H.F. ROBINSON ADMINISTRATION BUILDING – 2ND FLOOR RENOVATION

SCO **#19-20432-01A**
WCU Project ID**: 2016-060**

PROJECT MANUAL

CONSTRUCTION DOCUMENTS
September 18, 2019

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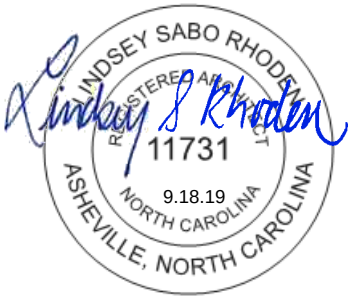
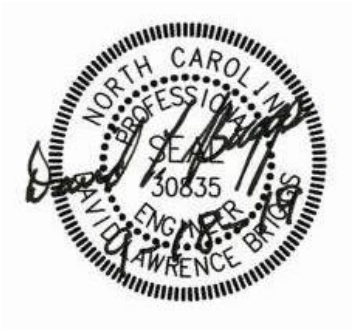
mcmillan | pazdan | smith
ARCHITECTURE

MPS Project No. 017314.02

SECTION 00 01 07 – SEALS PAGE

REGISTERED ARCHITECTURAL CORPORATION CERTIFICATE **MCMILLAN PAZDAN SMITH ARCHITECTURE** 	**ARCHITECT: LINDSEY S. RHODEN, AIA** **NC LICENSE NO 11731** **MCMILLAN PAZDAN SMITH ARCHITECTURE** 
ELECTRICAL: DAVID BRIGGS **NC LICENSE NO 30835** **SUD ASSOCIATES** 	**MECHANICAL: JEROME HAY** **NC LICENSE NO 18486** **SUD ASSOCIATES** 

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1.1 LIST OF DRAWINGS

A. List of Drawings: Drawings consist of the following Contract Drawings and other drawings of type indicated:

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E201	ELECTRICAL - GENERAL

END OF DOCUMENT 00 0115

DOCUMENT 00 11 13 – ADVERTISEMENT FOR BIDS

Sealed proposals will be received by Western Carolina University at the Facilities Building, 3476 Old Cullowhee Road, Cullowhee, NC 28723 up to 3:00pm, October 17th, 2019, and immediately thereafter publicly opened and read for the furnishing of labor, material and equipment for the Western Carolina University H.F. Robinson Administration Building – Second Floor Renovation. Mailed proposals shall be sent to the attention of Javier Torres at the following address: Western Carolina University-Facilities, 3476 Old Cullowhee Road, Cullowhee, NC 28723 up to 3:00pm. All proposals shall be lump sum single prime contract.

PRE-BID MEETING

A non-mandatory pre-bid meeting and site walk-through will be held for interested bidders on October 1st, 2019 at 11 am in Suite 230 of the H.F. Robinson Administration Building at Western Carolina University.

Complete plans, specifications and contract documents may be obtained by visiting Western Carolina University's 'Project Solicitations' webpage found at:

https://www.wcu.edu/discover/campus-services-and-operations/facilities-management/facilities-planning-design-and-construction/project-solicitations.aspx

For purposes of coordination, primary contact for project information is:
Project Manager: Lindsey Rhoden, AIA
Title: Architect
E-Mail Address: lrhoden@mcmillanpazdansmith.com

Signed: Javier Torres, AIA
University Architect
Western Carolina University

N O T I C E TO B I D D E R S

Sealed proposals will be received by WESTERN CAROLINA UNIVERSITY, FACILITIES MANAGEMENT in CULLOWHEE NC, in the offices of

Facilities Management
3476 Old Cullowhee Road
Cullowhee, NC 28723
up to 3:00 pm Thursday, October 17, 2019 and immediately thereafter publicly opened and read for the furnishing of labor, material and equipment entering into the construction of

H.F. ROBINSON ADMINISTRATION BUILDING
2ND FLOOR RENOVATION

Interior renovation of existing shell space into 8 offices, 2 storage rooms, a conference room and a lobby. Scope of work includes mechanical, electrical and interior finishes.

Bids will be received *for SINGLE PRIME contracts.* All proposals shall be lump sum.

Pre-Bid Meeting

An open pre-bid meeting will be held for all interested bidders Tuesday, October 1, 2019 at 11:00am in Suite 230 of the H.F. Robinson Administration Building at Western Carolina University. The meeting will address project specific questions, issues, bidding procedures and bid forms.

Complete plans, specifications and contract documents will be open for inspection in the offices of the Owner and the Architect and in the plan rooms of the Associated General Contractors, Carolinas Branch, ASHEVILLE, NC in the local North Carolina offices of McGraw-Hill Dodge Corporation, and in Minority Plan Rooms in:

Hispanic Contractors Association of the Carolinas (HCAC) in Winston-Salem, Charlotte and Raleigh Areas – 877-227-1680

Cherokee Business Development Center, PO Box 1200, Ginger Lynn Welch Complex, 810 Acquoni Road, Cherokee, NC 28719, Phone: 828-497 1666, FAX: 828-497-1665.

or may be obtained by those qualified as prime bidders, upon deposit of Two Hundred and NO Cents dollars ($ 200.00) in cash or certified check. The full plan deposit will be returned to those bidders provided all documents are returned in good, usable condition within ten (10) days after the bid date.

NOTE: The bidder shall include with the bid proposal the form *Identification of Minority Business Participation* identifying the minority business participation it will use on the project and shall include either *Affidavit **A*** or *Affidavit **B*** as applicable. Forms and instructions are included within the Proposal Form in the bid documents. Failure to complete these forms is grounds for rejection of the bid. (GS143-128.2c Effective 1/1/2002.)

All contractors are hereby notified that they must have proper license as required under the state laws governing their respective trades.

General contractors are notified that Chapter 87, Article 1, General Statutes of North Carolina, will be observed in receiving and awarding general contracts. General contractors submitting bids on this project must have license classification for_____
(set forth the license classification required by the NC General Contractors Licensing Board under G.S. 87-1)

Payment will be made based on ninety-five percent (95%) of monthly estimates and final payment made upon completion and acceptance of work.

No bid may be withdrawn after the scheduled closing time for the receipt of bids for a period of 30 days.

The owner reserves the right to reject any or all bids and to waive informalities.

Designer:	Owner:
McMillan Pazdan Smith Architecture	*Western Carolina University*
(Name)	*(Agency/Institution)*
47 Rankin Avenue, Suite 141	*3476 Cullowhee Road*
Asheville, NC, 28801	*Cullowhee, NC 28723*

SECTION 00 52 00 AGREEMENT FORM

PART 1 GENERAL

1.01 FORM OF AGREEMENT

A. The Agreement to be executed is attached following this page.
   1. The Form of Agreement is the State of North Carolina Standard Form of Informal Contract and General Conditions.

1.02 MODIFICATIONS TO THE AGREEMENT FORM

A. Supplementary General Conditions are also attached and are a part of this Standard Form of Informal Contract and General Conditions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF DOCUMENT

STATE OF NORTH CAROLINA
STANDARD FORM OF INFORMAL CONTRACT
AND GENERAL CONDITIONS

FOR

WESTERN CAROLINA UNIVERSITY
WCU – H.F. ROBINSON ADMINISTRATION BUILDING –
2ND FLOOR RENOVATIONS
CULIOWHEE, NORTH CAROLINA
PROJECT ID #: 2016-060
SCO#: 19-20432-01A

SCOPE OF WORK

Interior renovation of existing shell space into 8 offices, 2 storage rooms, a conference room and a lobby. Scope of work includes mechanical, electrical and interior finishes.

NOTICE TO BIDDERS

Sealed bids for this work will be received by:

Javier Torres, AIA – University Architect
Western Carolina University
3476 Old Cullowhee Road - Facilities Management Building
828-227-2345

up to **3:00 PM**, on **October 17, 2019** and immediately thereafter publicly opened and read aloud. Complete plans and specification and contract documents can be obtained by visiting Western Carolina University's 'Project Solicitations' webpage found at:

https://www.wcu.edu/discover/campus-services-and-operations/facilities-management/facilities-planning-design-and-construction/project-solicitations.aspx

A non-mandatory project walk-thru is scheduled for **October 1, 2019** at **11am.**

Bidders' questions will be entertained in writing until **5:00 PM** on **October 9, 2019**. Address all questions to University Architect, Javier Torres, AIA at jtorres@wcu.edu. Responses to BID RFI's will be issued by **5:00 PM** on **October 10, 2019**.

Contractors are hereby notified that they must have proper license under the State laws governing their respective trades and that North Carolina General Statute 87 will be observed in receiving and awarding contracts. General Contractors must have general license classification for Building, Specialty and/or Unclassified.

No bid may be withdrawn after the opening of bids for a period of 30 days. The Owner reserves the right to reject any or all bids and waive informalities. Bids shall be made only on the BID/ACEPTANCE form provided herein with all blank spaces for bids properly filled in and all signatures properly executed.

NOTE: The bidder shall include with the bid proposal the form *Identification of Minority Business Participation* identifying the minority business participation it will use on the project and shall include either *Affidavit **A*** or *Affidavit **B*** as applicable. Forms and instructions are included within the Bid/Acceptance Form in the bid documents.

Please note on the envelope – **Bid : Attn**: **Javier Torres, University Architect**

(Project Name)

(Bid Date)

(Contractor)

(License Number)

BID/ACCEPTANCE FORM

for

Western Carolina University – H.F. Robinson Administration Building – 2nd Floor Renovation

SCO ID #: 19-20432-01A
Project ID #: 2016-060

Interior Renovation of existing shell space located in the H.F. Robinson Building on the Western Carolina University, Cullowhee main campus.

We are in receipt of Addendum _____1 _____2 _____3 _____4

The undersigned, as bidder, proposes and agrees if this bid is accepted to contract with the State of North Carolina through Western Carolina University for the furnishing of all materials, equipment, and labor necessary to complete the construction of the work described in these documents in full and complete accordance with plans, specifications, and contract documents, and to the full and entire satisfaction of the State of North Carolina and Western Carolina University for the sum of:

BASE BID: Dollars $

Respectively submitted this _____day of_____20____

_____
(Contractor's Name)

Federal ID#:_____

Witness:_____

_____
(Proprietorship or Partnership)

Attest: *(corporation)*

(***Corporate Seal***)

By:_____

Title:_____
(*Owner, partner, corp. Pres. Or Vice President)*

Address:_____

Email Address:_____

By:_____ License #:_____

Title:_____
(Corporation, Secretary./Ass't Secretary.)

ACCEPTED by the STATE OF NORTH CAROLINA

through the

Total amount of accepted by the owner, included base bid and bid alternates:_____

_____

(Agency/Institution)

BY:_____TITLE:_____

G E N E R A L C O N D I T I O N S

1. GENERAL

It is understood and agreed that by submitting a bid that the Contractor has examined these contract documents, drawings and specifications and has visited the site of the Work, and has satisfied himself relative to the Work to be performed.

2. DEFINITIONS

Owner: "Owner" shall mean, The State of North Carolina through Western Carolina University

Contractor: "Contractor" shall mean the entity that will provide the services for the Owner.

Designer: The **designer(s)** are those referred to within this contract, or their authorized representatives. The Designer(s), as referred to herein, shall mean architect and/or engineer responsible for preparing the project plans and specifications. They will be referred to hereinafter as if each were of the singular number, masculine gender.

Contract Documents: "Contract Documents" shall consist of the Notice to Bidders; General Conditions of the Contract; special conditions if applicable; Supplementary General Conditions; the drawing and specifications, including all bulletins, addenda or other modifications of the drawings and specifications incorporated into the documents prior to their execution; the bid; the contract; the performance bond if applicable; and insurance certificates. All of these items together form the contract.

INTENT AND EXECUTION OF DOCUMENTS

The drawings and specifications are complementary, one to the other. That which is shown on the drawings or called for in the specifications shall be as binding as if it were both called for and shown. The intent of the drawings and specifications is to establish the scope of all labor, materials, transportation, equipment, and any and all other things necessary to provide a complete job. In case of discrepancy or disagreement in the Contract Documents, the order of precedence shall be: Form of Contract, specifications, large-scale detail drawings, small-scale drawings.

In such cases where the nature of the work requires clarification by the Designer/ Owner, the Designer/ Owner shall furnish such clarification. Clarifications and drawings shall be consistent with the intent of the Contract Documents, and shall become a part thereof.

4. AS-BUILT MARKED-UP CONSTRUCTION DOCUMENTS

Contractor shall provide one complete set of legible "as-built" marked-up construction drawings and specifications recording any and all changes made to the original design during the course of construction. In the event no changes occurred, submit construction drawings and specifications set with notation "No Changes." The Designer/Owner must receive "As-built" marked-up construction drawings and specifications before the final pay request can be processed.

5. SUBMITTAL DATA

The Contractor awarded the contract shall submit all specified submittals to the Owner/Designer. A minimum number of copies as specified by the owner, of all required submittal data pertaining to construction, performance and general dimensional criteria of the components listed in the technical specifications shall be submitted. No material or equipment shall be ordered or installed prior to written approval of the submittals by the Designer/Owner. Failure to provide submittal data for review on equipment listed in the technical specifications will result in removal of equipment by the Contractor at his expense if the equipment is not in compliance with the specifications.

6. SUBSTITUTIONS

In accordance with the provisions of G.S. 133-3, material, product, or equipment substitutions proposed by the bidders to those specified herein can only be considered during the bidding phase until five (5) days prior to the receipt of bids or by the date specified in the pre bid conference, when submitted to the Designer with sufficient data to confirm material, product, or equipment equality. Proposed substitutions submitted after this time will be considered only as potential change order.

