the surface, trowel to a smooth and even surface with a steel trowel.
- C. Floor slab surfaces shall be level or true to slope, with a tolerance of not more than plus or minus $1/4"$ in $10'-0"$ non-accumulating. While still plastic, the concrete surfaces shall be tested for surface irregularities with a 10-foot straightedge and the necessary corrections made.
- D. Floor slab surfaces shall slope to floor drains with a minimum slope of $1/4$ inch in 12 inches. Slope shall be even from high points to drain openings and shall extend throughout space drained.

3.17 WALKS AND CURBS:

- A. Walks and sidewalks shall be not less than 4" thick, placed over a 4" layer of porous fill as specified, and marked off with surface control joints at $6'-0"$ o.c. or as shown on the drawings. Sawed control joints shall be $3/4"$ to $1"$ deep and not over $1/4"$ wide unless otherwise noted, and shall be sawed within 48 hours of placing of concrete. Install expansion joints between walks and building, at changes in walk direction, at $20'-0"$ o.c., and elsewhere as shown. Expansion joints shall be formed with $1/2"$ thick preformed filler. Walk adjacent to buildings shall slope transverse $1/4"$ per foot away from the buildings. Turn down edges of sidewalks and reinforce as shown on the drawings.
- B. Concrete shall be tamped thoroughly, then screened, and floated to proper elevations and profiles before free water appears on the surface. While still plastic, the concrete shall be tested for irregularities with a 10-foot straight edge and the necessary corrections made. When that water sheen has disappeared from the surface, it shall be given a final non-slip finish by a circular scrubbing motion with a wood float after the concrete has hardened sufficiently to support the weight of the float.
- C. Curbs shall be constructed to size and profile shown, placed over a layer of porous fill.

D. All edges, joints and margins shall be straight, true, and rounded with jointing and edging tools.

E. Walks shall be sloped 1/4" per foot.

3.18 MISCELLANEOUS:

A. Fill concrete spandrel blocks (bond beams) with concrete and reinforce to form cap beams as shown.

B. Fill unit masonry cells with concrete and reinforce as called for on the drawings.

End of Section

Division 5:
Metals

SECTION 05500 - SHOP FABRICATED METAL

5.1 GENERAL:

Applicable provisions of the General Conditions and Division 1, General Requirements, apply to the work under this section.

5.2 SCOPE OF WORK:

- A. See drawings for location, quantities, and details of work required.
- B. See Section 05600 for metal specialties.
- C. See Section 09900 Painting for field painting specifications.
- D. Submit Shop Drawings (4 copies minimum) of a Roof Plan specifying the proposed locations of new anchors for wood nailers.

5.3 MATERIALS:

- A. Cast Iron: Clean, tough gray iron free from blow holes, cinder spots or cold shuts. Conforming to ASTM Specifications.
- B. Wrought Iron: (1) Plates, ASTM A52; Sheet, ASTM A162; and Bolts, Rods, Bars, ASTM A141.
- C. Structural Steel: ASTM A36.
- D. Aluminum: Type recommended by manufacturer unless specifically noted.
- E. In fabricating items which will be exposed to view, limit materials to those which are free from surface blemishes, pitting, rolled trade names, and roughness.

5.4 SHOP PAINT:

All ferrous metal items shall be painted with one coat of rust inhibitive oil based primer, as preparation for application of two additional coats of field painting as specified in Section 09900.

5.5 BOLTS AND ANCHORS:

Furnish and install all bolts, anchors, expansion bolts, etc., as needed to properly install all items of work, including woodwork, etc. including the following as applicable:

A. Hilti HIT HY 150 MAX Adhesive Anchor for solid concrete or masonry:

- 1. **Injectable Adhesive:** Shall be used for installation of all reinforcing steel dowels or threaded rods and inserts into new or existing solid concrete or masonry. For hollow base materials an injectable adhesive shall be used with a cylindrical mesh screen tube per the adhesive manufacturer's specifications.
- 2. **Adhesive:** Shall be furnished in containers which keep component A and component B separate. Containers shall be designed to accept static mixing nozzle which thoroughly blends component A and component B and allows injection directly into drilled hole. Only injection tools and static mixing nozzles as recommended by manufacturer's shall be used. Manufacturer's installation instructions shall be followed. Injection adhesives shall be formulated to include resin and hardener to provide optimal curing speed as well as high strength and stiffness. Typical curing

time at 68°F shall be 30 minutes. Injection adhesive shall be HIT HY 150 MAX, as furnished by Hilti.

3. 1/2" x 12" HAS-E Hilti Anchor Rods: Shall be furnished with chamfered ends so that either end will accept a nut and washer. Alternatively, anchor rods shall be furnished with a 45-degree chisel point on one end to allow for easy installation into the adhesive-filled hole. Anchor rods shall be manufactured to meet the following requirements:
 - a. ISO 898 Class 5.8;
 - b. ASTM A 193, Grade B7 (high-strength carbon steel anchor);
 - c. AISI 304 or AISI 316 stainless steel, meeting the requirements of ASTM F 539 (condition CW). Special order of HAS or HIT rods may vary from standard product.
4. Mesh Screen Tube: Shall be formed into a cylindrical shape, with one end closed to prevent extrusion of adhesive through that end. Screen tube shall be manufactured with a mesh size, length, and diameter as specified by the adhesive manufacturer. Mesh shall be manufactured from:
 - a. Low carbon steel with zinc electroplating or
 - b. AISI 304 stainless steel or
 - c. plastic. Anchor rods and screens shall be the Hilti HIT system as manufactured by Hilti.
5. Nuts and Washers: Shall be furnished to meet the requirements of the above anchor rod specifications.

B. Hilti HIT HY 20 for Hollow Masonry Construction:

1. Adhesive anchors shall consist of a threaded anchor rod, nut, and washer; a mechanical mesh screen tube, and an injectable adhesive material.

Injection adhesive shall be packaged in side by side refill packs which keep separate component A and component B. Side by side packs shall be designed to compress during use to minimize waste volume. Side by side packs shall also be designed to accept static mixing nozzle which thoroughly blends component A and component B and allows injection directly into a mesh screen tube. Alternately, product may be furnished in large rigid cartridges for high volume work. Only injection tools and static mixing nozzles as recommended by the manufacturer shall be used. Manufacturer's instructions shall be followed.

Injection adhesive shall be formulated to include resin, hardener, cement, and water to provide optimal curing speed as well as high strength and stiffness. Typical curing time at 68°F shall be 60 minutes.

Injection adhesive shall be HIT HY 20, as manufactured by Hilti.

2. 1/2" x 4 1/2" Anchor Rods: Furnish with chamfered ends so that either end will accept a nut and washer. Manufactured to meet the following requirements: ISO 898 Class 5.8.2 AISI 304 or AISI316 stainless steel, meeting the requirements of ASTM F 593 (condition CW).

Special order length HAS or HIT Rods may vary from standard product.

Furnish Nuts and Washers to meet the requirements of the above anchor rod specifications.

3. Mesh Screen Tube: Shall be formed into a cylindrical shape, with one end closed to prevent extrusion of adhesive through that end. Screen tube shall be manufactured with a mesh size, length, and diameter as specified by the adhesive manufacturer. Mesh shall be manufactured from: 1. Low carbon steel with zinc electro-plating, 2. AISI 304 stainless steel, or 3. Plastic.

Anchor rods and screens shall be the Hilti HIT system as manufactured by Hilti.

C. Hilti Kwik Bolt 3 Expansion Anchor for solid concrete:

1. Guide Specifications:

Torque controlled expansion anchors shall be Kwik Bolt 3 supplied by Hilti meeting the description in Federal specification A-A 1923A, Type 4. The anchor bears a length identification mark embossed into the impact section (dog point) of the anchor identifying the anchor as a Hilti Kwik Bolt 3 in the installed condition. Anchors are manufactured to meet one of the following conditions:

- a. The carbon steel anchor body, nut and washer have an electroplated zinc coating conforming to ASTM B 633 to a minimum thickness of 5µm.
- b. The carbon steel hot-dip galvanized anchor body, nut and washer conform to ASTM A 153. The expansion sleeve conforms to AISI 316.
- c. The anchor body, nut and washer conform to AISI 304. The expansion sleeve conforms to AISI 316.
- d. The anchor body, nut, washer, and expansion sleeve conform to AISI 316.

2. Product Features:

- a. Length identification code facilitates quality control and inspection after installation.
- b. Through fixture installation and variable thread lengths improve productivity and accommodate various base plate thicknesses.
- c. Raised impact section (Dog Point) prevents thread damage during installation.
- d. Anchor size is same as drill bit size for easy installation. For temporary applications anchors may be driven into drilled holes after usage.
- e. Mechanical expansion allows immediate load application.

3. Installation:

- a. Drill hole in concrete, structural lightweight concrete, or grout-filled concrete masonry using a Hilti carbide tipped drill bit and a Hilti rotary hammer drill. Remove dust from the hole with oil free compressed air or vacuum. Alternately for 1/2, 5/8, 3/4, and 1 inch diameter Kwik Bolt 3 anchors, the hole may be drilled using a matched tolerance Hilti DD-B or DD-C wet diamond core bit for anchoring applications. The slurry must be flushed from the diamond cored hole prior to anchor installation. The minimum hole depth must exceed the anchor embedment prior to torquing by one hole, diameter. Drive the anchor into the hole using a hammer. A minimum of six threads must be below the surface of the fixture. Tighten the nut to the recommended installation torque.

D. Joints: Tightly fitted, finished smooth and even concealed where possible, rivets countersunk on exposed surfaces. No drifting.

1. Steel: Riveted or welded.

2. Castings: Concealed bolts or cap screws counter-sunk on face.
3. Wrought Iron: Welded or machine screws.
4. Exterior Work: Shed water and prevent entrance to hollow work.
5. Aluminum: Welded, ground and buffed for flush machine screws.

5.6 EQUIPMENT SUPPORTS:

Provide equipment supports of structural shapes where shown and as detailed and where not furnished by equipment contractors.

5.7 LOOSE LINTELS AND MISCELLANEOUS SHAPES:

Unless otherwise shown, loose lintels shall be 16 inches longer than the masonry to masonry openings over which they occur. Unless otherwise shown, they shall be 5" X 3-1/2" X 3/8" angles, one for each 4 inches of wall thickness. Furnish other miscellaneous structural shapes to be built in by masons or other trades which are not elsewhere specified.

5.8 OTHER MATERIALS:

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

5.9 FABRICATION:

- A. Except as otherwise shown on the drawings or the approved shop drawings, use materials of size, thickness, and type required to produce reasonable strength and durability in the work of this section.
- B. Fabricate with accurate angles and surfaces which are true to the required lines and levels, grinding exposed welds smooth and flush, forming exposed connections with hair-line joints, and using concealed fasteners wherever possible.
- C. Prior to shop painting or priming, properly clean metal surfaces as required for the applied finish and for the proposed use of the item.
- D. On surfaces inaccessible after assembly or erection, apply two coats of the specified primer. Change color of second coat to distinguish it from the first.

5.10 INSTALLATION:

A. General:

1. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.
2. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
3. Set work accurately into position, plumb, level, true, and free from rack.
4. Anchor firmly into position.

5. Where field welding is required, comply with AWS recommended procedures of manual-shielded metal-arc welding for appearance and quality of weld and for methods to be used in correcting welding work.
 6. Grind exposed welds smooth and touchup shop prime coats.
 7. Do not cut, weld, or abrade surfaces which have been hot-dip galvanized after fabrication and which are intended for bolted or screwed field connections.
- B. Immediately after erection, clean the field welds, bolted connections, and abraded areas of shop priming. Paint the exposed areas with the same material used for shop priming. Apply final finish coats as specified in Section 09900.
- 5.11 WASTE MANAGEMENT:
- A. Collect metal cutoffs and scrap, and place in designated area for recycling.

End of Section

SECTION 05600 - STOCK FABRICATED METAL

5.1 GENERAL:

Applicable provisions of the General Conditions and Division 1, General Requirements, apply to the work under this section.

5.2 WORK INCLUDED:

- A. Furnish and install miscellaneous metal items as shown on the drawings and specified herein. The items included under this section are stock manufactured items that require little or no custom shop fabrication. They are listed together merely for convenience and it is not the intent of the specifications to require the contractor to procure them all from the same vendor.
- B. Provide all anchors, fastenings, and incidental work required to properly install the items specified.

5.3 RELATED WORK SPECIFIED ELSEWHERE:

- A. Custom fabricated metal items are specified in Section 05500, Shop Fabricated Metal.
- B. Field painting is specified in Section 09900, Painting.
- C. Metal Studs are specified in Section 09216.
- D. Rough and finished carpentry are specified in Section 06100.

5.4 SHOP DRAWINGS:

Submit shop drawings or installation diagrams for items that require measurements to be verified or established at the building and submit schedules and/or catalog cuts of other items.

5.5 SHOP PAINTING:

Items which are usually factory finished or prime painted shall have manufacturer's standard finish. Shop painting is not required on other items unless specifically noted.

5.6 MATERIALS:

- A. Materials shall be as specified in the detailed descriptions of the various items. Where no material is specifically called for, material shall conform to the respective published specifications of the manufacturers listed. Exposed fastenings for aluminum items shall be aluminum or stainless steel, unless otherwise specified.
- B. In locations where 2x wood nailers must be anchored to existing or new solid concrete or solid concrete fill, expansion anchors equal to or exceeding Hilti Kwik Bolt 3 Expansion Anchor System or Hilti HIT-HY 150 Adhesive Anchors shall be utilized as specified in Section 05500.
- C. In locations where 2x wood nailers must be anchored to existing or new hollow masonry or brick, anchors equal to Hilti HIT-HY 20 epoxy adhesive anchors shall be utilized as specified in Section 05500.

End of Section

Division 6:
Wood and Plastic

SECTION 06100 - CARPENTRY

6.1 GENERAL:

Applicable provisions of the General Conditions and Division 1, General Requirements, apply to the work under this section.