Submittals for proposed substitutions shall include the following information:

a. Name, address, and telephone number of manufacturer and supplier as appropriate.

b. Trade name, model or catalog designation.

c. Product data including performance and test data, reference standards, and technical descriptions of material, product, or equipment. Include color samples and samples of available finishes as appropriate.

d. Detailed comparison with specified products including performance capabilities, warranties, and test results.

e. Other pertinent data including data requested by the Designer to confirm product equality.

If a proposed material, product, or equipment substitution is deemed equal by the Designer to those specified, all bidders of record will be notified by Addendum**.**

7. WORKING DRAWINGS AND SPECIFICATIONS AT THE JOB SITE

The contractor shall maintain, in readable condition at his job site one complete set of working drawings and specifications for his work including all shop drawings. Such drawings and specifications shall be available for use by the owner, designer or his authorized representative.

The contractor shall maintain at the job site, a day-to-day record of work-in-place that is at variance with the contract documents. Such variations shall be fully noted on project drawings by the contractor and submitted to the designer upon project completion and no later than 30 days after acceptance of the project.

8. MATERIALS, EQUIPMENT, EMPLOYEES

a. The contractor shall, unless otherwise specified, supply and pay for all labor, transportation, materials, tools, apparatus, lights, power, fuel, heat, sanitary facilities, water, scaffolding and incidentals necessary for the completion of his work, and shall install, maintain and remove all equipment of the construction, other utensils or things, and be responsible for the safe, proper and lawful construction, maintenance and use of same, and shall construct in the best and most workmanlike manner, a complete job and everything incidental thereto, as shown on the plans, stated in the specifications, or reasonably implied therefrom, all in accordance with the contract documents.

b. All materials shall be new and of quality specified, except where reclaimed material is authorized herein and approved for use. Workmanship shall at all times be of a grade accepted as the best practice of the particular trade involved, and as stipulated in written standards of recognized organizations or institutes of the respective trades except as exceeded or qualified by the specifications.

c. Upon notice, the contractor shall furnish evidence as to quality of materials.

d. Products are generally specified by ASTM or other reference standard and/or by manufacturer's name and model number or trade name. When specified only by reference standard, the Contractor may select any product meeting this standard, by any manufacturer. When several products or manufacturers are specified as being equally acceptable, the Contractor has the option of using any product and manufacturer combination listed. However, the contractor shall be aware that the cited examples are used only to denote the quality standard of product desired and that they do not restrict bidders to a specific brand, make, manufacturer or specific name; that they are used only to set forth and convey to bidders the general style, type, character and quality of product desired; and that

equivalent products will be acceptable. Request for substitution of materials, items, or equipment shall be submitted to the designer for approval or disapproval; the designer prior to the opening of bids shall make such approval or disapproval. Alternate materials may be requested after the award if it can clearly be demonstrated that it is an added benefit to the owner and the designer and owner approves.

e. The designer is the judge of equality for proposed substitution of products, materials or equipment.

f. If at any time during the construction and completion of the work covered by these contract documents, the language, conduct, or attire of any workman of the various crafts be adjudged a nuisance to the owner or designer, or if any workman be considered detrimental to the work, the contractor shall order such parties removed immediately from grounds.

g. The Contractor shall cooperate with the designer and the owner in coordinating construction activities.

h. The Contractor shall maintain qualified personnel and effective supervision at the site at all times during the project, and exercise the appropriate quality control program to ensure compliance with the project drawings and specifications. The designer is responsible for determining compliance with the drawings and specifications.

9. CODES, PERMITS AND INSPECTIONS

The Contractor shall obtain the required permits, if required, give all notices, and comply with all laws, ordinances, codes, rules and regulations bearing on the conduct of the work under this contract. If the Contractor observes that the drawings and specifications are at variance therewith, he shall promptly notify the Designer in writing. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, codes, rules and regulations, and without such notice to the Owner, he shall bear all cost arising there from.

All work under this contract shall conform to the current North Carolina Building Code and other state and national codes as are applicable.

Projects constructed by the State of North Carolina or by any agency or institution of the State are not subject to county or municipal building codes and may* not be subject to inspection by county or municipal authorities. Where appropriate, the Contractor shall, cooperate with the county or municipal authorities by obtaining building permits. The contractor at no cost may obtain permits to the owner.

All fire alarm work shall be in accordance with the latest State Construction Office (SCO) *Guidelines for Fire Alarm Installation* (NFPA72). Where the contract documents are in conflict with the SCO guidelines, the SCO guidelines shall govern. The Contractor shall be responsible for all the costs for the correction of the work where he installs it in conflict with the latest edition of the SCO *Guidelines for Fire Alarm Installation*.

*****Inspection and certification of compliance by local authorities is necessary if an architect or engineer was not employed on the project, or if the plans and specifications were not approved and the construction inspected by the State Construction Office.

10. PROTECTION OF WORK, PROPERTY, THE PUBLIC AND SAFETY

a. The contractors shall be jointly responsible for the entire site and the building or construction of the same and provide all the necessary protections, as required by the owner or designer, and by laws or ordinances governing such conditions. They shall be responsible for any damage to the owner's property or of that of others on the job, by them, their personnel, or their subcontractors, and shall make good such damages. They shall be responsible for and pay for any damages caused to the owner. All contractors shall have access to the project at all times, except as indicated in the Supplemental General Conditions.

b. The contractor shall provide cover and protect all portions of the structure when the work is not in progress, provide and set all temporary roofs, covers for doorways, sash and windows, and all other materials necessary to protect all the work on the building, whether set by him, or any of the

subcontractors. Any work damaged through the lack of proper protection or from any other cause, shall be repaired or replaced without extra cost to the owner.

c. No fires of any kind will be allowed inside or around the operations during the course of construction without special permission from the designer and owner.

d. The contractor shall protect all trees and shrubs designated to remain in the vicinity of the operations by building substantial boxes around it. He shall barricade all walks, roads, etc., as directed by the designer to keep the public away from the construction. All trenches, excavations or other hazards in the vicinity of the work shall be well barricaded and properly lighted at night.

e. The contractor shall provide all necessary safety measures for the protection of all persons on the job, including the requirements of the A.G.C. *Accident Prevention Manual in Construction*, as amended, and shall fully comply with all state laws or regulations and North Carolina State Building Code requirements to prevent accident or injury to persons on or about the location of the work. He shall clearly mark or post signs warning of hazards existing, and shall barricade excavations, elevator shafts, stairwells and similar hazards. He shall protect against damage or injury resulting from falling materials and he shall maintain all protective devices and signs throughout the progress of the work.

f. The contractor shall adhere to the rules, regulations and interpretations of the North Carolina Department of Labor relating to Occupational Safety and Health Standards for the Construction Industry (Title 29, Code of Federal Regulations, Part 1926, published in Volume 39, Number 122, Part II, June 24, 1974, *Federal Register*), and revisions thereto as adopted by General Statutes of North Carolina 95-126 through 155.

i. In the event of emergency affecting the safety of life, the protection of work, or the safety of adjoining properties, the contractor is hereby authorized to act at his own discretion, without further authorization from anyone, to prevent such threatened injury or damage. Any compensation claimed by the contractor on account of such action shall be determined as provided for under Article 13(b).

j. Any and all costs associated with correcting damage caused to adjacent properties of the construction site or staging area shall be borne by the contractor. These costs shall include but not be limited to flooding, mud, sand, stone, debris, and discharging of waste products.

11. SUBCONTRACTS AND SUBCONTRACTORS

The Contractor is and remains fully responsible for his own acts or omissions as well as those of any subcontractor or of any employee of either. The Contractor agrees that no contractual relationship exists between the subcontractor and the Owner in regard to the contract, and that the subcontractor acts on this work as an agent or employee of the Contractor.

12. CONTRACTOR-SUBCONTRACTOR RELATIONSHIPS

The Contractor agrees that the terms of these Contract Documents shall apply equally to each Subcontractor as to the Contractor, and the Contractor agrees to take such action as may be necessary to bind each Subcontractor to these terms. The Contractor further agrees to conform to the Code of Ethical Conduct as adopted by the Associated General Contractors of America, Inc., with respect to Contractor-Subcontractor relationships. The Owner reserves the right to limit the amount of portions of work to be subcontracted as hereinafter specified.

13. CHANGES IN THE WORK AND CLAMS FOR EXTRA COST

a. The owner may have changes made in the work covered by the contract. These changes will not invalidate and will not relieve or release the contractor from any guarantee given by him pertinent to the contract provisions. These changes will not affect the validity of the guarantee bond and will not relieve the surety or sureties of said bond. All extra work shall be executed under conditions of the original contract.

b. Except in an emergency endangering life or property, no change shall be made by the contractor except upon receipt of approved change order from the designer, countersigned by the owner authorizing such change. No claim for adjustments of the contract price shall be valid unless this

procedure is followed. Should a claim for extra compensation by the contractor be denied by the designer or the owner, the contractor may pursue his claim in accordance with G.S. 143-135.3.

In the event of emergency endangering life or property, the contractor may be directed to proceed on a time and material basis whereupon the contractor shall proceed and keep accurately on such form as specified by the designer or owner, a correct account of costs together with all proper invoices, payrolls and supporting data. Upon completion of the work the change order will be prepared as outlined under either Method "c(1)" or Method "c(2)" or both.

c. In determining the values of changes, either additive or deductive, contractors are restricted to the use of the following methods:

1. Where the extra work involved is covered by unit prices quoted in the proposal, or subsequently agreed to by the Contractor, Designer, Owner and State Construction Office the value of the change shall be computed by application of unit prices based on quantities, estimated or actual as agreed of the items involved, except is such cases where a quantity exceeds the estimated quantity allowance in the contract by one hundred percent (100%) or more. In such cases, either party may elect to proceed under subparagraph c (2) herein. If neither party elects to proceed under c (2), then unit prices shall apply.

2. The contracting parties shall negotiate and agree upon the equitable value of the change prior to issuance of the change order, and the change order shall stipulate the corresponding lump sum adjustment to the contract price.

d. Under Paragraph “b” and Methods "c(2)" above, the allowances for overhead and profit combined shall be as follows: all contractors (the single contracting entity (prime), his subcontractors(1st tier subs), or their sub-subcontractors (2nd tier subs, 3rd tier subs, etc.) shall be allowed a maximum of 10% on work they each self-perform; the prime contractor shall be allowed a maximum of 5% on contracted work of his 1st tier sub; 1st tier, 2nd tier, 3rd tier, etc. contractors shall be allowed a maximum of 2.5% on the contracted work of their subs. ; Under Method "c(1)", no additional allowances shall be made for overhead and profit. In the case of deductible change orders, under Method "c(2)" and Paragraph (b) above, the contractor shall include no less than five percent (5%) profit, but no allowances for overhead.

e. The term "net cost" as used herein shall mean the difference between all proper cost additions and deductions. The "cost" as used herein shall be limited to the following:

1. The actual costs of materials and supplies incorporated or consumed as part of the work;

2. The actual costs of labor expended on the project site; labor expended in coordination, change order negotiation, record document maintenance, shop drawing revision or other tasks necessary to the administration of the project are considered overhead whether they take place in an office or on the project site.

3. The actual costs of labor burden, limited to the costs of social security (FICA) and Medicare/Medicaid taxes; unemployment insurance costs; health/dental/vision insurance premiums; paid employee leave for holidays, vacation, sick leave, and/or petty leave, not to exceed a total of 30 days per year; retirement contributions; worker’s compensation insurance premiums; and the costs of general liability insurance when premiums are computed based on payroll amounts; the total of which shall not exceed thirty percent (30%) of the actual costs of labor;

4. The actual costs of rental for tools, excluding hand tools; equipment; machinery; and temporary facilities required for the work;

5. The actual costs of premiums for bonds, insurance, permit fees and sales or use taxes related to the work.

Overtime and extra pay for holidays and weekends may be a cost item only to the extent approved by the owner.

f. Should concealed conditions be encountered in the performance of the work below grade, or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the contract documents, the contract sum and time for completion may be equitably adjusted by change order upon claim by either party made within thirty (30) days after the condition has been identified. The cost of such change shall be arrived at by one of the foregoing methods. All change orders shall be supported by a unit cost breakdown showing method of arriving at net cost as defined above.

g. Change orders shall be submitted by the contractor in writing to the owner/designer for review and approval. The contractor will provide such proposal and supporting data in suitable format. The designer shall verify correctness. Delay in the processing of the change order due to lack of proper submittal by the contractor of all required supporting data shall not constitute grounds for a time extension or basis of a claim. Within fourteen (14) days after receipt of the contractor's accepted proposal including all supporting documentation required by the designer, the designer shall prepare the change order and forward to the contractor for his signature or otherwise respond, in writing, to the contractor's proposal. Within seven (7) days after receipt of the change order executed by the contractor, the designer shall, certify the change order by his signature, and forward the change order and all supporting data to the owner for the owner's signature. The owner shall execute the change order, within seven (7) days of receipt.