6.2 SCOPE OF WORK:

- A. The work required under this section includes all work traditionally performed by carpenters including finishing and installing rough and finish carpentry, installation of millwork and/or herein specified as necessary to complete the work.
- B. Not included in this Division: Items of work listed in this paragraph are included in other Divisions of the Specifications as noted:
 - 1. Anchor Fasteners and other Stock Fabricated Metal: Division 5.
 - 2. Concrete Formwork: Division 2
 - 3. Caulking: Division 7.
- C. Submit shop drawings in four (4) copies.

6.3 QUALITY ASSURANCE:

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work under this Section.
- B. Codes and Standards:
 - 1. In addition to complying the pertinent codes and regulations of governmental agencies having jurisdiction, unless otherwise specifically directed or permitted by the Architect comply with:
 - a. "Product Use Manual" of the Western Wood Products Association for selection and use of products included in that manual;
 - b. "Plywood Specification and Grade Guide" of the American Plywood Association;
 - c. "Standard Specifications for Grades of California Redwood Lumber" of the Redwood Inspection Bureau for Redwood, when used.

6.4 DELIVERY, STORAGE, AND HANDLING:

- A. Comply with pertinent provisions of Section 01600.
- B. Protection:
 - 1. Deliver the materials to the job site and store, in a safe area, out of the way of traffic, and shored up off the ground surface.
 - 2. Identify framing lumber as to grades, and store each grade separately from other grades.
 - 3. Protect metals with adequate waterproofing outer wrapping.
 - 4. Use extreme care in offloading of lumber to prevent damage, splitting, and breaking of materials.

5. All lumber shall be stacked in a manner which insures proper ventilation and drainage and shall be covered to protect it from the elements.

6.5 MATERIALS:

- A. Lumber Standards and Grade-Marking: Each piece of framing lumber and each board shall comply with the American Lumber Standards, SPR 16, and with specific grading requirements of the association recognized as covering the species used and under whose grading rules it is produced. Each piece of framing lumber and each board shall be identified by the grade mark of a recognized association or independent inspection agency.
- B. Softwood Plywood shall conform to Product Standards PS-1-74 issued by the U. S. Department of Commerce. Each standard size panel shall be stamped or branded to show the type and grade of the panel. When used structurally, all plywood shall meet performance standards for its type as described in PS-1-74 for Softwood Plywood. It shall be identified as to species, grade, and glue type by means of appropriate grade-marks on each panel. In addition to the above requirements, all plywood permanently exposed in outdoor applications shall be of exterior type.
- C. Moisture content of framing lumber and boards shall not exceed 19% at time of installation.
- D. Dressed lumber shall be surfaced 4 sides.

6.6 GRADES AND SPECIES:

- A. Lumber for framing, plates, blocking, furring, etc., may be of any of the following species provided the grade for each is not lower than the minimum shown:
 1. Fir, Douglas - Standard Pine, Southern Yellow Leaf or Short Leaf - No. 2.

6.7 WOOD PRESERVATIVE TREATMENT:

- A. Pressure Treated Lumber: Lumber in contact with the ground; beams, sills, plates, grounds, nailers, wood cants and all other wood used relative to the roof fascia and canopy construction, copings, caps, etc.; all wood in contact with concrete or inaccessible enclosures; and wherever else called for on the drawings shall be pressure treated as called for by Federal Specifications TT-W-571, or the published standards of the American Wood Preserver's Association, and the following:
 1. Moisture content of lumber at time of treatment shall not be more than 30 percent.
 2. Preservative used for treating lumber to be painted or which will come in contact with finish materials shall be paintable type. Preservative used for treating lumber used in connection with elastomeric sheet roofing shall be salt type.
 3. All treated lumber shall be suitably identified as to name of treater, preservative used, and retention of preservative in pounds per cubic foot of lumber.
 4. All lumber shall be seasoned after treatment to the moisture content required for non-treated lumber.

6.8 SURFACE CONDITIONS:

Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

6.9 DELIVERIES:

- A. Stockpile materials sufficiently in advance of need to assure their availability in a timely manner for this Work.
- B. Make as many trips to the job site as are needed to deliver materials of this Section in a timely manner to ensure orderly progress of the Work.

6.10 COMPLIANCE:

- A. Do not permit materials not complying with the provisions of this Section to be brought onto or to be stored at the job site.
- B. Promptly remove non-complying materials from the job site and replace with materials meeting the requirements of this Section.

6.11 WORKMANSHIP:

- A. Produce joints which are tight, true, and well nailed, with members assembled in accordance with the Drawings and with pertinent codes and regulations.
- B. Selection of lumber pieces:
 - 1. Carefully select the members.
 - 2. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing, and will allow making of proper connections.
 - 3. Cut out and discard defects which render a piece unable to serve its intended function.
 - 4. Lumber may be rejected by the Architect, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.
- C. Do not shim any framing component.

6.12 FRAMING GENERAL

- A. All lumber shall be SP. No. 2 (M. C. = 19%) or equal unless noted otherwise.
- B. All continuous nailer plates shall be pressure treated 2x WD. Anchored to wall with 1/2" dia. Anchor bolts @ 48" o.c. unless otherwise noted.
- C. All wood in contact with concrete or masonry shall be pressure treated.

6.13 ROUGH HARDWARE

- A. Furnish all items of rough hardware such as nails, screws, bolts, hangers, anchors, or other accessories shown or required to properly secure the work in place. Items required to be built-in with concrete or masonry shall be finished in ample time for inclusion of the work.
- B. Fastening into concrete or masonry walls shall be made with adhesive anchors, toggle bolts, expansion shields, or Molly Bolts as specified in Section 05500. Wood plugs will not be permitted.

6.14 TEMPORARY ENCLOSURES AND PROTECTION:

Temporary enclosures shall be provided at door, window, and other openings in exterior walls, as necessitated by weather and good conditions. Enclosures shall be maintained in good repair and removed when no longer needed. Door and window frames and stone and other types of finished masonry sills shall be properly protected.

6.15 WOOD BLOCK NAILING STRIPS, GROUND AND FURRING:

Provide all wood blocks, nailing strips, and furring as conditions require to be embedded in or anchored to concrete, built into masonry, anchored to masonry, bolted to stud and elsewhere whether specifically mentioned herein or not. Provide wood blocking for anchorage of any items that require wood for adequate anchorage.

6.16 INSTALLATION OF ITEMS NOT FURNISHED UNDER THIS SECTION:

Install all items of millwork and architectural woodwork, metal frames, and other items in accordance with details and approved shop drawings.

6.17 MILLWORK AND TRIM (INSTALLATION):

- A. Exterior millwork and trim shall be installed with tight joints, securely nailed. Hot Dip Galvanized siding nails shall be used. Interior trim shall be fastened in place with finishing nails, the heads of which shall be set for putty. Interior woodwork shall be sanded as necessary to remove irregularities and machine marks. All work shall be left free of blemishes and defects.
- B. Joints in all work shall be tight and formed to conceal shrinkage. Joints in exterior work shall be made to exclude water and shall be bedded in white lead paste. Door and window trim shall be in single lengths without splicing, and corners shall be mitered unless otherwise called for by the drawings. Running trim shall be in long lengths and jointed only where solid fastenings can be made. End joints in built-up members shall be well distributed. Exterior corners shall be mitered and interior corners and/or angles shall be coped. Wherever necessary, woodwork shall be scribed to masonry or other adjacent work.
- C. All exterior millwork and trim shall be backprimed with one coat of paint specified for exterior wood priming in the Painting Division 9. Interior millwork and trim shall be backprimed with one coat of the paint specified for interior wood priming.

6.18 INSTALLATION OF OTHER ITEMS:

Install items in strict accordance with the Drawings and the recommended methods of the manufacturer as approved by the Architect, anchoring firmly into position at the prescribed locations, straight, plumb, and level.

6.19 FASTENING:

- A. Nailing:
 - 1. Use only common wire nails or spikes of the dimension shown on the Nailing Schedule, except where otherwise specifically noted on the Drawings.
 - 2. For conditions not covered in the Nailing Schedule provide penetration into the piece receiving the point of not less than 1/2 the length of the nail or spike, provided however, that 16d nails may be used to connect two pieces of 2" (nominal) thickness.
 - 3. Nail without splitting wood.
 - 4. Prebore as required.
 - 5. Remove split members and replace with members complying with the specified requirements.
- B. Bolting:
 - 1. Drill holes 1/16" larger in diameter than the bolts being used.

2. Drill straight and true from one side only.
3. Do not bear bolt heads on wood, but use washers under head and nut where both bear on wood, and use washers under all nuts. Countersink all washers and nuts at coping nailers and at EPDM roof curb and roof accessory nailers.

C. Screws:

1. For lag screws and wood screws, prebore holes same diameter as root of threads enlarging holes to shank diameter for length of shank. Countersink all tapcon screws at parapet wall plywood facers prior to installation of EPDM flashing.

6. 20 FINISHING:

- A. Sandpaper finished wood surfaces thoroughly as required to produce a uniformly smooth surface, always sanding in the direction of the grain; except do not sand wood which is designed to be left rough.
- B. No coarse grained sandpaper mark, hammer mark, or other imperfection will be accepted.

6. 21 CLEANING UP:

- A. Keep the premises in a neat, safe, and orderly condition at all times during execution of this portion of the Work, free from accumulation of sawdust, cut-ends and debris.
- B. Sweeping:
 1. At the end of each working day, and more often if necessary, thoroughly sweep surfaces where refuse from this portion of the Work has settled.
 2. Remove the refuse to the area of the job site set aside for its storage.
 3. Upon completion of this portion of the Work, thoroughly broom clean all surfaces.

End of Section

Division 7:
Thermal and Moisture Protection

SECTION 07920 - SEALANTS AND CAULKING

7.1 GENERAL:

Applicable provisions of the General Conditions and Division 1, General Requirements, apply to the work under this section.

7.2 WORK INCLUDED:

- A. Completely seal with caulking compound all joints around door frames, window frames and louver frames in interior and exterior walls; openings around pipes projecting through interior and exterior walls; and expansion joints in exterior walls and interior walls where shown on the drawings and elsewhere as required to provide a positive barrier against the passage of moisture and passage of air.
- B. Seal the top and base of all sound insulated interior partitions with acoustical sealant as recommended by the manufacturer to inhibit the passage of sound.
- C. Caulk vertical joints at intersection of gypsum board and/or plaster walls and concrete walls.
- D. Caulk all other joints noted on the drawings to be caulked and which are not specified to be caulked under other sections of the specifications.
- E. Caulk joints at intersections of gypsum board or plaster and concrete or brick.
- F. Design Requirements (all movement joints):
 - 1. Design number of joints and joint widths for maximum of plus or minus 50 percent movement.
 - 2. Design depth of sealant to be 1/2 width of joint.
 - 3. Maximum Depth: 1/2 inch (13 mm).
 - 4. Minimum Depth: 1/4 inch (6 mm).
- G. Performance Requirements: ASTM C920 Type S, Grade NS, Class 50, Use NT, M, A, G, and O.

7.3 RELATED WORK SPECIFIED ELSEWHERE:

- A. Division 9 - Finishes
- B. Division 26 - Electrical

7.4 ENVIRONMENTAL QUALITY ASSURANCE:

- A. Do not use products containing methylene chloride or chlorinated hydrocarbons.
- B. Avoid products containing bactericides and fungicides that are classified as phenol mercury acetates, phenol phenates, or phenol formaldehyde
- C. Avoid products containing aromatic and aliphatic solvents.
- D. Avoid products containing styrene butadiene.

7.5 INDOOR AIR QUALITY:

- A. The following sealants are considered safe for indoor use:

1. Oleoresinous (small amounts of aliphatic hydrocarbons)
 2. Acrylic emulsion latex (water based)
 3. Polysulfide (small amounts of toluene vapors)
 4. Polyurethane (small amounts of xylene and other solvents)
 5. Silicone (small amounts of xylene and other solvents)
- B. The use of the following sealants should be avoided indoors:
1. Butyl rubber (aliphatic hydrocarbons)
 2. Solvent based acrylic (xylene)
 3. Neoprene (xylene)
- 7.6 SUBMITTALS:
- A. Comply with Section 01300.
- B. Product Data: Submit manufacturer's technical bulletins and MSDS on each product.
- C. Samples:
1. Initial Selection Purposes: For each product exposed to view, manufacturer's standard bead consisting of strips of actual products showing full range of colors available.
 2. Verification: 2 sets of each type and color of joint sealant required. Install joint sealant samples in 1/2 inch wide joints formed between two 6 inch long strips of material matching appearance of exposed surfaces adjacent to joint sealants.
- D. Submit laboratory tests or data validating product compliance with performance criteria specified.
- E. Submit list of references from 5 projects similar in scope to this Project. Include contact name and phone number of person charged with oversight of each project.
- 7.7 QUALITY ASSURANCE:
- A. Manufacturer Qualifications: Company regularly engaged in manufacturing and marketing of products specified in this Section.
1. Manufacturer Qualifications: Company shall be ISO 9001:2000 Certified.
- B. Installer Qualifications: Qualified to perform Work specified by reason of experience or training provided by product manufacturer.
- C. Mock-Ups:
1. At start of Project, perform mock-up of required sealant Work at 1 area of building. Perform minimum of 1 mock-up for each different combination of substrates to be sealed. Coordinate mock-up areas with Architect.

2. Install mock-ups and test in presence of sealant manufacturer's authorized representative and Architect to assure installation procedures are consistent with warranty requirements.
3. After sealant has achieved sufficient cure as coordinated with manufacturer's representative, conduct adhesion pull-tests, or non-destructive testing, at discretion of Architect. Conduct tests per ASTM C1521.
 - a. Confirm results of adhesion tests as acceptable by Architect, Owner or Owner's representative, and sealant manufacturer prior to proceeding with Work.
4. Leave approved mock-ups in place to establish standards and guidelines for acceptable installation of sealant Work and acceptable appearance.

7.8 DELIVERY, STORAGE, AND HANDLING:

- A. Comply with Section 01600.
- B. Deliver products in original factory packaging bearing identification of product, manufacturer, and batch number. Provide Material Safety Data Sheets for each product.
- C. Store products in a location protected from freezing, damage, construction activity, precipitation, and direct sunlight per manufacturer's recommendations.
- D. Condition products to approximately 60 degrees F (16 degrees C) to 70 degrees F (21 degrees C) for use per manufacturer's recommendations.
- E. Handle products with appropriate precautions and care as stated on Material Safety Data Sheet.

7.9 PROJECT CONDITIONS:

- A. Do not use products under conditions of precipitation, or in inclement or freezing weather.
- B. Verify that substrates are clean, dry, and frost-free. Use appropriate measures for protection and supplementary heating to ensure proper curing conditions per manufacturer's recommendations if application during inclement weather occurs.

7.10 WARRANTY:

- A. Provide manufacturer's 5 year standard material warranty.
- B. Include coverage for replacement of sealant materials which fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure, provided sealant has been installed per manufacturer's recommendations.
- C. Warranty Exclusions: Failure resulting from concrete shrinkage, excessive movement structural cracks or defects, faulty construction, faulty design, faulty materials (other than joint sealants), improper installation, misuse of structure, settlement, or accident, fire, or other casualty or physical damage.

7.11 MATERIALS:

- A. Sealant for all exterior caulking shall be premium, very low-modulus, high-movement, non-sag, fast-curing, ready-to-use, silyl-terminated polyether sealant. ASTM C 920 compliance:
1. Type and Grade: S (single component) and NS (non-sag).
 2. Class: 100/50 for vertical joints.
 3. Use Related to Exposure: NT (nontraffic).
 4. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
 5. For use with E.I.F.S. per ASTM C 1382.
 6. USDA-compliant for use in meat and poultry areas.
 7. Acceptable Product: Masterseal NP 150 by BASF Building Systems, Shakopee, MN 55379, 1-800-433-9517, www.BASFbuildingsystems.com.
- B. Accessories:
1. Soft Backer Rod by BASF Building Systems.
 2. Closed Cell Backer Rod by BASF Building Systems.
 3. Porous Substrate Primer: Primer 2000 by BASF Building Systems.
 4. Cleaner: Reducer 990 by BASF Building Systems.
- C. Colors: As selected by the Architect or designated owner's representative from the manufacturer's standard colors.
- D. Sealant for interior cosmetic use shall be a paintable type equal to DAP Acrylic Latex Caulk, or Pecora AC-20 Acrylic Latex Caulk or Sonneborn Sonolac.
- E. Backup material and joint fillers shall be non-staining, compatible with sealant and primer used, and of a resilient nature. Raveled strands of non-staining rope fiber or cotton wicking may be used as filler in deep joints but the filler backing up the sealant shall be rod shaped foam neoprene, foam polyethylene, or hollow vinyl extrusions. Filler material impregnated with oil, bitumen, or similar substances shall not be used in any case.
- F. Bond breakers shall be polyethylene tape, pressure sensitive masking tape, or equal, as recommended by the sealant manufacturer.
- G. Sealant for interior use in sound insulated partitions shall be USG Acoustical Sealant or approved equal.
- H. For other services, provide products especially formulated for the proposed use and approved in advance by the Architect.
- I. Do not retain at the job site material which has exceeded the shelf life recommended by its manufacturer.

7.12 COLOR:

- A. Caulking in connection with existing brick veneer shall be a color to match the mortar joints as closely as possible unless otherwise noted. Other colors shall be selected by the Architect from the specified manufacturer's standard colors.
- B. Should such standard color not be available from an approved substitute manufacturer except at additional charge, provide such colors at no additional cost to the Owner.
- C. In concealed installations, and in partially or fully exposed installations where so approved by the Architect, use standard gray or black sealant.

7.13 EXAMINATION:

- A. Comply with Section 01710.
- B. Inspect areas involved in Work to establish extent of Work, access, and need for protection of surrounding construction.
- C. Examine joints for defects that would adversely affect quality of installation.
- D. Provide additional joint preparation, beyond that outlined in Specifications, as required by sealant manufacturer and Architect's recommendations based on mock-ups and field adhesion tests.

7.14 PREPARATION OF JOINTS:

- A. Surfaces to receive sealant shall be clean, dry, sound, and above 40 degrees F. temperature. Remove oil, grease, wax, tar, asphalt, corrosion, laitance, dust, and similar foreign substances.
- B. Concrete, Stone, and Other Masonry:
 - 1. Clean by grinding, sandblasting, or wire brushing to expose sound surface free of contamination and laitance.
 - 2. Prime masonry.
- C. Wood:
 - 1. Do not apply over freshly treated wood; treated wood must have weathered for at least 6 months.
 - 2. Clean new and weathered wood. Scrape away loose paint to bare wood. If coatings cannot be removed, test coatings to verify adhesion of sealant or determine appropriate.
- D. Metal:
 - 1. Remove scale, rust, and coatings from metal to expose bright white surface.
 - 2. Remove protective coatings as well as chemical residue or film.
- E. Aluminum Frames:
 - 1. Remove clear lacquer before application of joint sealants.

2. If coatings cannot be removed, test coatings to verify adhesion of sealant or determine an appropriate primer.
- F. Prime the following surfaces with primer recommended by joint sealant manufacturer:
1. Copper.
 2. Stainless steel.
 3. Galvanized steel.
 4. Fluorocarbon (Kynar) coatings.
 5. Remove other protective coatings or finishes that could interfere with adhesion.
- G. Glass:
1. Remove all oil and grease with xylene.
 2. Wipe clean and dry with a clean cloth until no solvent film or fingerprints remain.
- H. EIFS:
1. Base coat must be sound, well bonded, properly cured and of sufficient depth to comply with manufacturer's specifications.
 2. Prime joint face.
 3. Apply sealant to the EIFS system base coat.
- I. Priming: Where circumstances or substrates require primer, comply with the following requirements:
1. Apply primer full strength with brush or clean, lint-free cloth. Apply primer to a light, uniform coating. Porous surfaces require more primer. Do not over apply, or allow primer onto face of substrate.
 2. Allow primer to dry before applying joint sealants. Depending on temperature and humidity, primer should be tack-free in 15 to 120 minutes.
 3. Prime and seal on same workday.

7.15 INSTALLATION OF BACKUP MATERIAL:

- A. When using backup of tube or rod stock, avoid lengthwise stretching of the material. Do not twist or braid hose or rod backup stock. Install appropriate size backer rod, larger than joint per manufacturer's recommendations, and in a manner to provide concave sealant profile.
- B. Installation tool:
1. For installation of backup material, provide a blunt-surfaced tool of wood or plastic, having shoulders designed to ride on the adjacent finished surface and a protrusion of the required dimensions to assure uniform depth of backup material below the sealant.
 2. Do not, under any circumstances, use a screwdriver or similar tool for this purpose.
 3. Using the approved tool, smoothly and uniformly place the backup material to the depth indicated on the Drawings or otherwise required, compressing the backup material 25% to 50% and securing a positive fit.

- C. Where joint depth does not permit installation of backer rod, install adhesive-backed polyethylene bond-breaker tape along entire back of joint to prevent 3-sided adhesion of joint sealant.

7.16 APPLICATION:

- A. Examine the areas and conditions under which work of this section will be performed. Verify that temperature and moisture conditions are within manufacturer's acceptable limits. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- B. Prior to start of installation in each joint, verify the joint type according to details on the Drawings, or as otherwise directed by the Architect, and verify that the required proportion of width of joint to depth of joint has been secured.
- C. Equipment:
 - 1. Apply sealant under pressure with power-actuated hand-gun or manually-operated hand-gun, or by other appropriate means.
 - 2. Use guns with nozzle of proper size, and providing sufficient pressure to completely fill the joints as designed.
- D. Fill caulked joints with sealant to same depth as width of joint, but in no case less than 1/4" deep, except that joints wider than 1/2" shall be filled to a maximum depth of 1/2". Joints with greater depths than required shall be filled to the required depth from surface with approved joint filler. Apply sealant with gun, have proper size nozzle, and fill all voids solidly filling from the bottom up to avoid trapping air; superficial sealing with skin bead will not be acceptable.
- E. Sealant shall be mixed, handled and applied strictly in accordance with the manufacturer's instructions. Do not add foreign substances of any kind to the sealant material.
- F. Apply masking tape on adjacent surfaces, where required, in continuous strips in alignment with joints. Remove tape immediately after joints have been sealed and tooled.
- G. Tool joints to the profile shown on the Drawings, or as otherwise required if such profiles are not shown on the Drawings.
 - 1. Provide uniformly smooth joints with slightly concave surface.
 - 2. Use dry tooling method. Do not use tooling agent unless specifically so recommended in writing by the manufacturer of the sealant.

7.17 CURING TIME:

- A. Curing of joint sealants varies with temperature and humidity. The following times assume 75 degrees F (24 degrees C), 50 percent relative humidity, and joints 1/2 inch (13 mm) wide by 1/4 inch (6 mm).
- B. Skins: Within 1 hour.
- C. Functional: Within 3 days.
- D. Full Cure: Approximately 1 week.

7.18 INSPECTION:

- A. During execution of Work, inspect Work to assure compliance with manufacturer's guidelines, these Specifications when they exceed manufacturer's guidelines, and good construction practice.
- B. Refer to latest revision of ASTM C1521 for test methods and frequency.
- C. Allow inspections of Work and assist in testing requested by manufacturer's representative and Architect.
- D. Non-Compliant Work: If inspections reveal non-compliant Work or Work that was not installed per Specifications, and/or manufacturer requirements, remove adjacent work until a location is reached where installation was performed properly. Assist in spot checking of remainder of Work.

7.19 CLEANING:

- A. Remove masking tape immediately after joints have been tooled.
- B. Remove uncured sealant and joint filler with xylene, toluene, MEK, or other sealant manufacturer approved solvent.
- C. Remove cured sealant by cutting with sharp-edged tool.
- D. Remove thin films by abrading.
- E. Clean adjacent surfaces free of sealant or soiling resulting from caulking. Leave all work in a neat and clean condition.
- F. Upon completion of the work of this section, promptly remove from the job site all debris, empty containers and surplus material derived from this portion of the Work.

7.20 PROTECTION:

- A. Protect Work from contaminating substances and damage resulting from other construction operations or other causes so that sealed joints are without deterioration or damage at time of Project completion.

7.21 WASTE MANAGEMENT:

- A. Separate waste in accordance with a Waste Management Plan.
- B. Close and seal tightly all partly used sealant containers and store protected in well-ventilated fire-safe area at moderate temperature.
- C. Place used sealant tubes and containers in areas designated for hazardous materials.

End of Section

Division 9:
Finishes

SECTION 09216 – NON-STRUCTURAL METAL FRAMING

9.1 GENERAL:

Applicable provisions of the General Conditions, Supplementary Conditions and Division 1, General Requirements, apply to the work under this section.

9.2 WORK INCLUDED:

Furnish all labor, materials and equipment, and perform all work to install steel stud furr downs, partitions, furring, and miscellaneous light gauge metal framing as shown on the Drawings and specified herein.

9.3 RELATED WORK SPECIFIED ELSEWHERE:

- A. Gypsum Wallboard as specified in Section 09250.
- B. Painting is specified in Section 09900.
- C. Electrical Panelboards are specified in Section 262416.

9.4 SUBMITTALS:

- A. Comply with pertinent provisions of Section 01300.
- B. Product data: Within 45 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Materials list of items proposed to be provided under this section.
 - 2. Manufacturers; specifications and other data needed to prove compliance with the specified requirements.
 - 3. Manufacturers' recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

9.5 QUALITY ASSURANCE:

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.
- B. In addition to complying with the pertinent codes and regulations of governmental agencies having jurisdiction, comply with pertinent recommendations contained in "Specifications for Metal Lathing and Furring" published by the metal Lath/Steel Framing Association.

9.6 MATERIALS:

- A. Materials shall be products of United States Gypsum Company as listed or equal products of Georgia Pacific, Bostwick or Gold Bond Building Products.
- B. USG Steel Studs -- 358ST25 (3-5/8"). - Interior Partitions
- C. USG Steel Runners -- 358CR25 (3-5/8"). - Interior Partitions
- D. USG Metal Furring Channel (DWC-25).

- E. USG Metal Furring Channel Clip.
- F. 1-1/2" Cold-Rolled Channels.
- G. Galvanized Hanger Wire (8-ga.) (12-ga.).
- H. 18-ga. Galvanized Tie Wire.
- I. USG 3/4" Z Furring Channels.
- J. USG 362 CR 18 Runners.
- K. 5" X 14 Gal. Flat Strap Bracing.
- L. Fasteners -- USG Screws: 3/8" Type S, pan head; 3/8", 1/2" Type S-12, pan head; 5/8" Type S-12 low-profile head; 1", 1-1/4", 1-5/8", 1-7/8", 2-1/4" Type S, bugle head; 1", 1-5/8", 2-1/4" Type S or S-12 trim head, 5/32" dia. low velocity power driven fasteners with 1-1/4" penetration.
- M. Lath and Accessories: Metal Lathe - Diamond Mesh lath, minimum 3.4# per square yard with all casting beads, corner beads, vents, cornerites, stops, base screeds, etc., as required and equal to U.S. Gypsum Company Products. All accessories shall be pure zinc. Turn up all tie wire ends.
- N. Grout: provide a good grade of commercial grout for leveling the floor runner member of steel stud partitions as required.