At the time of signing a change order, the contractor shall be required to certify as follows:

"I certify that my bonding company will be notified forthwith that my contract has been changed by the amount of this change order, and that a copy of the approved change order will be mailed upon receipt by me to my surety."

h. A change order, when issued, shall be full compensation, or credit, for the work included, omitted or substituted. It shall show on its face the adjustment in time for completion of the project as a result of the change in the work.

i. If, during the progress of the work, the owner requests a change order and the contractor's terms are unacceptable, the owner, may require the contractor to perform such work on a time and material basis whereupon the contractor shall proceed and keep accurately on such form as specified by the Designer or owner, a correct account of cost together with all proper invoices, payrolls and supporting data. Upon completion of the work a change order will be prepared with allowances for overhead and profit per paragraph d. above and "net cost" and "cost" per paragraph e. above. Without prejudice, nothing in this paragraph shall preclude the owner from performing or to have performed that portion of the work requested in the change order.

14. ANNULMENT OF CONTRACT

If the contractor fails to begin the work under the contract within the time specified, or the progress of the work is not maintained on schedule, or the work is not completed within the time specified, or fails to perform the work with sufficient workmen and equipment or with sufficient materials to ensure the prompt completion of said work, or shall perform the work unsuitably or shall discontinue the prosecution of the work, or if the contractor shall become insolvent or be declared bankrupt or commit any act of bankruptcy or insolvency, or allow any final judgment to stand against him unsatisfied for a period of forty-eight (48) hours, or shall make an assignment for the benefit of creditors, or for any other cause whatsoever shall not carry on the work in an acceptable manner, the owner may give notice in writing, sent by certified mail, return receipt requested, to the contractor and his surety (if applicable) of such delay, neglect or default, specifying the same, and if the contractor within a period of seven (7) days after such notice shall not proceed in accordance therewith, then the owner shall, declare this contract in default, and, thereupon, the surety shall promptly take over the work and complete the performance of this contract in the manner and within the time frame specified. In the event the contractor, or the surety (if applicable) shall fail to take over the work to be done under this contract within seven (7) days after being so notified and notify the owner in writing, sent by certified mail, return receipt requested, that he is taking the same over and stating that he will diligently pursue and complete the same, the owner shall have full power and authority, without violating the contract, to take the prosecution of the work out of the hands of said contractor, to appropriate or use any or all contract materials and equipment on the grounds as may be suitable and acceptable and may enter into an agreement, either by public letting or negotiation, for the completion of said contract according to the terms and provisions thereof or use such other methods as in his opinion shall be required for the completion of said contract

in an acceptable manner. All costs and charges incurred by the owner, together with the costs of completing the work under contract, shall be deducted from any monies due or which may become due said contractor and surety (if applicable). In case the expense so incurred by the owner shall be less than the sum which would have been payable under the contract, if it had been completed by said contractor, then the said contractor and surety (if applicable) shall be entitled to receive the difference, but in case such expense shall exceed the sum which would have been payable under the contract, then the contractor and the surety (if applicable) shall be liable and shall pay to the owner the amount of said excess.

15. TERMINATION FOR CONVENIENCE

a. Owner may at any time and for any reason terminate Contractor's services and work at Owner's convenience, after notification to the contractor in writing via certified mail. Upon receipt of such notice, Contractor shall, unless the notice directs otherwise, immediately discontinue the work and placing of orders for materials, facilities and supplies in connection with the performance of this Agreement.

b. Upon such termination, Contractor shall be entitled to payment only as follows: (1) the actual cost of the work completed in conformity with this Agreement; plus, (2) such other costs actually incurred by Contractor as approved by Owner; (3) plus ten percent (10%) of the cost of the balance of the work to be completed for overhead and profit. There shall be deducted from such sums as provided in this subparagraph the amount of any payments made to Contractor prior to the date of the termination of this Agreement. Contractor shall not be entitled to any claim or claim of lien against Owner for any additional compensation or damages in the event of such termination and payment.

16. OWNER'S RIGHT TO DO WORK

If, during the progress of the work or during the period of guarantee, the contractor fails to prosecute the work properly or to perform any provision of the contract, the owner, after seven (7) days' written notice sent by certified mail, return receipt requested, to the contractor from the designer, may perform or have performed that portion of the work. The cost of the work may be deducted from any amounts due or to become due to the contractor, such action and cost of same having been first approved by the designer. Should the cost of such action of the owner exceed the amount due or to become due the contractor, then the contractor or his surety, or both, shall be liable for and shall pay to the owner the amount of said excess.

17. REQUESTS FOR PAYMENT

Contractor shall refer to the Supplemental General Conditions for specific directions on payment schedule, procedures and the name and address where to send applications for payments for this project. It is imperative that invoices be sent only to the above address in order to assure proper and timely delivery and handling.

The Designer/Owner will process all Contractor pay requests as the project progresses. The Contractor shall receive payment within thirty (30) consecutive days after Designer/Owner's approval of each pay request. Payment will only be made for work performed as determined by the Designer/Owner.

Retainage:

a. Retainage withheld will not exceed 5% at any time.
b. The same terms apply to general contractor and subcontractors alike.
c. Following 50% completion of the project no further retainage will be withheld if the contractor/subcontractor has performed their work satisfactorily.
d. Exceptions:
    1. Owner/Contractor can reinstate retainage if the contractor/subcontractor does not continue to perform satisfactorily.
    2. Following 50% completion of the project, the owner is authorized to withhold additional retainage from a subsequent periodic payment if the amount of retainage withheld falls below 2.5%.

Final payment will be made within forty-five (45) consecutive days after acceptance of the work, receipt of marked-up “as-built” drawings and specifications and the submission both of notarized Contractor's affidavit and final pay request. All pay requests shall be submitted to the Designer/Owner for approval.

THE CONTRACTOR'S FINAL PAYMENT AFFIDAVIT SHALL STATE: "THIS IS TO CERTIFY THAT ALL COSTS OF MATERIALS, EQUIPMENT, LABOR, SUBCONTRACTED WORK, AND ALL ELSE ENTERING INTO THE ACCOMPLISHMENT OF THIS CONTRACT, INCLUDING PAYROLLS, HAVE BEEN PAID IN FULL."

18. PAYMENTS WITHHELD

The designer with the approval of the Owner may withhold payment for the following reasons:

a. Faulty work not corrected.

b. The unpaid balance on the contract is insufficient to complete the work in the judgment of the designer.

c. To provide for sufficient contract balance to cover liquidated damages that will be assessed.

d. The secretary of the Department of Administration may authorize the withholding of payment for the following reasons:

i. Claims filed against the contractor or evidence that a claim will be filed.

ii. Evidence that subcontractors have not been paid.

When grounds for withholding payments have been removed, payment will be released. Delay of payment due the contractor without cause will make owner liable for payment of interest to the contractor as provided in G.S. 143-134.**1.** As provided in G.S. 143-134.1(e), the owner shall not be liable for interest on payments withheld by the owner for unsatisfactory job progress, defective construction not remedied, disputed work, or third-party claims filed against the owner or reasonable evidence that a third-party claim will be filed.

19. MINIMUM INSURANCE REQUIREMENTS

The work under this contract shall not commence until the contractor has obtained all required insurance and verifying certificates of insurance have been approved in writing by the owner. These certificates shall document that coverages afforded under the policies will not be cancelled, reduced in amount or coverages eliminated until at least thirty (30) days after mailing written notice, by certified mail, return receipt requested, to the insured and the owner of such alteration or cancellation. If endorsements are needed to comply with the notification or other requirements of this article copies of the endorsements shall be submitted with the certificates.

a. **Worker’s Compensation and Employer's Liability**

The contractor shall provide and maintain, until final acceptance, workmen's compensation insurance, as required by law, as well as employer's liability coverage with minimum limits of $100,000.

b. **Public Liability and Property Damage**

The contractor shall provide and maintain, until final acceptance, comprehensive general liability insurance, including coverage for premises operations, independent contractors, completed operations, products and contractual exposures, as shall protect such contractors from claims arising out of any bodily injury, including accidental death, as well as from claims for property damages which may arise from operations under this contract, whether such operations be by the contractor or by any subcontractor, or by anyone directly or indirectly employed by either of them and the minimum limits of such insurance shall be as follows:

Bodily Injury: $500,000 per occurrence

Property Damage: $100,000 per occurrence / $300,000 aggregate

In lieu of limits listed above, a $500,000 combined single limit shall satisfy both conditions.

Such coverage for completed operations must be maintained for at least two (2) years following final acceptance of the work performed under the contract.

c. **Property Insurance (Builder's Risk/Installation Floater)**

The contractor shall purchase and maintain property insurance until final acceptance, upon the entire work at the site to the full insurable value thereof. This insurance shall include the interests of the owner, the contractor, the subcontractors and sub-subcontractors in the work and shall insure against the perils of fire, wind, rain, flood, extended coverage, and vandalism and malicious mischief. If the owner is damaged by failure of the contractor to purchase or maintain such insurance, then the contractor shall bear all reasonable costs properly attributable thereto; the contractor shall effect and maintain similar property insurance on portions of the work stored off the site when request for payment per articles so includes such portions.

d. **Deductible**

Any deductible, if applicable to loss covered by insurance provided, is to be borne by the contractor.

e. **Other Insurance**

The contractor shall obtain such additional insurance as may be required by the owner or by the General Statutes of North Carolina including motor vehicle insurance, in amounts not less than the statutory limits.

f. **Proof of Carriage**

The contractor shall furnish the owner with satisfactory proof of carriage of the insurance required before written approval is granted by the owner.

20. ASSIGNMENT

No assignment of the Contractor's obligations or the Contractor's right to receive payment hereunder shall be permitted. However, upon written request approved by the Owner and solely as a convenience to the Contractor, the Owner may: (1) forward the Contractor's payment check directly to any person or entity designated by the Contractor, and (2) include any person or entity designated by Contractor as a joint payee on the Contractor's payment check. In no event shall such approval and action obligate the Owner to anyone other than the Contractor, and the Contractor shall remain responsible for fulfillment of all contract obligations.

21. CLEANING UP AND RESTORATION OF SITE

The Contractor shall keep the sites and surrounding area reasonably free from rubbish at all times and shall remove debris from the site from time to time or when directed to do so by the Owner. Before final inspection and acceptance of the project, the Contractor shall thoroughly clean the sites, and completely prepare the project and site for use by the Owner.

At the end of construction, the contractor shall oversee and implement the restoration of the construction site to its original state. Restoration includes but not limited to walks, drives, lawns, trees and shrubs, corridors, stairs and other elements shall be repaired, cleaned or otherwise restored to their original state.

22. GUARANTEE

The contractor shall unconditionally guarantee materials and workmanship against patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve (12) months following the final acceptance of the work and shall replace such defective materials or workmanship without cost to the owner.

Where items of equipment or material carry a manufacturer's warranty for any period in excess of twelve (12) months, then the manufacturer's warranty shall apply for that particular piece of equipment or material. The contractor shall replace such defective equipment or materials, without cost to the owner, within the manufacturer's warranty period.

Additionally, the owner may bring an action for latent defects caused by the negligence of the contractor, which is hidden or not readily apparent to the owner at the time of beneficial occupancy or final acceptance, whichever occurred first, in accordance with applicable law.

Guarantees for roofing workmanship and materials shall be stipulated in the specifications sections governing such roof, equipment, materials, or supplies.

23. STANDARDS

All manufactured items and/or fabricated assemblies subject to operation under pressure, operation by connection to an electric source, or operation involving a connection to a manufactured, natural, or LP gas source shall be constructed and approved in a manner acceptable to the appropriate State inspector which customarily requires the label or re-examination listing or identification marking of appropriate safety standard organization, such as the American Society of Mechanical Engineers for pressure vessels; the Underwriters Laboratories and/or National Electrical Manufacturers Association for electrically operated assemblies; or the American Gas Association for gas operated assemblies, where such approvals of listings have been established for the type of device offered and furnished. Further, all items furnished shall meet all requirements of the Occupational Safety and Health Act (OSHA), and State and federal requirements relating to clean air and water pollution.

All equipment and products must be independent third party tested and labeled (UL, FM, or CTS) before final connections to Owner services or utilities.

24. TAXES

a. Federal excise taxes do not apply to materials entering into state work (Internal Revenue Code, Section 3442(3)).

b. Federal transportation taxes do not apply to materials entering into state work (Internal Revenue Code, Section 3475(b) as amended).

c. North Carolina sales tax and use tax, as required by law, do apply to materials entering into state work and such costs shall be included in the bid proposal and contract sum.

d. Local option sales and use taxes, as required by law, do apply to materials entering into state work as applicable and such costs shall be included in the bid proposal and contract sum.

e. **Accounting Procedures for Refund of County Sales & Use Tax**

Amount of county sales and use tax paid per contractor's statements:

Contractors performing contracts for state agencies shall give the state agency for whose project the property was purchased a signed statement containing the information listed in G.S. 105-164.14(e).

The Department of Revenue has agreed that in lieu of obtaining copies of sales receipts from contractors, an agency may obtain a certified statement as of April 1, 1991 from the contractor setting forth the date, the type of property and the cost of the property purchased from each vendor, the county in which the vendor made the sale and the amount of local sales and use taxes paid thereon. If the property was purchased out-of-state, the county in which the property was delivered should be listed. The contractor should also be notified that the certified statement may be subject to audit.

In the event the contractors make several purchases from the same vendor, such certified statement must indicate the invoice numbers, the inclusive dates of the invoices, the total amount of the invoices, the counties, and the county sales and use taxes paid thereon.

Name of taxing county: The position of a sale is the retailer's place of business located within a taxing county where the vendor becomes contractually obligated to make the sale. Therefore, it is important that the county tax be reported for the county of sale rather than the county of use.

When property is purchased from out-of-state vendors and the county tax is charged, the county should be identified where delivery is made when reporting the county tax.

Such statement must also include the cost of any tangible personal property withdrawn from the contractor's warehouse stock and the amount of county sales or use tax paid thereon by the contractor.

Similar certified statements by his subcontractors must be obtained by the general contractor and furnished to the claimant.

Contractors are not to include any tax paid on supplies, tools and equipment which they use to perform their contracts and should include only those building materials, supplies, fixtures and equipment which actually become a part of or annexed to the building or structure.

25. EQUAL OPPORTUNITY CLAUSE

The non-discrimination clause contained in Section 202 (Federal) Executive Order 11246, as amended by Executive Order 11375, relative to equal employment opportunity for all persons without regard to race, color, religion, sex or national origin, and the implementing rules and regulations prescribed by the secretary of Labor, are incorporated herein.

The contractor(s) agree not to discriminate against any employee or applicant for employment because of physical or mental disabilities in regard to any position for which the employee or applicant is qualified. The contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified individuals with such disabilities without discrimination based upon their physical or mental disability in all employment practices.

26. MINORITY BUSINESS PARTICIPATION

GS 143-128.2 establishes a ten percent (10%) goal for participation by minority business in total value of work for each State building project.

For construction contracts with a value of less than $300,000, the Owner has the responsibility to make a good faith effort to solicit minority bids and to attain the goal. The contractor shall include with his bid a completed Identification of HUB Certified/Minority Business Participation form. Contractor shall submit completed Appendix E MBE Documentation for Contract Payments form with final payment request.

For construction contracts with a value of $300,000 or greater, the contractor shall comply with the document *Guidelines for* Recruitment and Selection of Minority Businesses for Participation in State Construction Contracts including Identification of Minority Business Participation, Affidavits A, B, C, and D, and Appendix E. These forms provided herein are hereby incorporated and made a part of this contract.

27. ACCESS TO PERSONS AND RECORDS

The State Auditor shall have access to persons and records as a result of all contracts or grants entered into by the Owner in accordance with General Statute 147-64.7. The Owner's internal auditors shall also have the right to access and copy the Contractor's records relating to the Contract and Project during the term of the Contract and within two years following the completion of the Project/close-out of the Contract to verify accounts, accuracy, information, calculations and/or data affecting and/or relating to Contractor's requests for payment, requests for change orders, change orders, claims for extra work, requests for time extensions and related claims for delay/extended general conditions costs, claims for lost productivity, claims for lost efficiency, claims for idle equipment or labor, claims for price/cost escalation, pass-through claims of subcontractors and/or suppliers, and/or any other type of claim for payment or damages from Owner and/or its project representatives.

28. GOVERNING LAWS

This contract is made under and shall be governed by and construed in accordance with the laws of the State of North Carolina. The Contractor shall comply with all applicable federal, State and local laws, statutes, ordinances and regulations including, but not limited to, the Omnibus Transportation Act of 1991 and its implementing regulations.

29. CONTRACTOR EVALUATION

The contractor's overall work performance on the project shall be fairly evaluated in accordance with the State Building Commission policy and procedures, for determining qualifications to bid on future State projects. In addition to final evaluation, an interim evaluation may be prepared during the progress of project. The owner may request the contractor's comments to evaluate the designer.

SECTION 00 73 00 – SUPPLEMENTARY GENERAL CONDITIONS

PART 1 GENERAL

1.01 SUMMARY

A. The following Supplementary General Conditions of the Contract augment the State Construction Office, North Carolina Department of Administration Informal Contract "General Conditions".

B. Where any article of the General Conditions is modified or any Paragraph, Subparagraph or Clause thereof is modified or deleted by these supplementary general conditions, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect.

C. Unless otherwise stated, the terms used in these Supplementary Conditions which are defined in the General Conditions have the meanings assigned to them in the General Conditions.

1.02 ARTICLE 5 - SUBMITTAL DATA

A. ADD the following paragraph to Article 5:

a. The GC shall submit with initial approval of the design documents for compliance and accuracy, electronic copies in PDF format of all shop drawings and submittals. Physical samples shall be submitted for color and workmanship (mock-up) approval. All Shop Drawings, Samples and Submittals for approval shall be completed within thirty (15) days after award of the sub-contract agreement between the GC and the specialty subcontractor.

B. ADD the following paragraph to Article 5:

b. The GC shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions or modifications including those requested by the Designer on previous submittals. In the absence of such written notice, the Designer's approval of a resubmission shall not apply to such revisions.

1.03 ARTICLE 7 - WORKING DRAWINGS AND SPECIFICATIONS AT THE JOB SITE

A. MODIFY the second paragraph of Article 7 to read:

The contractor shall maintain at the job office, a day-to-day record of work-in-place that is at variance with the contract documents. Such variations shall be fully noted on project drawings by the contractor and submitted to the Designer **and Owner**

upon request and at project completion and no later than 30 days after final acceptance of the project.

B. ADD the following paragraph to Article 7:

The GC shall submit to the Designer/Owner a copy of the daily field reports by its field supervision listing but not limited to personnel on site (including all subcontractors); weather conditions; major scopes of work under construction; material deliveries; safety incidents; progress photographs, and inspections.

1.04 ARTICLE 8 - MATERIALS, EQUIPMENT, EMPLOYEES

A. ADD the following paragraphs to Article 8:

i. The GC shall provide the Owner a complete list of addresses and emergency telephone numbers for the GC, his key personnel, and all subcontractors. This list shall be provided to the Owner prior to beginning the Work and shall be updated regularly with the updated provided to the Owner.

j. The GC acknowledges and agrees that, to the best of its knowledge, neither GC nor its employees, representatives or sub-contractors has at any time (1) been charged with personal or professional misconduct; (2) been convicted of any crime (other than traffic fines); (3) been required to register as a sex offender under Title I of the Sex Offender Registration and Notification Act of 2006 (SORNA). GC shall notify Owner immediately should any of the above conditions come into being.

k. The GC and subcontractors at its cost, agrees to perform criminal background checks, using services through companies such as 123nc.com, and screen all its employees, Consultants, and representatives prior to assigning them to perform any Service at Western Carolina University. Such background checks will be made available to Western Carolina University upon request.

l. The GC and subcontractors shall verify the work authorization of all employees that work on Western Carolina University property through E-Verify. Such authorization will be made available to Western Carolina University upon request.

m. Should an accident or disruption occur on the project work site, the GC shall notify Western Carolina University Safety Officer immediately.

n. The GC and each of its subcontractors shall be responsible for security to his/their equipment and the site-stored materials under his/their jurisdiction whether paid for by the Owner or not, until acceptance of the Project.

1.05 ARTICLE 9 – CODES, PERMITS AND INSPECTIONS

A. ADD the following paragraph to Article 9:

k. Minimum of (72) hours prior to any interruption in any minor utility or other services, and minimum 7 days for any interruption of major utility or service, the GC shall request and obtain permission from the Owner for such interruption. Failure of the GC to obtain Owner permission shall not be grounds for an extension of time.

l. Prior to performing any "hot work" or any work above ceiling in existing buildings, the GC shall obtain a permit for such from the Owner's Facilities Management Department.

m. The GC shall comply with Owner's Interim Life Safety Plan requirements to maintain egress from all occupied buildings.

n. Upon completion of the Work, the Contractor shall deliver to the Owner original copies of all required certificates of inspection.

1.06 ARTICLE 17 – REQUESTS FOR PAYMENT

A. ADD the following to the first paragraph, Article 17:

Contractor shall submit requests for payment to Designer/Owner monthly based on approved Schedule of Values.

B. ADD the following paragraph to the end of Article 17:

The application for payments shall be submitted on AIA Documents G702 and G702A. The GC shall include on each monthly Application for Payment, AIA Documents G702 and G702A, the following statement:

"We certify that the Surety for this Project has been duly notified of the amount of this request."

Unless exception to pay is made by the Surety to the Architect within four (4) calendar days following the date of request, it will be assumed that the Surety concurs in the payment of this application.

1.07 ARTICLE 19 MINIMUM INSURANCE REQUIREMENTS

A. MODIFY ARTICLE 19, Section 'a' under "Worker's Compensation and Employer's Liability" header to read:

a. The contractor shall provide and maintain, until final acceptance, workmen's compensation insurance, as required by law, as well as employer's liability coverage **for claims and all perils for errors, omissions, and damages of any kind or character which may arise out of or result from GC's**

performance under this Agreement with minimum limits of $100,000 **per occurrence.**

B. ADD the following paragraphs to ARTICLE 19:

g. Automobile Liability insurance (the "Auto Insurance") for claims and all perils for errors, omissions, and damages of any kind or character which may arise out of or result from GC's performance under this Agreement. The Auto Insurance shall cover owned, non-owned, and hired vehicles. The Auto Insurance shall be written in the amount of no less than $500,0000 Combined Single Limit (property and bodily injury) per occurrence.

h. Provide insurance certificate(s) to this office with language appropriately inserted in the insurance certificate block provided for Special Provisions, as follows:

1. "Not-withstanding the preprinted cancellation provisions on this form, coverages afforded under the policies will not be cancelled, reduced in amount nor will any coverages be eliminated until at least thirty (30) days after mailing written notice, by certified mail, return receipt requested, to the insured and the owner, of such alteration or cancellation."

1.08 ARTICLE 21 – CLEANING UP AND RESTORATION OF SITE

A. ADD the following paragraph to Article 21:

GC shall comply with Owner's requirements for Interim Life Safety Plan requirements.

1.09 ARTICLE 22 – GUARANTEE

A. ADD the following paragraph to Article 22:

Individual specifications requirements shall have warranties start at the date of Final Acceptance.

1.10 **ARTICLE 30 - TIME OF COMPLETION, DELAYS, EXTENSIONS OF TIME**

A. ADD Article 30 with the heading 'TIME OF COMPLETION, DELAYS, EXTENSIONS OF TIME' and the following language:

a. The GC shall commence work to be performed under this agreement on a date to be specified in a written order from the Designer and shall fully complete all work within Ninety (90) consecutive calendar days from, and

including said date. For each day in excess of the above number of days, the Contractor shall pay to the Owner the sum of $200 (Two-hundred Dollars and 00/100) per day as liquidated damages reasonably estimated in advance to cover the losses to be incurred by the Owner by reason of failure of said GC to complete the work within the time specified, such time being in the essence of this contract and a material consideration thereof.

b. The GC agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate or progress as will insure full completion thereof within the time specified.

c. If the Contractor is delayed at any time in the progress of his work by any act or negligence of the Owner, his employees or his separate contractor, by changes ordered in the work; by abnormal weather conditions; by any causes beyond the Contractor's control or by other causes deemed justifiable by Owner, then the contract time may be reasonably extended in a written order from the Owner upon written request from the contractor within ten days following the cause for delay.

d. Time extensions for weather delays, acts of God, labor disputes, fire, delays in transportation, unavoidable casualties or other delays which are beyond the control of the Owner do not entitle the Contractor to compensable damages for delays.

e. Any contractor claim for compensable damages for delays is limited to delays caused solely by the owner or its agents.

1.11 **ARTICLE 31 - CONSTRUCTION SUPERVISION AND SCHEDULE**

A. ADD Article 31 with the heading 'CONSTRUCTION SUPERVISION AND SCHEDULE' and the following language:

a. Bar Chart (Gantt) schedule shall indicate early start; early finish; late start; late finish; and float for each listed task.

b. Promptly following Contract Award, the Contractor shall hold a meeting for the purpose of establishing and preparing Contractor's construction schedule for the Work. Each major subcontractor shall be represented. The Contractor's construction schedule shall be in a detailed format satisfactory to the Owner and the Architect. If not accepted, the construction schedule shall be promptly revised by the Contractor in accordance with the recommendations of the Owner and the Architect and re-submitted for acceptance. The Contractor' construction schedule shall be sufficiently detailed to permit proper and complete coordination

of all trades in each portion of the Work. Therefore, the Contractor's construction schedule shall specifically indicate the following dates:

1. **Dates scheduled for completion of installation of major items of equipment.**

2. **The anticipated date of Substantial Completion.**

3. **The date of Final Completion of the Project, as established by the Contract.**

c. The accepted Contractor's construction schedule, bearing the approval signature of the Contractor and major subcontractors, shall be distributed to all interested parties in quantities as required. No application for payment will be approved until the Contractor's construction schedule has been received and accepted by Owner.

1.12 **ARTICLE 32 - COPIES OF DRAWINGS AND SPECIFICATIONS**

A. ADD Article 31 with the heading 'COPIES OF DRAWINGS AND SPECIFICATIONS' and the following language:

The Designer shall furnish free of charge to the General Contractor (GC) or Construction Manager (CM) an electronic copy in PDF format of the bid documents. Paper copies of drawing sets and specifications shall be furnished at cost, including mailing at the request of the General Contractor or Construction Manager. This cost shall be stated in the bidding documents.

END OF SECTION 007300

Identification of HUB Certified/ Minority Business Participation

I,_____,
(Name of Bidder)
do hereby certify that on this project, we will use the following HUB Certified/ minority business as construction subcontractors, vendors, suppliers or providers of professional services.

Firm Name, Address and Phone #	Work Type	*Minority Category	**HUB Certified (Y/N)

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

The total value of minority business contracting will be ($)_____.