9.7 PARTITION INSTALLATION:

- A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- B. Accurately layout partition and wall lines from the dimensions shown on the Drawings.
- C. Install metal studs and accessories in strict accordance with the manufacturer's recommendations as approved by the Architect, anchoring all components firmly into position.
- D. Align partition and wall assemblies to a tolerance of one in 200 horizontally and one in 500 vertically.
- E. Attach steel runners to structural elements with suitable fasteners located 2" from each end and spaced 24" o.c. All fire rated partitions shall extend to the floor or roof deck above. All non-fire-rated partitions shall extend to a minimum of 6 inches above the ceiling.
- F. Position studs vertically, with open side facing in same direction, engaging floor and ceiling runners, and spaced 16" o.c. When necessary, splice studs with 8" nested lap and two positive attachments per stud flange. Place studs in direct contact with all doorframes, abutting partitions, partition corners and existing construction elements. Where studs are installed directly against exterior walls and a possibility of water penetration through walls exists, install asphalt felt strips between studs and wall surfaces.
- G. Anchor all studs adjacent to door and window frames, partition intersections, corners and free-standing furring to structure and floor runner flanges with USG Metal Lock Fastener tool or screws. Securely anchor studs to anchors of door or frames, place horizontally a cut-to-length section of runner, with a web-flange bend at each end, and secure to strut-studs with two screws in each bent

web. Position a cut-to-length stud at vertical panel joints over doorframe header. Use 3 358ST25 and 358CR25 around all openings.

- H. Furr out around any pipes, electrical panels, etc. that won't fit into the wall whether or not shown on the drawings.
- I. Provide intermediate channels at ceiling line.

9.8 FURRING CHANNEL ATTACHMENT:

- A. Attach metal "Z" furring channels vertically spaced 24" o.c., to interior of masonry or concrete with hammer-set or power-driven fasteners or concrete stud nails staggered 24" o.c. on opposite flanges. Where furring channel is installed directly to exterior wall and a possibility of water penetration through walls exists, install asphalt felt protection strip between furring channel and wall.

9.9 CEILING INSTALLATION:

- A. Space 8-ga. hanger wires 48" o.c. along carrying channels and within 6" of ends of carrying-channel run. In concrete, anchor hangers by attachment to reinforcing steel, by loops embedded at least 2" or by approved inserts. For steel construction, wrap hanger around or through beams or joists.
- B. Install 1-1/2" carrying channels at 48" o.c., and within 6" of walls. Position channels for proper ceiling height, level, and secure with hanger wire saddle-tied along channel. Provide 1" clearance between runners and abutting walls and partitions. At channel splices, interlock flanges, overlap ends 12" and secure each end with double-strand 18-ga. tie wire.
- C. Erect metal furring channels at right angles to 1-1/2" carrying channels or main supports. Space furring (16") (24") o.c. and within 6" of walls. Provide 1" clearance between furring ends and abutting walls and partitions. Secure furring to carrying channels with clips or wire-tie to supports with double-strand 18-ga. wire. At light troffers or any openings that interrupt the carrying or furring channels, install additional cross reinforcing to restore lateral stability of grillage.

9.10 LEVELING:

- A. By use of the specified grout, or by other means approved by the Architect, provide continuous solid bearing under floor runner members of steel stud partitions and walls.
- B. Level in a manner to provide uniform interface with ceilings and other overhead construction.

9.11 SOUND ATTENUATING PARTITIONS:

- A. At sound attenuating partitions, set floor runners in two 1/4" diameter continuous beads of sealant complying with provisions of Section 07920 of these Specifications.

9.12 WASTE MANAGEMENT:

- A. Separate metal waste in accordance with a Waste Management Plan and place in designated areas for recycling or reuse.

End of Section

SECTION 09250 - GYPSUM WALLBOARD

9.1 GENERAL:

Applicable provisions of the General Conditions, Supplementary Conditions and Division 1, General Requirements apply to the work under this section.

9.2 WORK INCLUDED:

Furnish all labor, materials and equipment, and perform all work to install Gypsum Wallboard exposed ceilings, furrdowns and wallboard including all miscellaneous trim and accessories as shown on the drawings and specified herein, as required for a complete installation.

9.3 RELATED WORK SPECIFIED ELSEWHERE:

- A. Exterior Wall Metal Framing and Sheathing is specified in Section 05410.
- B. Carpentry is specified in Section 06100.
- C. Caulking is specified in Section 07920.
- D. Steel Stud Framing is specified in Section 09100.
- E. Painting is specified in Section 09900.

9.4 SUBMITTALS:

- A. Comply with pertinent provisions of Section 01300.
- B. Product data: within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Materials list of items proposed to be provided under this section;
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
 - 3. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.
- C. Mock-ups:
 - 1. At an area on the site where approved by the Architect, provide a mock-up gypsum wallboard wall and ceiling panels.
 - a. Make the panel approximately 4'-0" square.
 - b. Provide one mock-up panel for each gypsum wallboard wall and ceiling finish used on the Work.
 - c. The mock-ups may be used as part of the Work, and may be included in the finished Work, when so approved by the Architect.
 - d. Revise as necessary to secure the Architect's approval.
 - 2. The mock-up panels, when approved by the Architect, will be used as datum points for comparison with the remainder of the work of this section for the purpose of acceptance or rejection.
 - 3. If the mock-up panels are not permitted to be part of the finished Work, completely demolish and remove them from the job site upon completion and acceptance of the work of this section.

9.5 QUALITY ASSURANCE:

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experience in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.

9.6 DELIVERY, STORAGE AND HANDLING:

- A. Comply with pertinent provisions of Section 01600.
- B. All materials shall be delivered to the buildings in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

9.7 GYPSUM WALLBOARD:

A. General:

- 1. Provide gypsum wallboard complying with Fed Spec SS-L-30D, in 48" widths and in such lengths as will result in a minimum of joints. Materials shall be products of United States Gypsum Company as listed, or equal products of Georgia-Pacific, Gold Bond Building Products, Bostwick, Temple-Inland or the Flintkote Company, except as specifically noted otherwise.
 - 2. Regular wallboard: Provide type III, grade R, class 1, 1/2" thick for walls and 5/8" thick for ceilings except as may be shown otherwise on the Drawings.
 - 3. Fire-retardant wallboard: Provide type III, type "X", class 1, 5/8" thick.
 - 4. Water-resistant wallboard: Provide type VII, grade W or X as required, class 2, 1/2" thick for walls and 5/8" thick for ceilings except as may be shown otherwise on the Drawings.
 - 5. Foil-backed wallboard: Provide as shown on the Drawings.
- B. Shaft Walls: Where so indicated on the Drawings, provide gypsum wallboard system specifically designed for encasing shafts of the required fire-resistivity, and complying with Fed Spec SS-L-30D, type IV, grade R or X, class 1, in the dimensions shown or otherwise required.
 - C. Sheathing: Where gypsum wallboard sheathing is indicated on the Drawings, provide gypsum wallboard complying with Fed Spec SS-L-30D, type II, grade W, class 2.

9.7 METAL TRIM:

- A. Form from zinc coated steel not lighter than 26 gage, complying with Fed Spec QQ-S-775, type I, class d or e.
- B. Casing beads:
 - 1. Provide channel-shapes with an unexposed wing, and with a concealed wing not less than 7/8" wide. Casing beads shall be equal to USG No. 200-A.
 - 2. The exposed wing may be covered with paper cemented to the metal, but shall be suitable for joint treatment.
- C. Corner beads: Provide angle shapes with wings not less than 7/8" wide and perforated for nailing and joint treatment, or with combination metal and paper wings bonded together, not less than 1-1/4" wide and suitable for joint treatment. Corner beads shall be equal to USG Dur-A-Bond No. 103 (1-1/4" x 1-1/4").

- D. Edge beads for use at perimeter of ceilings:
 - 1. Provide angle shapes with wings not less than 3/4" wide.
 - 2. Provide concealed wing perforated for nailing, and and exposed wing edge folded flat.
 - 3. Exposed wing may be factory finished in white color.

9.7 JOINTING SYSTEM:

- A. Provide a jointing system, including reinforcing tape and compound, designed as a system to be used together and as recommended for this use by the manufacturer of the gypsum wallboard approved for use on this work. Materials for exposed joint treatment shall be USG Perf-A-Tape Dura-Bond Compound Taping, Dura-Bond 90 joint compound, and USG Ready-mixed Joint Compound Topping.
- B. Jointing compound may be used for finishing if so recommended by its manufacturer.

9.8 FASTENING DEVICES:

- A. For fastening gypsum wallboard in place on metal studs and metal channels, use flat-head screws, shouldered, specially designed for use with power-driven tools, not less than 1" long Type S Bugle Head Screws, with self-tapping threads and self-drilling points. Provide washers at sheathing.
- B. For fastening gypsum wallboard in place on wood, use 1-1/4" Type W Bugle Head Screws, or use annular ring type nails complying with ASTM C514 and of the length required by governmental agencies having jurisdiction.

9.9 ACCESS DOORS:

- A. In partitions and ceilings installed under this section, provide doors where required for access to mechanical installations and electrical installations.
- B. Types:
 - 1. Unless otherwise required, provide 24" x 24" metal access doors with concealed hinges to metal frame, and with Allen key lock.
 - 2. For piercing fire-rated surfaces, provide access doors having the same fire rating as the surface being pierced.
 - 3. For tile surfaces and toilet rooms, provide stainless steel access doors and frames, with satin finish.
 - 4. For other installations, provide prime-coated steel access doors and frames for finish painting to be performed at the job site under Section 09900 of these Specifications .

9.10 OTHER MATERIALS:

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to approval of the Architect.

9.11 SURFACE CONDITIONS:

- A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

9.12 INSTALLATION:

A. General:

1. Install the gypsum wallboard in accordance with the Drawings and with the separate boards in moderate contact but not forced into place.
2. At internal and external corners, conceal the cut edges of the boards by the overlapping covered edges of the abutting boards.
3. Stagger the boards so that corners of any four boards will not meet at a common point except in vertical corners.
4. The installation of gypsum board shall conform to applicable provisions of American National Standard Specifications for the application and finishing of wallboard, ANSI A97 .1-1965, the recommended specifications of the gypsum board manufacturer and to Underwriter's Laboratory. Refer to UL Assembly installation requirements at fire-rated partitions.

B. Ceilings:

1. Install the gypsum wallboard to ceilings with the long dimension of the wallboard at right angles to the supporting members.
2. Wallboard may be installed with the long dimension parallel to supporting members that are spaced 16" on centers when attachment members are provided at end joints.

C. Walls:

1. Install the gypsum wallboard to studs at right angles to the furring or framing members.
2. Make end joints, where required, over framing or furring members. Fit ends and edges closely, but not forced together. Stagger joints on opposite sides of partition,
3. At all fire-rated partitions the wallboard shall extend to the roof of the floor deck above unless otherwise noted. At all non-rated partitions the wallboard shall extend to a minimum of 6 inches above the ceiling.
4. Where fixtures or accessories are recessed into rated partitions, take caution and do work necessary to maintain the fire rating of the partition (i.e. line recess or double gypsum board as required to maintain fire rating).
5. Furr out around columns, and thicken partitions at electrical panels as required.

D. Attaching:

1. Drive the specified screws with clutch-controlled power screwdrivers, spacing the screws 8" on center at vertical joints, in field, and to door head and ceiling runners. Provide washers at sheathing.
2. Where framing members are spaced 24" apart on walls, space screws 12" on centers.
3. Attach double layers in accordance with the pertinent codes and the manufacturer's recommendations as approved by the Architect.
4. Attach to wood as required by governmental agencies having jurisdiction.
5. Power drive at least 3/8" from edges and ends of gypsum panels to provide uniform dimple 1/31" deep.

E. Access doors:

1. By careful coordination with the drawings and with the trades involved, install the specified access doors where required.
2. Anchor firmly into position, and align properly to achieve an installation flush with the finished surface.

9.13 JOINT TREATMENT:

A. General:

1. Inspect areas to be joint treated, verifying that the gypsum wallboard fits snugly against supporting framework.
 2. In areas where joint treatment and compound finishing will be performed, maintain a temperature of not less than 55 degrees for 24 hours prior to commencing the treatment, and until joint and finishing compounds have dried. Adequate ventilation shall be provided to carry off excess moisture.
 3. Apply the joint treatment and finishing compound by machine or hand tool.
 4. Provide a minimum drying time of 24 hours between coats, with additional drying time in poorly ventilated areas.
- B. Embedding compounds:
1. Apply to gypsum wallboard joints and fastener heads in a thin uniform layer.
 2. Spread the compound not less than 3" wide at joints, center the reinforcing tape in the joint, and embed the tape in the compound. Then spread a thin layer of compound over the tape.
 3. After this treatment has dried, apply a second coat of embedding compound to joints and fastener heads, spreading in a thin uniform coat to not less than 6" wide at joints, and feather edged.
 4. Sandpaper between coats as required.
 5. When thoroughly dry, sandpaper to eliminate ridges and high points.
- C. Finishing compound:
1. After embedding compound is thoroughly dry and has been completely snaded, apply a coat of finishing compound to joints and fastener heads.
 2. Feather the finishing compound to not less than 12" wide.
 3. When thoroughly dry, sandpaper to obtain a uniformly smooth surface, taking care to not scuff the paper surface of the wallboard.
 4. Where walls are scheduled for epoxy paint, apply additional coats of joint compound as required to conceal fastener and tape locations.

9.14 CORNER TREATMENT:

- A. Internal corners: Treat as specified for joints, except fold the reinforcing tape lengthwise through the middle and fit it neatly into the corner.
- B. External corners:
1. Install the specified corner bead, fitting neatly over the corner and securing with the same type fasteners used for installing the wallboard, or 9/16" rosin-coated staples.
 2. Space the fasteners approximately 6" on centers, and drive through the wallboard into the framing or furring member.
 3. After the corner bead has been secured into position, treat the corner with joint compound and reinforcing tape as specified for joints, feathering the joint compound out from 8" to 10" on each side of the corner.
 4. Corner beads shall be in single lengths except where corner exceeds standard stock lengths.

9.15 OTHER METAL TRIM:

- A. General:
1. The Drawings do not purport to show all locations and requirements for metal trim.
 2. Carefully study the Drawings and the installation, and provide all metal trim normally recommended by the manufacturer of the gypsum wallboard approved for use in this Work.
 3. Casing beads shall be installed where gypsum board abuts masonry, plaster or metal surfaces.

9.16 CLEANING UP:

- A. In addition to other requirements for cleaning, use necessary care to prevent scattering gypsum wallboard scraps and dust, and to prevent tracking gypsum and joint finishing compound onto floor surfaces.
- B. At completion of each segment of installation in a room or space, promptly pick up and remove from the working area all scrap, debris, and surplus material of this Section.