State of North Carolina AFFIDAVIT A – Listing of Good Faith Efforts

County of _____

(Name of Bidder)

Affidavit of_____

I have made a good faith effort to comply under the following areas checked:

Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive. (1 NC Administrative Code 30 I.0101)

- ❑ **1 – (10 pts)** Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.
- ❑ **2 --(10 pts)** Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.
- ❑ **3** – **(15 pts)** Broken down or combined elements of work into economically feasible units to facilitate minority participation.
- ❑ **4 – (10 pts)** Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- ❑ **5** – **(10 pts)** Attended prebid meetings scheduled by the public owner.
- ❑ **6** – **(20 pts)** Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
- ❑ **7 – (15 pts)** Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- ❑ **8** – **(25 pts)** Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- ❑ **9** – **(20 pts)** Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- ❑ **10 - (20 pts)** Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of the minority business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date:_____Name of Authorized Officer:_____

Signature:_____

Title:_____

SEAL

State of_____, County of_____

Subscribed and sworn to before me this _____day of _____20____

Notary Public_____

My commission expires _____

State of North Carolina --AFFIDAVIT B-- Intent to Perform Contract with Own Workforce.

County of _____

Affidavit of_____
(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the _____

_____contract.
(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement. The Bidder agrees to make a Good Faith Effort to utilize minority suppliers where possible.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date:_____Name of Authorized Officer:_____

Signature:_____

Title:_____

SEAL

State of _____, County of_____

Subscribed and sworn to before me this _____day of _____20___

Notary Public _____

My commission expires_____

Do not submit with bid Do not submit with bid Do not submit with bid Do not submit with bid

State of North Carolina - AFFIDAVIT C - Portion of the Work to be Performed by HUB Certified/Minority Businesses

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the portion of the work to be executed by HUB certified/minority businesses as defined in GS143-128.2(g) and 128.4(a),(b),(e) is equal to or greater than 10% of the bidders total contract price, then the bidder must complete this affidavit.
This affidavit shall be provided by the apparent lowest responsible, responsive bidder within **72 hours** after notification of being low bidder.

Affidavit of _____I do hereby certify that on the
(Name of Bidder)

_____
(Project Name)

Project ID#_____Amount of Bid $_____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. Attach additional sheets if required

Name and Phone Number	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date:_____Name of Authorized Officer:_____

SEAL

Signature:_____

Title:_____

State of _____, County of _____
Subscribed and sworn to before me this _____day of _____20_____
Notary Public_____
My commission expires_____

State of North Carolina AFFIDAVIT D – Good Faith Efforts

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the goal of 10% participation by HUB Certified/ minority business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts:

Affidavit of _____I do hereby certify that on the
(Name of Bidder)

_____
(Project Name)

Project ID#_____Amount of Bid $_____

I will expend a minimum of _____% of the total dollar amount of the contract with HUB certified/ minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. (Attach additional sheets if required)

Name and Phone Number	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

Examples of documentation that may be required to demonstrate the Bidder's good faith efforts to meet the goals set forth in these provisions include, but are not necessarily limited to, the following:

A. Copies of solicitations for quotes to at least three (3) minority business firms from the source list provided by the State for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.

B. Copies of quotes or responses received from each firm responding to the solicitation.

C. A telephone log of follow-up calls to each firm sent a solicitation.

D. For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.

E. Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.

F. Copy of pre-bid roster

G. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.

H. Letter detailing reasons for rejection of minority business due to lack of qualification.

I. Letter documenting proposed assistance offered to minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive bidder.

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date:_____Name of Authorized Officer:_____

Signature:_____

Title:_____

SEAL

State of_____, County of _____

Subscribed and sworn to before me this _____day of _____20____

Notary Public_____

My commission expires _____

APPENDIX E

MBE DOCUMENTATION FOR CONTRACT PAYMENTS

Prime Contractor/Architect: _____

Address & Phone: _____

Project Name: _____

SCO Project ID: _____

Pay Application #: _____ Period: _____

The following is a list of payments made to Minority Business Enterprises on this project for the above-mentioned period.

MBE FIRM NAME	* TYPE OF MBE	AMOUNT PAID THIS MONTH (With This Pay App)	TOTAL PAYMENTS TO DATE	TOTAL AMOUNT COMMITTED

*Minority categories: Black (B), Hispanic (H), Asian American (AA), American Indian (AI), White Female (WF), Socially and Economically Disadvantaged (SED)

Approved/Certified By:

_____ _____

Name Title

_____ _____

Date Signature

SUBMIT WITH EACH PAY REQUEST - FINAL PAYMENT - FINAL REPORT

SECTION 01 1000 – SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Project information.
   2. Work covered by Contract Documents.
   3. Work by Owner.
   4. Access to site.
   5. Coordination with occupants.
   6. Work restrictions.
   7. Specification and drawing conventions.

B. Related Requirements:
   1. Section 01 5000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: WCU | H.F. Robinson Administration Building – 2nd Floor Renovation
   1. Project Location: 221 H.F. Robinson Administration Building
      Cullowhee, North Carolina 28723

B. Owner: Western Carolina University
   1. Owner's Representative: Javier Torres, AIA

C. Architect: McMillan Pazdan Smith Architecture.
   1. Architect’s Representative: Thad Rhoden, AIA

D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:
   1. PME + FP: Sud Associates, P.A.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. Type of Contract:
   1. Project will be constructed under a single prime contract.

1.5 WORK BY OWNER

A. Preceding Work: Owner will perform the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.

B. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.

1. Installation of AV and Data systems.

1.6 ACCESS TO SITE

A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.7 COORDINATION WITH OCCUPANTS

A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

1.8 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 8 a.m. to 6 p.m., Monday through Friday, unless otherwise indicated.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Owner not less than 72 hours in advance of proposed minor utility interruptions.
2. Notify Owner not less than 7 days in advance of proposed major utility interruptions.

D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

E. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes.

F. Controlled Substances: Use of tobacco products and other controlled substances within the existing building is not permitted.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 1000

SECTION 01 25 00 – SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1.3 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use CSI Form 13.1A
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
    b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
    c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
    d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    e. Samples, where applicable or requested.
    f. Certificates and qualification data, where applicable or requested.
    g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
    h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
    i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
    j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's

letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.

l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

1.4 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution during the bidding phase until five days prior to the receipt of bids.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.

b. Requested substitution will not adversely affect Contractor's construction schedule.

c. Requested substitution has received necessary approvals of authorities having jurisdiction.

d. Requested substitution is compatible with other portions of the Work.

e. Requested substitution has been coordinated with other portions of the Work.

f. Requested substitution provides specified warranty.

g. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2500

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Requirements:

1. Division 01 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
2. Within 14 calendar days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.
    d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect within thirty (30) days after the condition has been identified.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

1.5 ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, base each Change Order proposal on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.
2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the Purchase Order amount or Contractor’s handling, labor, installation, overhead and profit. Submit claims within 21 days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. Owner will reject claims submitted later than 21 days after such authorization.

1. Do not include Contractor’s or subcontractor’s indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
2. No change to Contractor’s indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

1.6 CHANGE ORDER PROCEDURES

A. On Owner’s approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner, Architect and Contractor via the State Construction Office Change Order Form.

B. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

C. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

D. Promptly enter changes in Project Record Documents.

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive which instructs Contractor to proceed with a change in Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
2. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
    a. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.8 COMPUTATION OF CHANGE IN CONTRACT AMOUNT

A. As specified in the Agreement and Conditions of the Contract.

B. For pre-determined unit prices and quantities, the amount will based on the fixed unit prices.

C. For change ordered by without a quotation from , the amount will be determined by based on the 's substantiation of costs as specified for work.

D. Substantiation of Costs: Provide full information required for evaluation.

1. provide following data:
    a. Quantities of products, labor, and equipment.
    b. Taxes, insurance, and bonds.
    c. Overhead and profit.
    d. Justification for any change in Contract Time.
    e. Credit for deletions from Contract, similarly documented.
2. Support each claim for additional costs with additional information:
    a. Origin and date of claim.
    b. Dates and times work was performed, and by whom.
    c. Time records and wage rates paid.
    d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
3. For work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2600

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:

1. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
2. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
    a. Application for Payment forms with continuation sheets.
    b. Submittal schedule.
    c. Items required to be indicated as separate activities in Contractor's construction schedule.
2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:
    a. Project name and location.
    b. Name of Architect.
    c. Architect's project number.
    d. Contractor's name and address.
    e. Date of submittal.
2. Submit draft of AIA Document G703 Continuation Sheets.
3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
    a. Related Specification Section or Division.

b. Change Orders (numbers) that affect value.

c. Dollar value:

1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of 1 percent of the Contract Sum.

5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing.

7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.

9. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

10. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: Submit Application for Payment to Architect by the 25th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month. Provide a “pencil copy” to the architect no later than the 23rd of the month.

C. Application for Payment Forms: AIA Document G702 and AIA Document G703 as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.

2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

3. Transmittal: Submit 5 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt. Include copies of minority business participation forms and sales tax certificates. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

E. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Submittal schedule (preliminary if not final).
5. List of Contractor's staff assignments.
6. List of Contractor's principal consultants.
7. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
8. Initial progress report.

F. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

G. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2900

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. Coordination drawings.
2. Administrative and supervisory personnel
3. Project meetings
4. Request for Interpretation (RFIs)

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

C. Related Requirements:

1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request Contractor seeking information required by or clarifications of the Contract Documents.

1.4 COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.
4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

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

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

1.5 SUBMITTALS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
   a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
   b. Indicate required installation sequences.
   c. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
2. Sheet Size: At least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
3. Number of Copies: Submit two opaque copies of each submittal. Architect will return 1 copy.
   a. Submit five copies where Coordination Drawings are required for operation and maintenance manuals. Architect will retain two copies; remainder will be returned. Mark up and retain one returned copy as a Project Record Drawing.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone

numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.6 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.

1.7 REQUESTS FOR INFORMATION (RFIs)

A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.

1. RFIs shall originate with Contractor. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:

1. Project name.
2. Date.
3. Name of Contractor.
4. Name of Architect
5. RFI number, numbered sequentially.
6. Specification Section number and title and related paragraphs, as appropriate.
7. Drawing number and detail references, as appropriate.
8. Field dimensions and conditions, as appropriate.
9. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
10. Contractor's signature.
11. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.

C. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above.

1. Attachments shall be electronic files in Adobe Acrobat PDF format.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow 10 working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:
    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.

c. Requests for approval of Contractor's means and methods.

d. Requests for coordination information already indicated in the Contract Documents.

e. Requests for adjustments in the Contract Time or the Contract Sum.

f. Requests for interpretation of Architect's actions on submittals.

g. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.

3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 2600 "Contract Modification Procedures."

a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log monthly. Use software log with not less than the following:

1. Project name.

2. Name and address of Contractor.

3. Name and address of Architect.

4. RFI number including RFIs that were returned without action or withdrawn.

5. RFI description.

6. Date the RFI was submitted.

7. Date Architect's response was received.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1.8 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.

2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.

3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner**,** and Architect, within three days of the meeting.

B. Preconstruction Conference: The Owner will schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect.

1. Agenda: Discuss items of significance that could affect progress, including the following:

a. Tentative construction schedule.

b. Critical work sequencing and long-lead items.

c. Designation of key personnel and their duties.

d. Procedures for processing field decisions and Change Orders.

e. Procedures for RFIs.

f. Procedures for testing and inspecting.
g. Procedures for processing Applications for Payment.
h. Distribution of the Contract Documents.
i. Submittal procedures.
j. Preparation of record documents.
k. Use of the premises and existing building.
l. Work restrictions.
m. Responsibility for temporary facilities and controls.
n. Construction waste management and recycling.
o. Parking availability.
p. Office, work, and storage areas.
q. Equipment deliveries and priorities.
r. First aid.
s. Security.
t. Progress cleaning.
u. Working hours.

2. Minutes: Architect will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
   a. Contract Documents.
   b. Related RFIs.
   c. Related Change Orders.
   d. Purchases.
   e. Deliveries.
   f. Submittals.
   g. Review of mockups.
   h. Possible conflicts.
   i. Compatibility requirements.
   j. Time schedules.
   k. Weather limitations.
   l. Manufacturer's written instructions.
   m. Warranty requirements.
   n. Compatibility of materials.
   o. Acceptability of substrates.
   p. Temporary facilities and controls.
   q. Space and access limitations.

r. Testing and inspecting requirements.

s. Installation procedures.

t. Coordination with other work.

u. Required performance results.

v. Protection of adjacent work.

w. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.

5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress meetings at bi-weekly intervals with Owner and monthly intervals with Owner and Architect.

1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction 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.

1) Review schedule for next period.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.

2) Sequence of operations.

3) Status of submittals.

4) Deliveries.

5) Off-site fabrication.

6) Access.

7) Site utilization.

8) Progress cleaning.

9) Quality and work standards.

10) Status of correction of deficient items.

11) Field observations.

12) Status of RFIs.

13) Status of proposal requests.

14) Pending changes.

15) Status of Change Orders.

16) Pending claims and disputes.

17) Documentation of information for payment requests.

3. Minutes: Contractor will record and distribute the meeting minutes to each party present and to parties requiring information.

   a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 3100

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's Construction Schedule.
2. Submittals Schedule.
3. Daily construction reports.
4. Field condition reports.
5. Special reports.

B. Related Sections include the following:

1. Division 01 Section "Payment Procedures" for submitting the Schedule of Values.
2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
3. Division 01 Section "Photographic Documentation" for submitting construction photographs.
4. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
5. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the Schedule of Values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by Architect.

C. Event: The starting or ending point of an activity.

D. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.

3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

E. Fragment: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.

F. Major Area: A story of construction, a separate building, or a similar significant construction element.

G. Milestone: A key or critical point in time for reference or measurement.

H. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.

I. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 SUBMITTALS

A. Qualification Data: For scheduling consultant.

B. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:

1. Scheduled date for first submittal.
2. Specification Section number and title.
3. Submittal category (action or informational).
4. Name of subcontractor.
5. Description of the Work covered.
6. Scheduled date for Architect's final release or approval.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.

1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
2. Initial Submittal: Submit concurrently with preliminary network diagram. Include submittals required during the first 15 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. General: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

B. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within 15 days of date established for the Notice to Proceed. Indicate critical path activities. Submit updated schedule with each Application for Payment.

C. Coordination: Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests and other required schedules and reports.

1. Secure time commitments for performing critical elements of the work from parties involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

D. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.

E. Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

F. Treat each story or separate area as a separate numbered activity for each principal element of the work.

G. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Work By Owner: Include a separate activity for each portion of the work performed by the Owner.
3. Products Ordered In Advance: Include a separate activity for each product. Include delivery date indicated in Division 1 Section “Summary.” Delivery dates indicated stipulate the earliest possible delivery date.
4. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 1 Section “Summary.” Delivery dates indicated stipulate the earliest possible delivery date.
5. Work Restrictions: Show the effect of the following items on the schedule:
    a. Coordination with existing construction.
    b. Limitations of continued occupancies.
    c. Uninterruptible services.
    d. Partial occupancy before Substantial Completion.
    e. Use of premises restrictions.
    f. Provisions for future construction.
    g. Seasonal variations.
    h. Environmental control.

H. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to the Notice to Proceed, Substantial Completion and Final Completion.

I. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragments to demonstrate the effect of the proposed change on the overall project schedule.

2.3 CONSTRUCTION SCHEDULE - CONTENT

A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.

B. Identify each item by specification section number.

C. Identify work of separate stages and other logically grouped activities.

D. Provide sub-schedules for each stage of Work identified in Section 01 1000.

E. Provide sub-schedules to define critical portions of the entire schedule.

F. Include conferences and meetings in schedule.

G. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.

H. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, Products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.

I. Indicate delivery dates for owner-furnished products.

J. Coordinate content with schedule of values specified in Section 01 2000.

K. Provide legend for symbols and abbreviations used.

2.4 REPORTS

A. Daily Construction Reports: The contractor shall maintain a construction diary recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. Approximate count of personnel at Project site.
3. High and low temperatures and general weather conditions.
4. Accidents.
5. Meetings and significant decisions.
6. Unusual events (refer to special reports).
7. Stoppages, delays, shortages, and losses.
8. Meter readings and similar recordings.
9. Emergency procedures.
10. Orders and requests of authorities having jurisdiction.
11. Change Orders received and implemented.
12. Construction Change Directives received.
13. Services connected and disconnected.
14. Equipment or system tests and startups.
15. Partial Completions and occupancies.
16. Substantial Completions authorized.

B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.5 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from parties involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

2.6 SPECIAL REPORTS

A. General: Submit special reports directly to Architect within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Participate in joint review and evaluation of schedule with Architect at each submittal.

B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate Actual Completion percentage for each activity.

C. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

3.2 SPECIAL REPORTS

A. General: Submit special reports directly to Architect within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List Chain of events, persons participating, response by Contractor’s personnel, evaluation of results or effects, and similar pertinent information. Advise Architect in advance when these events are known or predictable.

END OF SECTION 01 3200

SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Periodic construction photographs.

B. Related Requirements:

1. Section 017700 "Closeout Procedures" for submitting photographic documentation as project record documents at Project closeout.

1.3 INFORMATIONAL SUBMITTALS

A. Construction Photographs:

1. Digital Images: Submit a complete set of digital image electronic files with each submittal of prints on CD-ROM. Identify electronic media with date photographs were taken. Submit images that have same aspect ratio as the sensor, uncropped.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in uncompressed TIFF or JPG format, produced by a digital camera with minimum sensor size of 8 megapixels, and at an image resolution of not less than 3200 by 2400 pixels.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.

B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: Include date and time in file name for each image.
2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect.

C. Preconstruction Photographs: Before commencement of demolition take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.

1. Take 8 photographs to show existing conditions adjacent to property before starting the Work.

D. Periodic Construction Photographs: Take 12 photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

E. Architect Directed Construction Photographs: From time to time, Architect will instruct photographer about number and frequency of photographs and general directions on vantage points. Select actual vantage points and take photographs to show the status of construction and progress since last photographs were taken.

F. Additional Photographs: Architect request photographs in addition to periodic photographs specified.

1. Three days' notice will be given, where feasible.
2. In emergency situations, take additional photographs within 24 hours of request.
3. Circumstances that could require additional photographs include, but are not limited to, the following:
    a. Immediate follow-up when on-site events result in construction damage or losses.

END OF SECTION 01 3233

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:

1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
3. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
4. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
5. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action.

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. General: Electronic copies of CAD Drawings of the Contract Drawings will not be provided by Architect for Contractor's use in preparing submittals.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the

Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 7 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 7 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 7 days for initial review of each submittal.

E. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Include the following information on label for processing and recording action taken:
    a. Project name.
    b. Date.
    c. Name and address of Architect.
    d. Name and address of Contractor.
    e. Name and address of subcontractor.
    f. Name and address of supplier.
    g. Name of manufacturer.
    h. Submittal number or other unique identifier, including revision identifier.
        1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
    i. Number and title of appropriate Specification Section.
    j. Other necessary identification.

F. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.

G. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.

H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.

1. Transmittal Form: Provide locations on form for the following information:
    a. Project name.
    b. Date.

c. Destination (To:).
d. Source (From:).
e. Names of subcontractor, manufacturer, and supplier.
f. Category and type of submittal.
g. Submittal purpose and description.
h. Specification Section number and title.
i. Drawing number and detail references, as appropriate.
j. Transmittal number, numbered consecutively.
k. Submittal and transmittal distribution record.
l. Remarks.
m. Signature of transmitter.

2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.

I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked "Approved, or approved as noted."

J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

K. Use for Construction: Use only final submittals with mark indicating "Approved or approved as noted" taken by Architect.

1.5 CONTRACTOR'S USE OF ARCHITECT'S CAD FILES

A. General: At Contractor's written request, copies of Architect's CAD files will be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:
1. Release of liability associated with the utilization of the files and submission of Architect's form for release.
2. Payment for administrative time associated with production of the files at $50/sheet.
3. Utilization of the files in the format provided by the architect without conversion to multiple file types. File type provided will be .dwg, Autocad version 2006 or later.
4. No adjustments for layering or formating.
5. Availability of Architect's consultant’s files is limited and subject to their individual company policy.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.
1. Submit electronic submittals directly to Architect by email.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's written recommendations.
    b. Manufacturer's product specifications.
    c. Manufacturer's installation instructions.
    d. Standard color charts.
    e. Manufacturer's catalog cuts.
    f. Wiring diagrams showing factory-installed wiring.
    g. Standard product operation and maintenance manuals.
    h. Compliance with specified referenced standards.
    i. Testing by recognized testing agency.
    j. Application of testing agency labels and seals.
    k. Notation of coordination requirements.
    l. Product Cleaning Instructions

4. Submit Product Data before or concurrent with Samples.
5. Number of Copies: Submit three copies of Product Data, unless otherwise indicated. Architectwill return two copies. Mark up and retain one returned copy as a Project Record Document.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Dimensions.
    b. Identification of products.
    c. Fabrication and installation drawings.
    d. Roughing-in and setting diagrams.
    e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
    f. Shopwork manufacturing instructions.
    g. Templates and patterns.
    h. Schedules.
    i. Design calculations.
    j. Compliance with specified standards.
    k. Notation of coordination requirements.
    l. Notation of dimensions established by field measurement.
    m. Relationship to adjoining construction clearly indicated.
    n. Seal and signature of professional engineer if specified.

o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches .

3. Number of Copies: Submit three opaque copies of each submittal, unless copies are required for operation and maintenance manuals. Submit five copies where copies are required for operation and maintenance manuals. Architect will retain two copies; remainder will be returned. Mark up and retain one returned copy as a Project Record Drawing.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

2. Identification: Attach label on unexposed side of Samples that includes the following:

a. Generic description of Sample.

b. Product name and name of manufacturer.

c. Sample source.

d. Number and title of appropriate Specification Section.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

4. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.

5. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

a. Number of Samples: Submit three sets of Samples. Architect will retain oner Sample sets; remainder will be returned.

1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.

2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product.
2. Number and name of room or space.
3. Location within room or space.
4. Number of Copies: Submit three copies of product schedule or list, unless otherwise indicated. Architect will return two copies.
    a. Mark up and retain one returned copy as a Project Record Document.

F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation" for Construction Manager's action.

G. Submittals Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

H. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."

I. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."

J. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design.Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.
4. Number of Copies: Submit three copies of subcontractor list, unless otherwise indicated. Architect will return two copies.
    a. Mark up and retain one returned copy as a Project Record Document.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Architect will not return copies.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
3. Test and Inspection Reports: Comply with requirements specified in Division 01 Section "Quality Requirements."

B. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."

C. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

H. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

I. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

J. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

L. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

M. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."

N. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

O. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

P. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

Q. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

R. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

S. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:

1. Preparation of substrates.
2. Required substrate tolerances.
3. Sequence of installation or erection.
4. Required installation tolerances.
5. Required adjustments.
6. Recommendations for cleaning and protection.

T. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

U. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect.

1. Architect will not review submittals that include MSDSs and will return the entire submittal for resubmittal.

2.3 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Shop drawings received by the Architect that do not bear the Contractor's stamp of approval will be immediately returned to the Contractor without review by the Architect. Delay caused by shop drawings being returned because of incomplete or inaccurate information or for lack of Contractor's approval stamp will not be grounds for an extension of time.

3.2 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:

C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01 3300

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Requirements:

1. Division 01 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
2. Divisions 02 through 49 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include 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 tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.

10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Permits, Licenses, and Certificates: For 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.

1.6 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329 and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

a. Provide test specimens representative of proposed products and construction.

b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.

c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.

d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.

e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.

f. When testing is complete, remove test specimens, assemblies, mockups**,** and laboratory mockups; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.

2. Notify Architect seven days in advance of dates and times when mockups will be constructed.

3. Demonstrate the proposed range of aesthetic effects and workmanship.

4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.

a. Allow seven days for initial review and each re-review of each mockup.

5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

6. Demolish and remove mockups when directed unless otherwise indicated.

K. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Specification Sections.

1.7 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.

2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

G. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Architect testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.8 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.

3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
   1. Date test or inspection was conducted.
   2. Description of the Work tested or inspected.
   3. Date test or inspection results were transmitted to Architect.
   4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 4000

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's

"Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

AABC	Associated Air Balance Council www.aabc.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	(202) 624-5800
AATCC	American Association of Textile Chemists and Colorists www.aatcc.org	(919) 549-8141
ABMA	American Bearing Manufacturers Association www.americanbearings.org	(202) 367-1155
ACI	American Concrete Institute (Formerly: ACI International) www.concrete.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
AEIC	Association of Edison Illuminating Companies, Inc. (The) www.aeic.org	(205) 257-2530
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000
AHAM	Association of Home Appliance Manufacturers www.aham.org	(202) 872-5955
AHRI	Air-Conditioning, Heating, and Refrigeration Institute (The) www.ahrinet.org	(703) 524-8800
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100

AITC	American Institute of Timber Construction www.aitc-glulam.org	(303) 792-9559
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
AOSA	Association of Official Seed Analysts, Inc. www.aosaseed.com	(607) 256-3313
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
APA	Architectural Precast Association www.archprecast.org	(239) 454-6989
API	American Petroleum Institute www.api.org	(202) 682-8000
ARI	Air-Conditioning & Refrigeration Institute (See AHRI)	
ARI	American Refrigeration Institute (See AHRI)	
ARMA	Asphalt Roofing Manufacturers Association www.asphaltroofing.org	(202) 207-0917
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASCE/SEI	American Society of Civil Engineers/Structural Engineering Institute (See ASCE)	
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (American Society of Mechanical Engineers) www.asme.org	(800) 843-2763 (973) 882-1170
ASSE	American Society of Safety Engineers (The) www.asse.org	(847) 699-2929
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9500

ATIS	Alliance for Telecommunications Industry Solutions www.atis.org	(202) 628-6380
AWEA	American Wind Energy Association www.awea.org	(202) 383-2500
AWI	Architectural Woodwork Institute www.awinet.org	(571) 323-3636
AWMAC	Architectural Woodwork Manufacturers Association of Canada www.awmac.com	(403) 453-7387
AWPA	American Wood Protection Association (Formerly: American Wood-Preservers' Association) www.awpa.com	(205) 733-4077
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.gobrick.com	(703) 620-0010
BICSI	BICSI, Inc. www.bicsi.org	(800) 242-7405 (813) 979-1991
BIFMA	BIFMA International (Business and Institutional Furniture Manufacturer's Association) www.bifma.com	(616) 285-3963
BISSC	Baking Industry Sanitation Standards Committee www.bissc.org	(866) 342-4772
BOCA	BOCA (Building Officials and Code Administrators International Inc.) (See ICC)	
BWF	Badminton World Federation (Formerly: International Badminton Federation) www.bwfbadminton.org	60 3 9283 7155
CDA	Copper Development Association www.copper.org	(800) 232-3282 (212) 251-7200
CEA	Canadian Electricity Association www.electricity.ca	(613) 230-9263

CEA	Consumer Electronics Association www.ce.org	(866) 858-1555 (703) 907-7600
CFFA	Chemical Fabrics & Film Association, Inc. www.chemicalfabricsandfilm.com	(216) 241-7333
CFSEI	Cold-Formed Steel Engineers Institute www.cfsei.org	(866) 465-4732 (202) 263-4488
CGA	Compressed Gas Association www.cganet.com	(703) 788-2700
CIMA	Cellulose Insulation Manufacturers Association www.cellulose.org	(888) 881-2462 (937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(404) 622-0073
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CPA	Composite Panel Association www.pbmdf.com	(703) 724-1128
CRI	Carpet and Rug Institute (The) www.carpet-rug.org	(706) 278-3176
CRRC	Cool Roof Rating Council www.coolroofs.org	(866) 465-2523 (510) 485-7175
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(800) 328-6306 (847) 517-1200
CSA	Canadian Standards Association www.csa.ca	(800) 463-6727 (416) 747-4000
CSA	CSA International (Formerly: IAS - International Approval Services) www.csa-international.org	(866) 797-4272 (416) 747-4000
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
CSSB	Cedar Shake & Shingle Bureau www.cedarbureau.org	(604) 820-7700
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute) www.cti.org	(281) 583-4087

CWC	Composite Wood Council (See CPA)	
DASMA	Door and Access Systems Manufacturers Association www.dasma.com	(216) 241-7333
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
ECA	Electronic Components Association www.ec-central.org	(703) 907-8024
ECAMA	Electronic Components Assemblies & Materials Association (See ECA)	
EIA	Electronic Industries Alliance (See TIA)	
EIMA	EIFS Industry Members Association www.eima.com	(800) 294-3462 (703) 538-1616
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
ESD	ESD Association (Electrostatic Discharge Association) www.esda.org	(315) 339-6937
ESTA	Entertainment Services and Technology Association (See PLASA)	
EVO	Efficiency Valuation Organization www.evo-world.org	(415) 367-3643 44 20 88 167 857
FIBA	Fédération Internationale de Basketball (The International Basketball Federation) www.fiba.com	41 22 545 00 00
FIVB	Fédération Internationale de Volleyball (The International Volleyball Federation) www.fivb.org	41 21 345 35 45
FM Approvals	FM Approvals LLC www.fmglobal.com	(781) 762-4300
FM Global	FM Global (Formerly: FMG - FM Global) www.fmglobal.com	(401) 275-3000
FRSA	Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc. www.floridaroof.com	(407) 671-3772
FSA	Fluid Sealing Association	(610) 971-4850

	www.fluidsealing.com	
FSC	Forest Stewardship Council U.S. www.fscus.org	(612) 353-4511
GA	Gypsum Association www.gypsum.org	(301) 277-8686
GANA	Glass Association of North America www.glasswebsite.com	(785) 271-0208
GS	Green Seal www.greenseal.org	(202) 872-6400
HI	Hydraulic Institute www.pumps.org	(973) 267-9700
HI/GAMA	Hydronics Institute/Gas Appliance Manufacturers Association (See AHRI)	
HMMA	Hollow Metal Manufacturers Association (See NAAMM)	
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
HPW	H. P. White Laboratory, Inc. www.hpwhite.com	(410) 838-6550
IAPSC	International Association of Professional Security Consultants www.iapsc.org	(415) 536-0288
IAS	International Approval Services (See CSA)	
ICBO	International Conference of Building Officials (See ICC)	
ICC	International Code Council www.iccsafe.org	(888) 422-7233 (202) 370-1800
ICEA	Insulated Cable Engineers Association, Inc. www.icea.net	(770) 830-0369
ICPA	International Cast Polymer Alliance www.icpa-hq.org	(703) 525-0511
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
IEC	International Electrotechnical Commission www.iec.ch	41 22 919 02 11
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The)	(212) 419-7900

	www.ieee.org	
IES	Illuminating Engineering Society (Formerly: Illuminating Engineering Society of North America) www.ies.org	(212) 248-5000
IESNA	Illuminating Engineering Society of North America (See IES)	
IEST	Institute of Environmental Sciences and Technology www.iest.org	(847) 981-0100
IGMA	Insulating Glass Manufacturers Alliance www.igmaonline.org	(613) 233-1510
IGSHPA	International Ground Source Heat Pump Association www.igshpa.okstate.edu	(405) 744-5175
ILI	Indiana Limestone Institute of America, Inc. www.iliai.com	(812) 275-4426
Intertek	Intertek Group (Formerly: ETL SEMCO; Intertek Testing Service NA) www.intertek.com	(800) 967-5352
ISA	International Society of Automation (The) (Formerly: Instrumentation, Systems, and Automation Society) www.isa.org	(919) 549-8411
ISAS	Instrumentation, Systems, and Automation Society (The) (See ISA)	
ISFA	International Surface Fabricators Association (Formerly: International Solid Surface Fabricators Association) www.isfanow.org	(877) 464-7732 (801) 341-7360
ISO	International Organization for Standardization www.iso.org	41 22 749 01 11
ISSFA	International Solid Surface Fabricators Association (See ISFA)	
ITU	International Telecommunication Union www.itu.int/home	41 22 730 51 11
KCMA	Kitchen Cabinet Manufacturers Association www.kcma.org	(703) 264-1690
LMA	Laminating Materials Association (See CPA)	

LPI	Lightning Protection Institute www.lightning.org	(800) 488-6864
MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MCA	Metal Construction Association www.metalconstruction.org	(847) 375-4718
MFMA	Maple Flooring Manufacturers Association, Inc. www.maplefloor.org	(888) 480-9138
MFMA	Metal Framing Manufacturers Association, Inc. www.metalframingmfg.org	(312) 644-6610
MHIA	Material Handling Industry of America www.mhia.org	(800) 345-1815 (704) 676-1190
MIA	Marble Institute of America www.marble-institute.com	(440) 250-9222
MMPA	Moulding & Millwork Producers Association (Formerly: Wood Moulding & Millwork Producers Association) www.wmmpa.com	(800) 550-7889 (530) 661-9591
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937 (604) 298-7578
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. www.mss-hq.org	(703) 281-6613
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(630) 942-6591
NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(800) 797-6223 (281) 228-6200
NADCA	National Air Duct Cleaners Association www.nadca.com	(202) 737-2926
NAIMA	North American Insulation Manufacturers Association www.naima.org	(703) 684-0084
NBGQA	National Building Granite Quarries Association, Inc. www.nbgqa.com	(800) 557-2848
NCAA	National Collegiate Athletic Association (The) www.ncaa.org	(317) 917-6222
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900

NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NETA	InterNational Electrical Testing Association www.netaworld.org	(888) 300-6382 (269) 488-6382
NFHS	National Federation of State High School Associations www.nfhs.org	(317) 972-6900
NFPA	NFPA (National Fire Protection Association) www.nfpa.org	(800) 344-3555 (617) 770-3000
NFPA	NFPA International (See NFPA)	
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-1776
NHLA	National Hardwood Lumber Association www.nhla.com	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NOFMA	National Oak Flooring Manufacturers Association (See NWFA)	
NOMMA	National Ornamental & Miscellaneous Metals Association www.nomma.org	(888) 516-8585
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSF	NSF International (National Sanitation Foundation International) www.nsf.org	(800) 673-6275 (734) 769-8010
NSPE	National Society of Professional Engineers www.nspe.org	(703) 684-2800

NSSGA	National Stone, Sand & Gravel Association www.nssga.org	(800) 342-1415 (703) 525-8788
NTMA	National Terrazzo & Mosaic Association, Inc. (The) www.ntma.com	(800) 323-9736
NWFA	National Wood Flooring Association www.nwfa.org	(800) 422-4556 (636) 519-9663
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (978) 557-0720
PLASA	PLASA (Formerly: ESTA - Entertainment Services and Technology Association) www.plasa.org	(212) 244-1505
RCSC	Research Council on Structural Connections www.boltcouncil.org	
RFCI	Resilient Floor Covering Institute www.rfci.com	(706) 882-3833
RIS	Redwood Inspection Service www.redwoodinspection.com	(925) 935-1499
SAE	SAE International (Society of Automotive Engineers) www.sae.org	(877) 606-7323 (724) 776-4841
SBCCI	Southern Building Code Congress International, Inc. (See ICC)	
SCTE	Society of Cable Telecommunications Engineers www.scte.org	(800) 542-5040 (610) 363-6888
SDI	Steel Deck Institute www.sdi.org	(847) 458-4647
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SEFA	Scientific Equipment and Furniture Association www.sefalabs.com	(877) 294-5424 (516) 294-5424
SEI/ASCE	Structural Engineering Institute/American Society of Civil Engineers (See ASCE)	
SIA	Security Industry Association www.siaonline.org	(866) 817-8888 (703) 683-2075

SJI	Steel Joist Institute www.steeljoist.org	(843) 293-1995
SMA	Screen Manufacturers Association www.smainfo.org	(773) 636-0672
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SMPTE	Society of Motion Picture and Television Engineers www.smpte.org	(914) 761-1100
SPFA	Spray Polyurethane Foam Alliance www.sprayfoam.org	(800) 523-6154
SPIB	Southern Pine Inspection Bureau www.spib.org	(850) 434-2611
SPRI	Single Ply Roofing Industry www.spri.org	(781) 647-7026
SRCC	Solar Rating and Certification Corporation www.solar-rating.org	(321) 638-1537
SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
STI	Steel Tank Institute www.steeltank.com	(847) 438-8265
SWI	Steel Window Institute www.steelwindows.com	(216) 241-7333
SWPA	Submersible Wastewater Pump Association www.swpa.org	(847) 681-1868
TCA	Tilt-Up Concrete Association www.tilt-up.org	(319) 895-6911
TCNA	Tile Council of North America, Inc. (Formerly: Tile Council of America) www.tileusa.com	(864) 646-8453
TEMA	Tubular Exchanger Manufacturers Association, Inc. www.tema.org	(914) 332-0040
TIA	Telecommunications Industry Association (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance)	(703) 907-7700

	www.tiaonline.org	
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance (See TIA)	
TMS	The Masonry Society www.masonrysociety.org	(303) 939-9700
TPI	Truss Plate Institute www.tpinst.org	(703) 683-1010
TPI	Turfgrass Producers International www.turfgrasssod.org	(800) 405-8873 (847) 649-5555
TRI	Tile Roofing Institute www.tileroofing.org	(312) 670-4177
UBC	Uniform Building Code (See ICC)	
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
USAV	USA Volleyball www.usavolleyball.org	(888) 786-5539 (719) 228-6800
USGBC	U.S. Green Building Council www.usgbc.org	(800) 795-1747
USITT	United States Institute for Theatre Technology, Inc. www.usitt.org	(800) 938-7488 (315) 463-6463
WASTEC	Waste Equipment Technology Association www.wastec.org	(800) 424-2869 (202) 244-4700
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(800) 283-1486 (503) 639-0651
WCMA	Window Covering Manufacturers Association www.wcmanet.org	(212) 297-2122
WDMA	Window & Door Manufacturers Association www.wdma.com	(800) 223-2301 (312) 321-6802
WI	Woodwork Institute (Formerly: WIC - Woodwork Institute of California) www.wicnet.org	(916) 372-9943
WMMPA	Wood Moulding & Millwork Producers Association (See MMPA)	

WSRCA	Western States Roofing Contractors Association www.wsrca.com	(800) 725-0333 (650) 938-5441
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
ICC	International Code Council www.iccsafe.org	(888) 422-7233
ICC-ES	ICC Evaluation Service, LLC www.icc-es.org	(800) 423-6587 (562) 699-0543

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-7923
DOC	Department of Commerce National Institute of Standards and Technology www.nist.gov	(301) 975-4040
DOD	Department of Defense http://dodssp.daps.dla.mil	(215) 697-2664
DOE	Department of Energy www.energy.gov	(202) 586-9220
EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
FAA	Federal Aviation Administration www.faa.gov	(866) 835-5322
FG	Federal Government Publications www.gpo.gov	(202) 512-1800
GSA	General Services Administration www.gsa.gov	(800) 488-3111 (202) 619-8925
HUD	Department of Housing and Urban Development	(202) 708-1112

	www.hud.gov	
LBL	Lawrence Berkeley National Laboratory Environmental Energy Technologies Division http://eetd.lbl.gov	(510) 486-4000
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742
SD	Department of State www.state.gov	(202) 647-4000
TRB	Transportation Research Board National Cooperative Highway Research Program www.trb.org	(202) 334-2934
USDA	Department of Agriculture Agriculture Research Service U.S. Salinity Laboratory www.ars.usda.gov	(202) 720-3656
USDA	Department of Agriculture Rural Utilities Service www.usda.gov	(202) 720-2791
USDJ	Department of Justice Office of Justice Programs National Institute of Justice www.ojp.usdoj.gov	(202) 307-0703
USP	U.S. Pharmacopeia www.usp.org	(800) 227-8772 (301) 881-0666
USPS	United States Postal Service www.usps.com	(202) 268-2000

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CFR	Code of Federal Regulations Available from Government Printing Office www.gpo.gov/fdsys	(866) 512-1800 (202) 512-1800
DOD	Department of Defense Military Specifications and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
DSCC	Defense Supply Center Columbus	

	(See FS)	
FED-STD	Federal Standard (See FS)	
FS	Federal Specification Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
	Available from Defense Standardization Program www.dsp.dla.mil	
	Available from General Services Administration www.gsa.gov	(800) 488-3111 (202) 619-8925
	Available from National Institute of Building Sciences/Whole Building Design Guide www.wbdg.org/ccb	(202) 289-7800
MILSPEC	Military Specification and Standards (See DOD)	
USAB	United States Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
USATBCB	U.S. Architectural & Transportation Barriers Compliance Board (See USAB)	

E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CBHF	State of California Department of Consumer Affairs Bureau of Electronic Appliance and Repair, Home Furnishings and Thermal Insulation www.bearhfti.ca.gov	(800) 952-5210 (916) 574-2041
CCR	California Code of Regulations Office of Administrative Law California Title 24 Energy Code www.calregs.com	(916) 323-6225
CDHS	California Department of Health Care Services (Formerly: California Department of Health Services) (See CCR)	
CDPH	California Department of Public Health Indoor Air Quality Program www.cal-iaq.org	

CPUC	California Public Utilities Commission www.cpuc.ca.gov	(800) 848-5580 (415) 703-2782
SCAQMD	South Coast Air Quality Management District www.aqmd.gov	(909) 396-2000
TFS	Texas Forest Service Forest Resource Development and Sustainable Forestry http://txforestservice.tamu.edu	 (979) 458-6606

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 4200

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.
2. Division 01 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
3. Division 01 Section "Execution" for progress cleaning requirements.
4. Divisions 02 through 49 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.