End of Section

SECTION 09900 - PAINTING

9.1 GENERAL:

- A. Applicable provisions of the General Conditions and Division 1- General Requirements, apply to the work under this section.
- B. The Painting Contractor agrees to save the Owner and Architect harmless from all liens or damages to persons or property arising from or caused by his work and to carry sufficient liability and property damage insurance on the job, in an amount satisfactory to the Architect. The Painting Contractor shall comply with all other federal and state laws as required.

9.2 SUMMARY:

- A. Painting is required on all new and existing surfaces as scheduled and noted on the drawings and herein as specified and as needed for a complete and proper installation.
- B. The term "paint" as used herein is all inclusive, meaning emulsions, enamels, oil paints, sealers, stains, varnishes, polyvinyl emulsions, latex emulsions and similar coatings, whether used as prime, intermediate, or finish coats.
- C. Before any paint material has been delivered to the job, the Supplier shall submit a complete list of materials proposed for use, identifying each type of material by manufacturer's brand name, and no material shall be delivered to the job until the Architect's approval has been secured in writing. Approval will be of brands and quality, but not for results obtained.
- D. Painting will not be required on putty or glazing compound, or on factory finished items including prefinished metal fascia; equipment; moving parts of operating units; sensing devices; motor shafts; required labels or equipment identification; galvanized wire work, and prefinished metal gutters and downspouts except as may be specifically required elsewhere in the specifications or on the drawings.
- E. The Painting Contractor shall furnish all material, labor, and equipment required to complete all painting and finishing as shown on drawings, plans, and specifications.
- F. The Painting Contractor shall examine the specifications for the various other trades and shall thoroughly familiarize himself with all their provisions regarding their painting. All surfaces that are left unfinished by the requirements of other specifications shall be painted or finished as a part of this contract.
- G. Copper, bronze, chromium plate, nickel, stainless steel, aluminum, Monel metal, lead, and lead-coated copper shall not be painted or finished, except as otherwise specified.
- H. The Painting Contractor shall be responsible for inspecting the work of others prior to the application of any paint or finishing material. If any surface to be finished cannot be put in proper condition for finishing by customary cleaning, sanding, and puttying operations, the Painting Contractor shall immediately notify the Owner or the Architect in writing or assume responsibility for and rectify any unsatisfactory finish resulting.

9.3 RELATED WORK SPECIFIED ELSEWHERE:

- A. Performance standards are specified in Section 01060 - Regulatory Requirements.
- B. Cleaning is specified in Section 01710 - Cleaning.
- C. Caulk is specified in Section 07920 - Sealants and Caulking.

9.4 SUBMITTALS, COLORS, AND SPECIMENS FOR APPROVAL:

- A. Comply with pertinent provisions of Section 01300.
- B. Product Data: Within five calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
1. Materials list of items proposed to be provided under this Section.
 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 3. Submit a list of equivalent products proposed for use when other than the products named. Cross-reference named products for comparison and include product data for each proposed equivalent product.
- C. Samples:
1. The Architect will prepare a color schedule showing colors to be used and locations of use with color chip samples provided by the paint supplier for guidance in painting.
 2. The Architect may select, allocate, and vary colors on different surfaces throughout the Work. Following the selection of colors and glosses by the Architect, the Contractor shall submit samples for the Architect's review as follows:
 - a. Prepare three samples at the job of each color and each gloss for each material on which the finish is specified to be applied. Successive coats on these sample panels shall be applied in such a way that portions of all preceding coats remain exposed. Prepare wood samples on a piece of wood that matches the species and texture of wood to which the coating will be applied.
 - b. Except as otherwise directed by the Architect, make Samples approximately 8"X10" in size.
 - c. Revise and resubmit each Sample as requested until the required gloss, color, dry mil thickness, and texture is achieved. Such Samples, when approved, will become standards of color and finish for accepting or rejecting the work of this Section.
 - d. After approval of 8"X10" samples by the Architect, the Contractor shall provide at least 100 sq. ft. of each finish on actual wall surfaces and other building components.
 1. Provide full-coat finish samples in areas as directed by the Architect.
 2. Provide required sheen, color, texture, materials, and workmanship.
 3. If necessary, simulate finished lighting condition for review of in-place work.

After approval these sample areas and building components shall serve as the standard for similar work throughout the complex.
 - e. The Contractor shall not commence finish painting until approved Samples are on file at the job site.

9.5 QUALITY ASSURANCE:

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Paint Coordination:
 - 1. Provide finish coats which are compatible with the prime coats actually used.
 - 2. Review other Sections of these Specifications as required, verifying the prime coats to be used and assuring compatibility of the total coating system for the various substrata.
 - 3. Upon request, furnish information on the characteristics of the specific finish materials to assure that compatible prime coats are used.
 - 4. Provide barrier coats over non-compatible primers, or remove the primer and re-prime as required.
- C. **No claim by the Contractor concerning the unsuitability of any material specified or his inability to produce satisfactory results therewith will be considered unless such claim is made in writing to the Architect before the Contract is signed.**

9.6 DELIVERY, STORAGE, AND HANDLING:

- A. Comply with pertinent provisions of Section 01600.
- B. Deliver products to the Site in original sealed containers with labels intact.
- C. All materials used on the job shall be stored in a single place designated by the Owner or the Architect. Such storage place shall be kept neat and clean and all damage thereto or to its surroundings shall be made good by the Painting Contractor.

9.7 PROJECT CONDITIONS:

- A. Do not apply solvent-thinned paints when the temperature of surfaces to be painted and the surrounding air temperatures are below 45° F, unless otherwise permitted by the manufacturers' printed instructions as approved by the Architect.
- B. Weather conditions:
 - 1. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85%; or to damp or wet surfaces, unless otherwise permitted by the manufacturer's printed instructions as approved by the Architect.
 - 2. Applications may be continued during inclement weather only within the temperature limits specified by the paint manufacturer as being suitable for use during application and drying periods.
 - 3. Apply paint only when temperature of surfaces to be painted and surrounding air temperature are within the range permitted by manufacturer's printed instruction for the product used. No paint shall be applied when the outside air temperature is less than 50 degrees.
- C. Do not apply paint until concrete and mortar has cured 60 days minimum.

- D. Ensure lighting level of 80-ft. candles, measured at substrate surface and mid-height of vertical surfaces, is provided during paint application.
- E. All soiled or used rags, waste, and trash must be removed from the day's work area(s) each night, and every precaution taken to avoid the danger of fire.
- F. The Painting Contractor shall protect surfaces and objects inside and outside the building, as well as the grounds, lawns, shrubbery, and adjacent properties against damage. The Painting Contractor shall hold himself responsible for damage to adjacent furnishings.
- G. At completion of work, the Painting Contractor shall remove from the premises all surplus painting materials and all debris created by him; he shall remove all spatters and leave his part of the work in a clean and finished condition.
- H. Before starting paint application in enclosed areas broom clean areas and remove excess dust. After installation has started, do not broom or otherwise generate dust.

9.8 EXTRA STOCK:

Upon completion of the work of this Section, deliver to the Owner an extra stock equaling a minimum of a one-gallon unopened container of each product in each color, type, and gloss of paint used in the Work. Each container shall be tightly sealed and clearly labeled with the contents and the location where used.

9.9 MATERIALS:

A. Acceptable manufacturers:

1. The Painting Schedule in this Section is based, in general, on products of Pittsburgh Paints, PPG Industries, Inc. For Paint Materials, acceptable manufacturers shall be one of the following:
 - a. Pittsburgh Paints, PPG Industries, Inc.
 - b. The Sherwin-Williams Company
 - c. The Glidden Company, ICI Paints
 - d. Pratt & Lambert, Inc.
 - e. Devoe & Reynolds Co.
 - f. Courtaulds Coatings, Inc., Porter Paint Division
2. Ready mixed Latex Wood Filler and resin based, ready mixed Exterior Spackling Paste shall be manufactured by Synko.
3. Paint remover shall be a methylene chloride paint remover equal to Dad's Easy Spray Contractor Grade Paint and Varnish Remover as manufactured by Sansher Corporation, 8005 N. Clinton Street, Fort Wayne, IN 46825.
4. Mildewcidal / Algicidal Multi-Purpose wash equal to Mildew Check as manufactured by Pittsburgh Paints, PPG Industries, Inc. shall be applied over all areas subject to mold / algae / mildew growth.
5. No substitutions shall be allowed except under the provisions of Section 01600.
6. Where products are proposed other than those specified by name and number in the Painting Schedule, provide under the product data submittal required by Article 9.4 of this Section a new painting schedule compiled in the same format used for the Painting Schedule included in this Section.

7. Accessory Materials: As required to perform the work and achieve specified results.
8. Spackling Putty: Duraboard Spackling Putty, manufactured by United States Gypsum Company.

B. Undercoats and thinners:

1. Provide undercoat paint produced by the same manufacturer as the finish coat.
2. Use only the thinners recommended by the paint manufacturer, and use only to the recommended limits.
3. Insofar as practicable, use undercoat, finish coat, and thinner material as parts of a unified system of paint finish.

C. Rust Inhibitor:

Rust inhibitor for all rusted ferrous metal surfaces shall be Ospho as manufactured by the Skybryte Company, Cleveland, Ohio 44114, (216) 771-1590, www.ospho.com.

Apply as recommended by the manufacturer to perform the work and achieve specified results.

D. All paint shall be "best grade" or "first quality" for the use specified.

E. All paint shall be ready-mixed, except that tinting and thinning may be done at the job. All paint materials shall be delivered in original unopened containers with labels intact and legible. The paint shall be suitable for spraying when thinned by not more than 12 percent by volume of thinner.

F. All materials shall be used strictly in accordance with manufacturer's label directions.

G. All materials such as linseed oil, shellac, and turpentine shall be pure and of highest quality and approved by the Architect. They shall bear identifying labels on the containers.

H. Any necessary materials required for a complete and proper installation not specifically covered and specified in this contract shall be subject to the Architect's approval and the Contractor shall submit to the Architect, before any materials are delivered, the name and the brand of the materials which he proposes to use and shall receive an approval of same in writing from the Architect.

9.10 EQUIPMENT:

- A. For application of the approved paint, use only such equipment as is recommended for application of the particular paint by the manufacturer of the particular paint, and as approved by the Architect.
- B. For application of mildewcide, paint stripper, and washing solutions, use only such equipment and pressure settings as is recommended for washing the particular surface by the manufacturer of the cleaning solutions, the equipment, and the material to be washed.
- C. Prior to use of application equipment, verify that the proposed equipment is actually compatible with the material to be applied, and that integrity of the finish will not be jeopardized by the use of the proposed equipment.

9.11 SURFACE CONDITIONS:

- A. It shall be the responsibility of the Painting Contractor to carefully inspect and examine surfaces or areas prepared to receive his work. Should he consider such surfaces or areas not proper or satisfactory for the installation or application of his work, he shall notify the Owner in writing, with copy to the Architect. Should he proceed before proper corrections have been made, it shall be at

his own risk and any subsequent corrections that may be ordered or required shall be at his expense. The starting of work on any surface shall imply that the surface has been inspected and approved by the Painting Contractor.

- B. Verify that defects in surfaces to be finished can be corrected by customary cleaning, sanding, and puttying operations.
- C. Measure moisture content of substrate. Do not apply finishes when moisture content of concrete, masonry, and gypsum board exceeds 12 percent and when moisture content of exterior wood exceeds 15 percent.
- D. Measure alkalinity of concrete, plaster, and masonry surfaces. Do not apply finishes when alkaline is sufficient to cause blistering of finish paint.

9.12 SURFACE PREPARATION:

A. General:

1. Perform preparation and cleaning procedures in strict accordance with the paint manufacturer's recommendations as approved by the Architect.
2. Remove removable hardware and items which are in place and are not scheduled to receive paint finish; or provide surface applied protection prior to surface preparation and painting operations. Remove doors if necessary to paint the bottom edge. Remove casework hardware, electrical device plates, light fixture trim, and fittings.
3. Following completion of painting in each space or area, reinstall the removed items by using workmen who are skilled in the necessary trades.
4. Clean each surface to be painted prior to applying paint or surface treatment.
5. Remove oil and grease with clean cloths and cleaning solvent of low toxicity and flash point in excess of 200 degrees F, prior to start of mechanical cleaning.
6. Schedule the cleaning and painting so that dust and other contaminants from the cleaning process will not fall onto wet, newly painted surfaces.
7. Remove any foreign materials which will adversely affect adhesion or appearance of applied coating.
8. Remove mildew and neutralize surface.
9. Any and all damage to interior or exterior of all buildings resulting from surface preparation shall be repaired at the Contractor's expense.
10. Efflorescence should be removed from all masonry surfaces after causes have been corrected.
11. Remove electrical panel box covers and doors before painting walls. Paint separately and reinstall when paint is dry.
12. Provide drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.

B. Preparation of wood surfaces:

1. Clean wood surfaces until free from dirt, oil, and other foreign substances.
2. Smooth finished wood surfaces exposed to view using the proper sandpaper. Where so required, use varying degrees of coarseness in sandpaper to produce a uniformly smooth and unmarred wood surface.
3. All voids in exterior wood such as nail holes, cracks, etc. shall be filled with a resin based exterior spackling paste. Larger voids, up to 2 inches in diameter, shall be filled with a latex wood filler. All wood with voids larger than two (2) inches in diameter shall be replaced.
4. Prime all surfaces (face, edges, ends, and back side) of new wood as soon as possible.
5. Apply paste wood filler by wiping across the grain, then in a circular motion to obtain a smooth filled surface. Allow to dry overnight and sand with the grain, to obtain a smooth surface before applying finish.
6. To prevent bleeding or discoloration, all knots, pitch steaks, and sappy spots shall be sealed before application of the prime coat.
7. Unless specifically approved by the Architect, do not proceed with painting of wood surfaces until the moisture content of the wood is 15% or less as measured by a moisture meter approved by the Architect.
8. For natural finish work, filler (if required) shall be colored to match wood.
9. Between coats of polyurethane prime coat, rub with steel wool and allow overnight drying.

C. Preparation of metal surfaces:

1. Thoroughly clean surfaces until free from dirt, oil, and grease.
2. On new unfinished galvanized surfaces use solvent for the initial cleaning, and then treat the surface thoroughly with phosphoric acid etch in accordance with the manufacturer's directions for use. Remove etching solution completely before proceeding. Repair galvanized surfaces and coat welds with zinc-rich primer.
3. Clean all new unfinished or exposed existing ferrous metal surfaces with mineral spirits to remove soil, grease, and dirt. Wipe dry. Remove all rust, scale, and defective paint by scraping and wire brushing. Where steel or iron has a heavy coating of scale it shall be removed by sandblasting if necessary.
4. Allow all metal surfaces to dry thoroughly before application of paint.
5. After preparation, all existing rusted ferrous metal surfaces shall be treated with a minimum of one full coat of Ospho rust inhibitor as manufactured by The Skybryte Company, Cleveland, Ohio 44114, (216) 771-1590, www.ospho.com. Apply Ospho as directed by the manufacturer and let dry overnight prior to painting.

D. Preparation of Concrete and Masonry Surfaces:

1. Remove form oil from cast-in-place concrete.

2. Patch large holes with pointing mortar and finish flush with adjacent surface. Fill small holes, after priming, with prepared patching material.
3. Acid etch concrete floor surfaces, scheduled to have paint finish, with solution of 1 part 32 percent muriatic acid to 4 parts water. Flush floor with clean water and allow to dry thoroughly.

E. Other Previously Painted Surfaces:

Remove all blistered, peeling, and scaling paint to a sound substrate. Remove heavy chalk by scrubbing with soap and water. Sand any glossy areas and dust clean. Clean and spot prime any failed areas. Use soap and water on protected areas such as eaves and ceilings to remove invisible residues. Rinse, clean, and let dry. Any existing mildew on the surface must be completely killed and removed before applying paint.

F. Preparation of Gypsum Board Surfaces:

1. Fill scratches and uneven areas with spackling compound and sand to a smooth, level surface. Exercise care to avoid raising nap of paper.
2. For surfaces scheduled to receive epoxy, semi-gloss or gloss enamel finish, apply skim coat of joint compound to entire surface.

9.13 MATERIALS PREPARATION:

A. General:

1. Mix and prepare paint materials in strict accordance with the manufacturers' recommendations as approved by the Architect.
2. When materials are not in use, store in tightly covered containers.
3. Store and mix paint materials only in spaces designated and assigned for the purpose. Do not permit painter oil soaked rags to accumulate. Exercise strict precautions at all times against fire.
4. Maintain containers used in storage, mixing, and application of paint in a clean condition, free from foreign materials and residue.

B. Stirring:

1. Stir materials before application, producing a mixture of uniform density.
2. Do not stir into the material any film which may form on the surface, but remove the film and, if necessary, strain the material before using.

9.14 APPLICATION:

A. General:

1. Touchup shop-applied prime coats which have been damaged, and touchup bare prior to start of finish coats application.
2. Slightly vary the color of succeeding coats from light to dark.
 - a. Do not apply additional coats until the completed coat has been inspected and approved.

- b. Only the inspected and approved coats of paint will be considered in determining the number of coats applied, otherwise no credit for the coat applied will be given, and the Contractor shall then assume the responsibility and recoat work in question. The Painting Contractor shall furnish the Architect a report of each coat applied, when completed, for inspection, and approval to comply with the above.
3. Sand and dust between coats to remove defects visible to the unaided eye from a distance of five feet.
4. On removable panels and hinged panels, paint the back sides to match the exposed sides.
5. All work shall be done by skilled mechanics in accordance with the manufacturer's directions and the best standard practice and in a manner acceptable to the Architect. Any work not conforming to these specifications shall be corrected to the satisfaction of the Architect. Such corrections shall be made at the expense of the Painting Contractor.
6. All finishes shall be evenly applied and free from sags, runs, crawls, brush marks, skips, or other defects.
7. Products shall be applied at the proper consistency and shall be thinned, tinted, or otherwise altered only in accordance with the manufacturer's printed directions.
8. All materials shall be applied to surfaces that are dry and properly prepared and when weather conditions are favorable for painting. Exterior surfaces shall not be painted in damp, frosty, or cold weather. Latex paints shall not be applied when surface or air temperature is below 50° F. If any paint is applied to a damp material or improperly prepared surfaces, the Contractor shall use such corrective measures as determined by the Architect.
9. Use applicators and techniques best suited for substrate and type of material being applied. Apply paint systems to metal surfaces by spraying. Brush applications are unacceptable for metal surfaces.
10. Apply materials at not less than manufacturer's recommended spreading rate to provide a total dry film thickness not less than 1.5 mil per coat or that recommended, for the system used, by the specific manufacturer, whichever is greater.
11. Protect all adjacent work and materials by suitable covering, or other methods, during the progress of the work. Upon completion, remove all paint spots from the floors, glass, and other surfaces.

B. Drying:

1. Allow sufficient drying time between coats, modifying the period as recommended by the material manufacturer to suit adverse weather conditions.
2. Consider oil-base and oleo-resinous solvent-type paint as dry for recoating when the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and when the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

C. Brush Applications:

1. Brush out and work the brush coats onto the surface in an even film.
2. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, and other surface imperfections will not be acceptable.

- D. Spray Application:
1. Except as specifically otherwise approved by the Architect, confine spray application to metal framework and similar surfaces where hand brushwork would be inferior.
 2. Where spray application is used, apply each coat to provide the hiding equivalent of brush coats.
 3. Do not double back with spray equipment to build up film thickness of two coats in one pass.
- E. Sand lightly between coats to achieve a uniform finish.
- F. Covering shall be complete. Apply additional coats when undercoats, soil, or other conditions show through the final coat of paint, until paint film is of uniform finish, color, and appearance and coverage is complete.
- G. Apply stain and varnish smoothly to produce surface free of laps, runs, cloudiness, brush marks, or other surface imperfections.
- H. Apply transparent and semi-transparent finishes to produce surface uniform in shading with only the color variations being those caused by natural wood grain.
- I. Painting is not required in concealed areas and generally inaccessible areas, such as foundation spaces, attic spaces, furred areas, utility tunnels, pipe chases, duct shafts, and elevator shafts.
- J. Where existing work is cut, patched, or added to, paint or touch-up surfaces to match existing work as closely as possible.
- K. For completed work, match the approved Samples as to texture, color, and coverage. Remove, refinish, or repaint work not in compliance with the specified requirements.
- L. Miscellaneous surfaces and procedures:
1. Exposed mechanical items:
 - a. Finish electric panels, access doors, conduits, pipes, ducts, grilles, registers, vents, and items of similar nature to match the adjacent wall and ceiling surfaces, or as directed.
 - b. Paint visible duct surfaces behind vents, registers, and grilles flat black.
 - c. Wash metal with solvent, prime, and apply two coats of DTM industrial enamel.
 2. Exposed pipe and duct insulation:
 - a. Apply one coat of latex paint on insulation which has been sized or primed under other Sections; apply two coats on such surfaces when unprepared.
 - b. Match color of adjacent surfaces.
 - c. Remove band before painting, and replace after painting.
 3. Hardware:
 - a. Paint prime coated hardware to match adjacent surfaces.

- b. Paint metal portions of head seals, jamb seals, and astragal seals to match the color of the door frame unless otherwise directed by the Architect.
4. Wet areas:
 - a. In pool areas and contiguous areas, add an approved fungicide to paints.
 - b. For oil base paints, use 1% phenolmercuric or 4% tetrachlorophenol.
 - c. For water emulsion and glue size surfaces, use 4% sodium tetrachlorophenate.
 5. Exposed vents: Apply two coats of heat-resistant paint approved by the Architect.
 6. Paint exterior doors on tops, bottoms, and side edges, same as exterior face.
 7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 8. Paint exposed conduit, boxes, gaslines, and electric equipment, except prefinished items.
 9. Paint exposed ducts, pipes, hangers, and supports, except prefinished items.
 10. Paint interior surfaces of ducts that are visible through grilles and louvers, to limit of sight line.
 11. Paint louvers, grilles, covers, and access panels except prefinished items. Paint dampers to match face of grilles.
 12. Paint surfaces behind movable equipment and furnishings same as similar exposed surfaces.

9.15 SCHEDULE OF PAINTING:

Note:

1. All items listed in the following paint schedule may not apply to this project.
2. Numbers of coats listed in this schedule are minimum. If coverage is not complete and uniform, additional coats must be added until the finished surface is satisfactory and accepted by the Architect.

A. Exterior Metal, Ferrous:

1. First coat (exposed metal): PPG PITT-TECH Exterior Primer DTM Industrial Enamel 90-712.
2. Second coat: PPG PITT-TECH High Performance Waterborne High Gloss DTM Industrial Enamel 90-374. Existing painted metal shall receive second coat only.

B. Exterior Metal, Galvanized:

1. First coat (exposed metal): PPG Speedhide Galvanized Steel Primer, 6-209.
2. Second coat: PPG PITT-TECH High Performance Waterborne High Gloss DTM Industrial Enamel 90-374.
3. Third Coat: PPG PITT-TECH High Performance Waterborne High Gloss DTM Industrial Enamel 90-374.

C. Aluminum:

1. First coat (unfinished aluminum): PPG PITT-TECH Exterior Primer DTM Industrial Enamel 90-712.
2. Second coat: PPG Manor Hall Exterior Eggshell 100% Acrylic Latex 70-301 Series.
3. Third coat: PPG Manor Hall Exterior Eggshell 100% Acrylic Latex 70-301 Series.

D. Exterior Wood:

1. First coat (unpainted wood): PPG Sun-Proof Universal Exterior Oil Based Primer 1-70.
2. Second coat: PPG Manor Hall Exterior Eggshell 100% Acrylic Latex House and Trim 79 Line.
3. Third coat: PPG Manor Hall Exterior Eggshell 100% Acrylic Latex House and Trim 79 Line.

E. Concrete and Masonry:

1. First coat (new unpainted block only): PPG Speedhide Latex Masonry Block Filler, 6-7.
2. Second coat: PPG Manor Hall Exterior Eggshell 100% Acrylic Latex House and Trim 79 Line.
3. Third coat: PPG Manor Hall Exterior Eggshell 100% Acrylic Latex House and Trim 79 Line.

F. Concrete Floors :

1. First Coat : PPG Speedhide Masonry Paint Surface Sealer, 6-8.
2. Second and Third Coats : PPG Alkyd / Oil Floor and Deck Enamel, #3-Series.

G. Interior Woodwork (PAINTED) :

1. First Coat : PPG Speedhide Quick-Drying Enamel Undercoat, 6-6.
2. Second Coat : PPG Speedcraft Interior Eggshell Latex Enamel, 5-411 Series.

H. Interior Woodwork (STAINED) :

1. First Coat : PPG Interior Semi-Transparent Satin Rez, 77-302.
2. Second and Third Coats : PPG Rez Polyurethane Clear Varnishes, 77-Series.

I. Drywall (LATEX FINISH) :

1. First Coat : PPG Speedcraft Interior Latex Primer-Sealer, White 5-2 Series.
2. Second and Third Coats : PPG Speedcraft Interior Eggshell Enamel, 5-411 Series.

J. Equipment and Other Metal Surfaces :

1. First Coat : PPG Speedhide Rust Inhibitive Steel Primer, #6-208 Series.

2. Second and Third Coats : PPG Speedhide Gloss-Oil Interior / Exterior Enamels, #6-282 Series.

K. PVC Pipe and Insulated Pipe Covering :

1. First and Second Coats : PPG Pitt-Tech One Pack Interior / Exterior High Performance, High Gloss, DTM Industrial Waterborne Acrylic Enamel, 90 Series.

L. Interior Ferrous Metals (CONVENTIONAL ALKYD SYSTEM) :

1. First Coat: PPG Multiprime Inhibitive Primer 97-682.
2. Second and Third Coats: PPG Speedhide Interior Enamel, #6-1110.

M. Interior Galvanized Metal (CONVENTIONAL ALKYD):

1. First Coat: PPG Speedhide 6-209 Galvanized Steel Primer.
2. Second and Third Coats: PPG Speedhide Gloss-Oil Interior / Exterior Enamels, #6-1110.

9.16 WASTE MANAGEMENT:

- A. Separate wastes in accordance with a Waste Management Plan. Set aside extra paint for future color matches, or reuse by Owner, Habitat for Humanity, etc. Where paint recycling is available, collect all waste paint by type and provide for delivery to recycling or collection facility.
- B. Close and seal tightly all partly used paint and finish containers and store protected in well-ventilated fire-safe area at moderate temperature.
- C. Place empty containers of solvent-based paints in areas designated for hazardous materials.
- D. Do not dispose of paints or solvents by pouring on the ground. Place in designated containers for proper disposal.

End of Section

Division 26:
Electrical

SECTION 260500 - ELECTRICAL GENERAL PROVISIONS

PART 1 – GENERAL

1.1 WORK INCLUDED

- A. Provide all materials, labor, and equipment required to furnish and install a complete electrical system as indicated on the Drawings and as specified herein.
- B. Electrical work includes, but is not limited to, the following:
 - 1. Electrical distribution system for lighting and power including the electrical service and necessary feeders, panelboards, branch circuits, conduit, lighting fixtures, control switches, and receptacles.
 - 2. Excavation, trenching, and backfilling for conduit and/or cable.
 - 3. Grounding.
 - 4. Power wiring for equipment furnished under Division 21, 22, and 23.

1.2 RELATED WORK

- A. The following work shall be furnished under other Divisions of these Specifications, but shall be coordinated with said Divisions by Division 26 tradesman prior to bid.
 - 1. Painting.
 - 2. Cutting and patching.
 - 3. Heating, ventilating, air conditioning, and plumbing equipment.

1.3 DEFINITIONS

- A. Provide: Shall mean "furnish, install, connect, and put in good working order."
- B. Wiring: Shall mean "wire and cable, installed in raceway with all required boxes, fittings, connectors, etc. completely installed."
- C. Engineer: Shall mean "Engineer of Record" whose seal is affixed to the contract specifications and drawings of Division 26.

1.4 CODES AND STANDARDS

- A. Comply with applicable local, state, and federal codes.
- B. Electrical work shall be installed in accordance with the Drawings and Specifications, the 2012 IBC, 2011 NEC, ANSI, and NFPA.
- C. In event of conflict between Drawings, Specifications and such codes, Engineer shall be notified in writing prior to bid. A ruling will then be made by the Engineer in writing. All work shall be installed in strict accordance with applicable codes without additional cost to Owner.

- D. Contractor shall submit and/or file all necessary specifications and drawings as required by governing authorities.

1.5 SUBMITTALS

- A. Provide submittals on materials and equipment identified in the Specifications and Drawings prior to manufacturer, order, or installation in accordance with Shop Drawings, Product Data, and Samples.

- B. Submittals shall include but not be limited to the following:

Lighting fixtures Panelboards Safety switches

1.6 OPERATING AND MAINTENANCE MANUALS

- A. Furnish, to the Owner, three bound and indexed sets of operation and maintenance instructions on the electrical equipment. Instructions shall also include recommended spare parts lists.
- B. A minimum of 4 hours of training on the operation and maintenance of the electrical equipment shall be provided for the Owner's representative.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver equipment and materials to job site in original, unopened, labeled containers.
- B. Store ferrous materials to prevent rusting. Store finished materials and equipment to prevent staining and discoloring.

PART 2 – PRODUCTS (Not used)

PART 3 - EXECUTION

3.1 SITE VISIT

- A. Visit job site prior to bid date to determine actual conditions under which work shall be done, to become familiar with project, and to verify total scope of work required. Failure to do so shall not constitute a reason for an extra charge.

End of Section

SECTION 260501 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 – GENERAL

1.1 QUALITY ASSURANCE

- A. Qualifications of Manufacturer: All materials and equipment used in work of Division 26 shall be produced by manufacturers regularly engaged in manufacturer of similar items and with history of successful production acceptable to the Engineer. They shall be new and be UL listed and labeled or listed and labeled by other recognized testing laboratory where such label is available.
- B. Qualifications of Installers: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in necessary crafts and who are completely familiar with specified requirements and methods needed for proper performance of work of this Section.

PART 2 – PRODUCTS

2.1 SUBSTITUTIONS

- A. Reference in Specifications to any article, device, product, material, fixture, form and type of construction, by name, make, or catalog number shall be interpreted as established standard of quality and shall not be construed as limiting competition unless noted otherwise. Any article, device, product, material, fixture, form and type of construction which in the judgment of Engineer, expressed in writing, is equal to that specified, may be used.
- B. Substitution shall be approved by Engineer before purchase and/or installation. If unapproved materials are installed, work required to remove and replace unapproved items shall be done at the Contractor's expense.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Electrical drawings are diagrammatic and shall not be scaled for exact sizes or locations. They are not intended to disclose absolute or unconditional knowledge of actual field conditions. This Division shall be prepared to relocate any outlet or device 6' in any direction without additional charge to the Owner.
- B. Equipment shall be installed according to manufacturer's recommendations.
- C. Protect work and materials from damage by weather, entrance of water, and dirt. Cap conduit during installation. Avoid damage to materials and equipment in place.
- D. Satisfactorily repair or remove and replace damaged work with new materials.
- E. Failure to route conduit through building without interfering with other equipment and construction shall not constitute a reason for an extra charge. Equipment, conduit and fixtures shall fit into available space in building and shall not be introduced into building at such times and manner as to cause damage to structure. Equipment requiring services shall be readily accessible.

- F. 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.
 2. Verify all dimensions by field measurements.
 3. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for electrical installations.
 4. 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.
 5. 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.
 6. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
 7. 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.
 8. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, whether exposed or concealed.
 9. 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.
 10. Install access panels or doors where units are concealed behind finished surfaces.
 11. Insulate dissimilar metals so they are not installed in direct contact.
- H. Conduits which pass through floor slabs (except ground floor) shall be sealed with Fire Stop Sealant. Seal around conduits or other wiring materials passing through partitions, floors, and fire rated walls. Use UL approved Fire Stop Sealant as detailed on the drawings.
- I. Coordinate electrical power connection requirements with all equipment suppliers. Where power requirements differ from drawing design requirements, Engineer shall be notified for clarification and installation requirements prior to installing that portion of work. Cost for equipment and labor for improperly installed electrical connections not coordinated and approved by other trades and the Engineer shall be incurred by the Electrical Contractor and shall not constitute a reason for an extra charge because of rework.

3.2 CUTTING AND PATCHING

- A. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.

3.3 TESTING AND EQUIPMENT SERVICING

- A. Entire installation shall be free from improper grounds and short or open circuits. Conductors shall be tested before energizing circuit. Test to insure that entire system is in proper operating condition, and that adjustments and setting of circuit breakers, fuses, control equipment, and apparatus have been made. Correct defects discovered during tests.
- B. Equipment shall be turned over to Owner in lubricated condition with instructions on further lubrication included in operating instructions.

3.4 REMOVAL OF DEBRIS

- A. Remove surplus materials and debris caused by, or incidental to electrical work. Remove such debris at frequent intervals. Keep job site clean during construction.

3.5 IDENTIFICATION OF EQUIPMENT

- A. Equipment shall be identified in accordance with Section 260553, "Electrical Identification."

3.6 AS-BUILT DRAWINGS

- A. Maintain one set of blue line electrical prints on site, marked to show as-built conditions and installations, prints to be turned over to Owner after job is complete.

3.7 TEMPORARY LIGHTING AND POWER

- A. Provide, maintain and remove after construction is completed, temporary lighting adequate for workman safety and temporary power for all trades.

3.8 OTHER MATERIALS

- A. Work of this Division shall also include those items not specifically mentioned or described, but which are obviously necessary to conform to the design intent, applicable codes and to produce complete electrical system that functions properly. These materials shall be as selected by Contractor but subject to approval of the Engineer.

3.9 OTHER COORDINATION

- A. Contractor shall obtain and pay for all necessary permits and inspection fees required for the electrical installation.
- B. All utility company (KUB) aid to construction fees shall be included in the bid.

3.10 GUARANTEE-WARRANTY

- A. Guarantee work to be free of material and workmanship defects for a period of one year, from date of final acceptance for the project. Repair and replace defective work and other work damaged thereby which becomes defective during term of Guarantee-Warranty. Furnish Owner with three written copies of Guarantee-Warranty.

End of Section

SECTION 260519 - WIRE AND CABLE

PART 1 – GENERAL

1.1 WORK INCLUDED

- A. Wire and cable for all service, feeders, branch circuits, and instrument and control wiring rated 600 volts and below.

1.2 QUALITY ASSURANCE

- A. Listing and Labeling: Provide wire and cable that is listed and labeled.
 - 1. The term "listed and labeled": As defined in the National Electrical Code, Article 100.
 - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
- B. Wire and cable and its installation shall comply with requirements of the National Electrical Code.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Wires and cables shall meet applicable requirements of the National Electrical Code and UL for the type of insulation, jacket, and conductor specified or indicated.
- B. All conductors shall be copper with 600 volt insulation unless otherwise indicated.
- C. Wire and cable shall be manufactured by Belden, General Cable, Essex, Encore, Rome Cable, Southwire, or approved equal.
- D. Use solid copper type THHN/THWN for branch circuit wiring #10 AWG and smaller. No conductor for branch circuit wiring shall be smaller than #12 AWG.
- E. Use stranded copper, type THHN/THWN for feeder and power circuits #8 AWG and larger.
- F. Provide color coded wire and with a different color for each phase and neutral and ground as follows: 240/120 volt circuits - phases A and B: black and red, respectively; neutral: white; ground: green. Approved color tape is acceptable for feeders. The neutral shall have a stripe to match the corresponding phase conductor color. Also provide color coded wire for control circuits.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Complete conduit system before pulling any wire or cable. Use cable lubricants recommended by cable manufacturer as necessary.
- B. Conductors shall be continuous from outlet to outlet or to branch circuit over-current devices. Make splices only in junction boxes. Splices shall not be made in panelboards. Control wiring shall be continuous between components and/or terminal boards.

- C. A minimum of eight (8") inches of slack conductor shall be left in every outlet or junction box. There should also be enough slack so three (3") inches extends outside the outlet or junction box.
- D. Make splices in conductors #10 AWG and smaller diameter with insulated, pressure-type connector. Use Scotchlok, Ideal, or equal wire connectors.
- E. Make splices in conductors #8 AWG and larger diameter with solderless connectors and cover with insulation material equivalent to conductor insulation. Use Burndy compression connectors with crimpit cover, type CC, or equal.
- F. Where branch circuits homeruns exceed 70' in length for 120 volt and 150' in length for 240 volt circuits, #10 AWG wire shall be the minimum size used to the first outlet.

3.2 TESTING

- A. After completion of the installation and splicing and prior to energizing the conductors, wire and cable shall be given continuity and insulation tests as herein specified.
- B. Test wiring to verify that no short circuits, open circuits, or accidental grounds exist. Continuity tests shall be conducted using a dc device with bell or buzzer.
- C. All conductors number 4 and larger shall be Megger tested.

End of Section

SECTION 260526 - GROUNDING AND BONDING

PART 1 – GENERAL

1.1 WORK INCLUDED

- A. Grounding electrodes and conductors.
- B. Equipment grounding conductors.
- C. Bonding.

1.2 PERFORMANCE REQUIREMENTS

- A. The grounding system to earth resistance shall be less than 25 ohms.

1.3 QUALITY ASSURANCE

- A. Listing and Labeling: Provide grounding and bonding materials that are listed and labeled.
 - 1. The term "listed and labeled": As defined in the National Electrical Code, Article 100.
 - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
- B. Components and installation shall comply with the requirements of the National Electrical Code (NEC).
- C. Materials shall comply with UL 467, "Grounding and Bonding Equipment."

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers shall be Burndy, T&B, or approved equal.

2.2 GROUNDING ELECTRODES

- A. Ground rods shall be copper clad steel with minimum dimensions of ¾ inch diameter by 10 feet long.

2.3 CONNECTORS

- A. Exothermic welded connections shall be provided in kit form and selected for the specific types, sizes, and combinations of conductors and other items to be connected.
- B. Pressure connectors shall be high-conductivity-plated units.
- C. Bolted clamps shall be heavy-duty units listed for the application.

2.4 WIRE AND CABLE

- A. All grounding conductors shall be copper.

- B. The grounding electrode conductor shall be stranded.
- C. Equipment grounding conductors shall have green insulation.
- D. Bare copper conductors shall conform to the following:
 - 1. Solid conductors: ASTM B-3
 - 2. Assembly of stranded conductors: ASTM B-8
 - 3. Tinned Conductors: ASTM B-33

2.5 MISCELLANEOUS CONDUCTORS

- A. Ground bus shall be bare annealed copper bars.
- B. Braided bonding jumpers shall be copper tape, braided number 30 gauge bare copper wire, and terminated with copper ferrules.
- C. Bonding strap conductor/connectors shall be soft copper, 0.05 inch thick and two (2") inches wide, unless otherwise noted.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Grounding system shall be in accordance with Article 250 of the NEC except where the Drawings or Specifications exceed NEC requirements.
- B. Install code size green grounding conductors in all feeder and branch circuits. Bond conductors to chassis or fixed equipment.
- C. All grounding conductors shall be bonded to multi-terminal ground bus at panelboard or other distribution equipment. Grouping of grounding conductors under a single lug is not acceptable.
- D. Bond interior metal piping systems.
- E. Bond reinforcing steel in foundation footing to grounding electrode conductor. Bond steel together.
- F. Install a single ground rod at each building and connect to the grounding electrode system.
- G. Locate all grounding attachments away from areas subject to physical damage. Provide protective covering as required.

3.2 CONNECTIONS

- A. Make connections in such a manner as to minimize possibility of galvanic action or electrolysis. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to assure high conductivity and make contact points closer in order of galvanic series.

2. Make connections with clean bare metal at points of contact.
 3. Aluminum to steel connections shall be with stainless steel separators and mechanical clamps.
 4. Aluminum to galvanized steel connections shall be with tin-plated copper jumpers and mechanical clamps.
 5. Coat and seal connections involving dissimilar metals with inert material such as red lead paint to prevent future penetration of moisture to contact surfaces.
- B. Use exothermic welded connections for connections to structural steel and for underground connections. Comply with manufacturer's written recommendations. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. For compression-type connections, use hydraulic compression tools to provide the correct circumferential pressure for compression connectors. Use tools and dies recommended by the manufacturer of the connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on the ground conductor.
- D. Terminate insulated equipment grounding conductors for feeders and branch circuits with pressure-type grounding lugs. Where metallic raceways terminate at metallic housings without mechanical and electrical connection to the housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to the ground bus in the housing. Bond electrically noncontinuous conduits at both entrances and exits with grounding bushings and bare grounding conductors.
- E. Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values for connectors and bolts. Where manufacturer's torquing requirements are not indicated, tighten connections to comply with torque tightening values specified in UL 486A and UL 486B.
- F. Where insulated ground conductors are connected to ground rods or ground buses, insulate the entire area of the connection and seal against moisture penetration of the insulation and cable.
- G. Do not use flexible metal conduit and fittings as a grounding means. Pull a green wire in each piece of flexible conduit, and screw to conduit system with lugs at both ends.

3.3 FIELD QUALITY CONTROL

- A. Use the fall-of-potential method as described in IEEE Standard 81 to measure the resistance of the following. Record the measurements and provide to the Engineer.
1. The resistance between earth and each ground rod prior to interconnection with other ground rods.
 2. The resistance between earth and the counterpoise.
 3. The resistance of the grounding system at the grounding electrode connection to earth.

4. Measure the ground resistance when there has been no precipitation for 5 days, without the soil being moistened by any means other than natural precipitation or natural drainage or seepage, and without chemical treatment or other artificial means of reducing natural ground resistance.
 5. Resistance shall be less than 25 ohms.
- B. Perform continuity tests at all power receptacles to ensure the ground terminals are properly grounded to the facility ground network.

End of Section

SECTION 260529 - SUPPORTING DEVICES

PART 1 – GENERAL

1.1 WORK INCLUDED

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

1.2 QUALITY ASSURANCE

- A. Electrical Component Standard: Components and installation shall comply with the National Electrical Code.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, Slotted Metal Angle and U-Channel Systems shall be provided by Allied Tube & Conduit, American Electric, B-Line Systems, Inc., Unistrut Diversified Products, or approved equal.
- B. Subject to compliance with requirements, Conduit Sealing Bushings shall be provided by Bridgeport Fittings, Inc., Cooper Industries, Inc., Killark Electric Mfg. Co., O-Z/Gedney, Raco, Inc., Spring City Electrical Mfg. Co., Thomas & Betts Corp., or approved equal.

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 aluminum or hot-dip galvanized.

2.3 MANUFACTURED SUPPORTING DEVICES

- A. Raceway Supports: Raceways shall be supported with 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.
 - 3. Powder-Driven Threaded Studs: Heat-treated steel, designed specifically for the intended service.
- C. Conduit Sealing Bushings: Factory-fabricated watertight conduit sealing bushing assemblies suitable for sealing around conduit, or tubing passing through concrete floors and walls. Construct seals with steel sleeve, malleable iron body, neoprene sealing grommets or rings, metal pressure rings, pressure clamps, and cap screws.

- D. 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.
- E. U-Channel Systems: 16-gauge 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 manufacturer.

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.
- C. Pipe Sleeves: Provide pipe sleeves of one of the following:
 - 1. Sheet Metal: Fabricate from galvanized sheet metal; round tube closed with snaplock joint, welded spiral seams, or welded longitudinal joint. Fabricate sleeves from the following gage metal for sleeve diameter noted:
 - a. 3-inch and smaller: 20-gauge.
 - b. 4-inch to 6-inch: 16-gauge.
 - c. over 6-inch: 14-gauge.
 - 2. Steel Pipe: Fabricate from Schedule 40 galvanized steel pipe.
 - 3. Plastic Pipe: Fabricate from Schedule 80 PVC plastic pipe.

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 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. Sleeves: Install in concrete slabs and walls and all other fire rated floors and walls for raceways and cable installations. For sleeves through fire rated wall or floor construction, apply UL listed firestopping sealant in gaps between sleeves and enclosed conduits and cables in accordance with manufacturer's recommendations.
- H. Conduit Seals: Install seals for conduit penetrations of slabs on grade and exterior walls below grade and where indicated. Tighten sleeve seal screws until sealing grommets have expanded to form watertight seal.
- I. 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. Threaded studs driven by a powder charge and provided with lock washers and nuts may be used

instead of expansion bolts and machine or wood screws. 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.

End of Section

SECTION 260537 - OUTLET AND JUNCTION BOXES

PART 1 – GENERAL

1.1 WORK INCLUDED

- A. Wall and ceiling outlet boxes.
- B. Pull and junction boxes.

1.2 QUALITY ASSURANCE

- A. Listing and Labeling: Provide outlet and junction boxes that are listed and labeled.
 - 1. The term "listed and labeled": As defined in the National Electrical Code, Article 100.
 - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
- B. Outlet and junction boxes and their installation shall comply with the requirements of the National Electrical Code.

PART 2 – PRODUCTS

2.1 OUTLET AND JUNCTION BOXES

- A. Outlet and junction boxes shall be plastic, 1-1/2" deep minimum by Racco, T&B/Steel City, Crouse Hinds or approved equal. Use 2 hour rated plastic boxes in rated walls.

PART 3 – EXECUTION

3.1 GENERAL

- A. Outlet and junction boxes in inaccessible ceiling areas shall be located no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- B. Install boxes to preserve fire resistance rating of partitions and other elements, using UL listed fire stop materials and methods.
- C. Do not install flush mounted boxes back-to-back in walls; provide minimum six (6") inches separation. Provide minimum twenty-four (24") inches separation in fire rated walls.
- D. Bonding jumpers shall be used around concentric knockouts.

3.2 OUTLET BOXES

- A. Outlet boxes shall be securely anchored, set true, and plumb and no part of box shall extend beyond finished wall or ceiling. Flush mounted boxes shall be set to within 1/8" of finished wall and a plaster ring used to make cover flush with wall.

- B. Select boxes according to intended use and type of outlet. Ceiling outlet boxes shall be four (4") inches octagon and 2-1/2" deep. Use four (4") inches square boxes where required. All ceiling outlet boxes shall have a fixture stud of the no bolt, self-locking type if required to hang the fixture specified at the outlet.
- C. Install blank device plates on outlet boxes left for future use.
- D. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices. Confirm accessibility code compliance.

3.3 JUNCTION BOXES

- A. Pull and junction boxes shall be sized in accordance with the National Electrical Code according to number of conductors in box or type of service to be provided. Minimum size is 4-11/16" square and 2-1/2" deep.
- B. Pull boxes shall be provided where necessary in the conduit system to facilitate conductor installation. Conduit runs longer than 100 feet or with bends exceeding 270 degrees shall have a pull box installed at a convenient intermediate location.
- C. Install in locations as shown on Drawings and as required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements.
- D. Install pull and junction boxes above accessible ceilings and in unfinished areas only.

3.4 ADJUSTING

- A. Adjust flush-mounting outlets to make front flush with finished wall material.
- B. Install knockout closures in unused box openings.

3.5 CLEANING

- A. Clean interior of boxes to remove dust, debris, and other material.
- B. Clean exposed surfaces and restore finish.

End of Section

SECTION 260553 - ELECTRICAL IDENTIFICATION

PART 1 – GENERAL

1.1 WORK INCLUDED

A. Extent and types of electrical identification are indicated herein and as follows:

1. Operational instructions and warnings.
2. Danger signs.
3. Equipment/system identification signs.
4. Conduit identification.
5. Power and control wiring identification.
6. Terminal marking.
7. Arc-flash warning.
8. Panelboard Legends.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, identification products shall be provided by W.H. Brady Co., Ideal Industries, Inc., Panduit, T&B, or approved equal.

2.2 MATERIALS

- A. General: Except as otherwise indicated, provide manufacturer's standard products of categories and types required for each application. Where more than single type is specified for an application, selection is Installer's option, but provide single selection for each application.
- B. Cable/Conductor Identification Bands: Provide manufacturer's standard wrap-around type, vinyl-cloth, self-adhesive cable/conductor markers with either pre-numbered plastic coated type or write-on type with clear plastic self-adhesive cover flap, numbered to show circuit identification. Provide markers for all field control wiring.
- C. Self-Adhesive Plastic Signs: Provide manufacturer's standard, self-adhesive or pressure-sensitive, pre-printed, flexible vinyl signs for operational instructions or warnings. Signs shall be of sizes suitable for application areas and adequate for visibility, with proper wording for each application (as examples: 208V, EXHAUST FAN or DANGER – HIGH VOLTAGE).
1. Colors: Unless otherwise indicated or required by governing regulations, provide orange signs with black lettering.

- D. Engraved Plastic-Laminate Signs: Provide three-layer engraving stock in sizes and thickness indicated, engraved with engraver's standard letter style of sizes and wording indicated, black and white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.
1. Thickness: 1/16", for units up to 20 sq. in. or eight (8") length; 1/8" for larger units.
 2. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate substrate.
- E. Underground Warning Tape: Provide four (4") inch wide detectable type, plastic, yellow warning tape with suitable warning describing type of cable/circuit over buried electrical lines.

2.3 LETTERING AND GRAPHICS

- A. General: Coordinate names, abbreviations, and other designations used in electrical identification work, with corresponding designations shown, specified, or scheduled. Provide numbers, lettering, and working as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of electrical systems and equipment.

PART 3 – EXECUTION

3.1 APPLICATION AND INSTALLATION

- A. General Installation Requirements:
1. Coordination: Where identification is to be applied to surfaces, which require finish, install identification after completion of painting.
 2. Regulations: Comply with governing regulations and requests of governing authorities for identification of electrical work.
 3. Equipment/System Identifications: Install engraved plastic-laminate sign on each disconnect and enclosure. Except as otherwise indicated, provide single line of text, 1/2" high lettering on 1-1/2" high sign (2" high where 2 lines are required), white lettering in black field. Provide text matching terminology and numbering of the contract documents and shop drawings. Provide identification and warning signs for each unit of the following categories of electrical work.
 - a. Panelboards
 - b. Disconnect switches.
- B. Install signs at locations indicated or, where not otherwise indicated, at locations for best convenience of viewing without interference with operation and maintenance of equipment. Secure to substrate with stainless steel tamperproof fasteners.
- C. Install magnetic/traceable underground warning tape in accordance with the National Electrical Code.

End of Section

SECTION 260573 - OVERCURRENT PROTECTIVE DEVICES

PART 1 – GENERAL

1.1 WORK INCLUDED

- A. This section includes circuit breakers and fuses.

1.2 SUBMITTALS

- A. Provide manufacturer's product data for the following:

1. Circuit breakers
2. Enclosures
3. Fuses (Provide complete list of all fuses and the equipment where they are used.)
4. Shunt trips

- B. Provide maintenance data for products for inclusion in the Operating and Maintenance Manual.

1. Include a load current and overload relay heater list compiled by Contractor after motors have been installed. Arrange list to demonstrate selection of heaters to suit actual motor nameplate full load currents.

1.3 QUALITY ASSURANCE

- A. Listing and Labeling: Provide overcurrent protective devices that are listed and labeled.

1. The term "listed and labeled": As defined in the National Electrical Code, Article 100.
2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

- B. Overcurrent protective devices and their installation shall comply with the requirements of the National Electrical Code.

- C. Circuit breakers shall comply with UL 489, NEMA AB 1, and NEMA AB 3.

- D. Fuses shall conform to NEMA FU 1.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Circuit Breakers: Subject to compliance with requirements, provide products by Cutler-Hammer; General Electric Co.; Siemens Energy & Automation, Inc.; Square D Co.; or approved equal.

- B. Fuses: Subject to compliance with requirements, provide products by Bussmann Mfg. Co., Littlefuse Co, Ferraz Shawmut, or approved equal.

2.2 FUSES

- A. A complete set of fuses for all switches shall be provided. Fuses shall have a voltage rating not less than the circuit voltage.
- B. Provide Class RK1 fuses for motor branch circuits.
- C. Fuses shall be labeled showing UL class, interrupting rating, and time-delay characteristics, when applicable.
- D. Fuse holders field-mounted in a cabinet or box shall be porcelain. Field installation of fuse holders made of such materials as ebony asbestos, Bakelite, or pressed fiber shall not be used.

2.3 EQUIPMENT ENCLOSURES

- A. Enclosures for equipment shall be in accordance with NEMA 250.
- B. Equipment installed inside, clean, dry locations shall be contained in NEMA Type 1, general-purpose sheet-steel enclosures.
- C. Equipment installed in wet locations shall be contained in NEMA Type 3R, rainproof, sheet-steel enclosures, constructed for outdoor use to protect against falling rain, sleet, and ice.
- D. Ferrous-metal surfaces of electrical enclosures shall be cleaned and painted with the manufacturer's standard finish.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install overcurrent protective devices as indicated or required, in accordance with the manufacturer's written instructions and with recognized industry practices to ensure that protective devices comply with requirements.
- B. Coordinate with other work, including electrical wiring work, as necessary to interface installation of overcurrent protective devices.
- C. Install enclosed circuit breakers plumb with operating handle at five (5') feet above finished elevation.
- D. Set field-adjustable circuit breakers for trip settings as indicated, subsequent to installation of devices.
- E. Provide engraved plastic-laminate nameplates under the provisions of Section 260553, "Electrical Identification" for enclosed circuit breakers and motor controllers.

3.2 ADJUSTING

- A. Inspect circuit breaker operating mechanisms for malfunctioning and where necessary, adjust units for free mechanical movement.

3.3 FIELD QUALITY CONTROL

- A. Prior to energization of overcurrent protective devices, test devices for continuity of circuitry and for short-circuits. Correct malfunctioning units, and then demonstrate compliance with requirements.

End of Section

SECTION 262416 - PANELBOARDS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Lighting and appliance panelboards (loadcenters). All 240/120Volt, 1 Phase panels.

1.2 REFERENCES

- A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.
- B. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum); National Electrical Manufacturers Association.
- C. NEMA PB 1 - Panelboards; National Electrical Manufacturers Association.
- D. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; National Electrical Manufacturers Association.
- E. NFPA 70 - National Electrical Code; National Fire Protection Association;

1.3 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.

1.4 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.5 MAINTENANCE MATERIALS

- A. Furnish two of each panelboard key.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Eaton Electrical/Cutler-Hammer
- B. GE Industrial
- C. Square D
- D. GE

2.2 LIGHTING AND APPLIANCE PANELBOARDS

- A. Description: NEMA PB1, circuit breaker type, lighting and appliance branch circuit panelboard. Unit shall be similar to Square D. Co. NQOB Series.
- B. Panelboard Bus: Copper, ratings as indicated. Provide aluminum ground bus in each panelboard; provide insulated ground bus where scheduled.
- C. Minimum Integrated Short Circuit Rating: As indicated.
- D. Cabinet Box: 4 inches (153 mm) deep, 14 inches (508 mm) wide.
- E. Cabinet Front: Flush cabinet front with concealed trim clamps, concealed hinge, metal directory frame, and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install panelboards in accordance with NEMA PB 1.1 and NECA 1.
- B. Install panelboards plumb. Install recessed panelboards flush with wall finishes.
- C. Height: 6 feet (1800 mm) to top of panelboard; install panelboards taller than 6 feet (1800 mm) with bottom no more than 4 inches (100 mm) above floor.
- D. Provide filler plates for unused spaces in panelboards.
- E. Provide typed or circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.
- F. Provide engraved plastic nameplates under the provisions of Section 260553.
- G. Ground and bond panelboard enclosure according to Section 260526.

End of Section