1.3 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces**,** Architect, testing agencies, and authorities having jurisdiction.

B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Polyethylene Sheet: Reinforced, fire-resistive sheet, 6-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.

B. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.

2.2 TEMPORARY FACILITIES

A. Common-Use Field Office: Meetings will be held on site, and if not possible, meetings will be held in Suite 230. If Suite 230 is unavailable, meetings will be held in the Facilities Management Conference room. Contractor to confirm availability of Facilities Conference Room if needed. Furnish and equip offices as follows:

1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of **8** at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 017700 "Closeout Procedures".

C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY UTILITY INSTALLATION

A. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
   a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
   b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.

3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

B. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

C. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.2 SUPPORT FACILITIES INSTALLATION

A. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

B. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

2. Maintain and touchup signs so they are legible at all times.

C. Temporary Elevator Use: Use of elevators is not permitted

D. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.

1. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Section 011000 "Summary."

C. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.

D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

E. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

F. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and tenants from fumes and noise.

1. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.

2. Protect air-handling equipment.

3. Provide walk-off mats at each entrance through temporary partition.

3.4 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.

2. At project acceptance, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 01 5000

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Procedures for substitutions during bidding period.
   2. General product requirements, including:
      a. General specification requirements for all products.
      b. Product options.
      c. Procedures for substitution requests.
   3. General requirements for product documentation, including:
      a. Requirements and procedures for schedule of products.
      b. General requirements for operation and maintenance data.
      c. General requirements for warranties.
   4. General procedures for products including:
      a. Procedures for transportation and handling.
      b. Procedures for delivery and receiving.
      c. Procedures for storage.

1.2 DEFINITIONS

A. Damage: Any sort of deterioration whether due to weather, water, normal wear and tear, accident, or abuse, resulting in soiling, marring, breakage, corrosion, rotting, or impairment of function.

1.3 SUBMITTALS

A. Schedule of Products: Submit for approval.
B. Final Schedule of Products: Submit for project record.
C. Log of Servicing of Equipment in Long-term Storage: Submit for project record.
D. Operation and Maintenance Data: Submit for approval.
E. Warranties: Submit for project record.

PART 2 - PART 2 - PRODUCTS

2.1 GENERAL

A. Components required to be supplied in quantity within a specification section shall be identical, interchangeable, and made by the same manufacturer.
B. Do not use products removed from existing construction, unless specifically permitted by the contract documents or approved by the owner.

PART 3 - PART 3 - EXECUTION

3.1 PRODUCT OPTIONS

A. It is the Project Expediter 's responsibility to select products which comply with the contract documents and which are compatible with one another, with existing and new work, and with all products specified by the designers.

1. Verify that electrical characteristics of products are compatible with electrical systems. Notify architect of all discrepancies immediately prior to shop drawing submittal.
2. Where visual matching to an established physical sample or color scheme is required, the architect's decision will be final.

B. Do not use any substitute products which have not been approved in accordance with the requirements of the contract documents; formal substitution request is required.

C. Definition of Substitute Product: Any product which does not meet the requirements of the contract documents, whether in product characteristics, performance, quality, or manufacturer or brand names, is considered a substitute.

D. Product Options: Where products are specified using more than one method, such as description with a manufacturer list, use a product meeting the requirements of both specification methods.

E. Products Specified by Reference Standard: Use any product meeting the specification. Provisions of reference standards shall not modify the responsibilities of the owner or architect as defined in the contract documents.

F. Products Specified by Performance Requirements: Use any product meeting the specification.

G. Products Specified to Match a Physical Sample: Use any product that matches; obtain the architect's approval.

H. Products Specified by Listing a Brand Name Product as the "Basis of Design": Provide a product equivalent to the product specified within the limits of variation specified. Use of a product other than that specified constitutes a representation by the contractor that he will comply with all the conditions specified for acceptance of substitutions, although formal submittal of a request for substitution is not required.

I. Products Specified by Listing Brand Name(s): Provide a product at least equal to the brand name product, or products, listed; submit substitution request for any brand name product not listed.

J. Products Specified by Listing Manufacturer(s): Provide a product meeting the specification; submit substitution request for any manufacturer not listed.

3.2 SUBSTITUTIONS DURING THE BIDDING PERIOD

A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.

B. Acceptable substitutions will be added to the contract documents by written addendum only; no verbal approvals will be valid.

3.3 SUBSTITUTIONS AFTER AWARD OF THE CONTRACT

A. Substitutions will not be considered between the bid date and the award of the contract.

B. Substitutions will not be allowed after award of the contract except when, through no fault of the Project Expediter, none of the specified products are available. An unavailable product is defined as a product not available due to strikes, natural disaster or product discontinuance. Burden of proof of unavailability is the responsibility of the Project Expediter and shall be in the form of written documentation from the manufacturer to the Project Expediter. The Project Expediter shall submit certified check to the designer for his/her time expended to review the proposed substitution prior to the designer's return of the product review and his/her decision to approve or reject the substitution submitted for review. The designer shall not be responsible for delays to the project schedule due to substitution request submittals for available products. The contractor making the substitution request, when specified products are available assumes full responsibility for any and all delays his/her substitution request may have on the progress schedule. The Project Expediter shall coordinate and obtain written approval of all other major sub-contractor's when the substitution request may effect the construction schedule.

3.4 SUBSTITUTION PROCEDURE

A. Submission of request for substitution shall constitute a representation that the entity making the request:

1. Has investigated the proposed product and determined that it is equal to or better than the specified product. Absence of an explicit comparison of any characteristic of the proposed product to the specified product shall constitute a representation that the proposed product is equal to or better than the specified product with regard to that characteristic.
2. Will provide the same warranty for the proposed product as for the specified product.
3. Will coordinate the installation and make other changes which may be required for the work to be complete in all respects, including:
    a. Redesign.
    b. Additional components and capacity required by other work affected by the change.
4. Waives all claims for additional costs including extended overhead and time extensions which subsequently may become apparent and which are caused by the change. He/she shall also assume full responsibility and liability from all claims for additional costs and time extensions from the other prime contractors which may be caused by the change.
5. Will reimburse the designer for additional costs for evaluation of the substitution request, redesign if required, and re-approval by authorities having jurisdiction if required.

B. Substitutions will not be considered when acceptance would require substantial revision of the contract documents.

C. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals without separate written request.

D. Substitution requests will not be considered when submitted directly by a subcontractor or supplier.

E. Substitution Request Procedure: Submit written request with complete data substantiating compliance of the proposed product with the requirements of the contract documents.

1. Submit request to the architect.
2. Submit 2 copies of each request and accompanying data.
3. Submit request accompanied by the transmittal form included in the project manual.
4. Only one request for substitution will be considered for each product.

F. Data Required with Substitution Request: Provide at least the following data:

1. Identify product by specification section and paragraph number.
2. Manufacturer's name and address, trade name and model number of product (if applicable), and name of fabricator or supplier (if applicable).
3. Complete product data.
4. A list of other projects on which the proposed product has been used, with project name, the design professional's name, and owner contact.
5. An itemized comparison of the proposed product to the specified product.
6. Net amount of change to the contract sum.
7. List of maintenance services and replacement materials available.
8. Statement of the effect of the substitution on the construction schedule.
9. Description of changes that will be required in other work or products if the substitute product is approved.

G. The architect will determine acceptability of the proposed substitution.

H. When the proposed substitution is not accepted, provide the product (or one of the products, as the case may be) specified.

3.5 SCHEDULE OF PRODUCTS

A. Prepare a complete schedule of products used, including the following for each product:

1. Manufacturer's name.
2. Brand or trade name.
3. Model number, if applicable.
4. Reference standard, if more than one is applicable.
5. Arrange products in the schedule by specification sections; indicate paragraph where specified.

B. Prepare and submit a preliminary schedule within 30 days after award of contract. ; resubmit when revised; submit final schedule prior to final payment.

C. Schedule of products shall not be used to obtain approval of substitute products; make separate request for substitution.

3.6 OPERATION AND MAINTENANCE DATA

A. Provide operation and maintenance data as specified in individual product sections.

1. Provide data sufficient for operation and maintenance by owner without further assistance from the manufacturer.
2. Provide completed data at least 45 days prior to instruction of owner personnel.

B. Data Required For Products - General:

1. Name of manufacturer and product.
2. Name, address, and telephone number of subcontractor or supplier.
3. Local source of replacements.
4. Local source of replaceable parts and supplies.

C. Product Data: Where product data is specified for inclusion in operation and maintenance data, provide manufacturer's data sheets marked to indicate specific product and product options actually installed; delete inapplicable data.

D. Custom Manufactured Products: Provide all information needed for reordering.

E. Finish Materials: Manufacturer's product data, color/texture designations, manufacturer's instructions for care, cleaning, and maintenance, and recommended cleaning schedule.

F. Products Exposed to Weather and Products for Moisture Protection: Manufacturer's product data, recommended inspection schedule and procedures, maintenance and repair procedures, maintenance materials required, and installation details.

G. Equipment: Provide at least the following information:

1. Product data giving equipment and function description, with normal operating characteristics and limiting conditions.
2. Starting, operating, and troubleshooting procedures.
3. Cleaning and maintenance requirements and procedures.
4. External finish maintenance requirements.
5. List of maintenance materials required.
6. List of special tools required.

7. Parts list: List all replaceable parts, with ordering data.
8. Recommended quantity of spare parts to be maintained in storage.
9. Recommended maintenance schedule.

H. Systems: Provide overall function description, with diagrams, prepared especially for this project.

I. Form of Data: Prepare data in the form of an instructional manual.

1. Arrange content logically, using section numbers and sequence of sections indicated on the table of contents of this project manual.
2. When multiple volumes are used, arrange by related subjects; identify contents in cover title.
3. Assemble into 3-ring binders with maximum 2-inch ring size.
    a. Hardback, cleanable plastic covers.
    b. Identify each book with title "Operation and Maintenance Instructions" and project name.
    c. Page size 8-1/2 by 11 inches, maximum.
    d. Prepare special typewritten data on minimum 20-pound paper.
    e. Provide tabbed divider for each product and system.
    f. Drawings: Bind in with other data; provide reinforced binding edge; fold larger drawings to size of pages.
        1) Do not use pockets or loose drawings.
4. Provide table of contents for each volume listing:
    a. Name of the project.
    b. Name, address, telephone number, and contact name of:
        1) Architect.
        2) Project Expediter.
    c. Index of products and systems included in volume.

3.7 WARRANTIES

A. Provide warranties as specified in individual product sections.

B. Manufacturer Warranties: Manufacturer's standard product warranty running for the manufacturer's standard term, unless otherwise indicated.

1. Submit copies of all manufacturer warranties which extend beyond the end of the contract correction period.

C. Special Project Warranties: Written warranty commencing at date of substantial completion, running for the term indicated, and signed by the entities specified.

1. Where completion of warranty item is materially delayed beyond the date of substantial completion, provide warranty commencing on date of acceptance.
2. Submit each special project warranty.

D. Provide at least 3 copies of each executed warranty.

E. Show actual date of commencement on each warranty.

3.8 TRANSPORTATION AND HANDLING

A. Require supplier to package finished products in a manner which will protect from damage during shipping, handling, and storage.

B. Transport products by methods which avoid damage.

C. Deliver in dry, undamaged condition in manufacturer's unopened packaging.

D. Provide equipment and personnel adequate to handle products by methods which prevent damage.

E. Provide additional protection during handling where necessary to prevent damage to products and packaging.

F. Lift large and heavy components at designated lift points only.

3.9 DELIVERY AND RECEIVING

A. Arrange deliveries of products to allow time for inspection prior to installation.

B. Coordinate delivery to avoid conflict with the work and to take into account both the conditions at the site and the availability of personnel, handling equipment, and storage space.

C. Clearly mark partial deliveries to identify contents, to permit easy accumulation of entire delivery, and to facilitate assembly.

D. Promptly inspect shipments and remedy damage, incorrect quantity, incompleteness, improper or illegible labeling, and noncompliance with requirements of contract documents and approved submittals.

3.10 STORAGE

A. Off-site storage of products for which application for payment will be made: Reference Article 31 of the General Conditions of the Contract.

B. General Storage Procedures:

1. Store products immediately on delivery.
2. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.
3. Store in a manner to prevent damage to the stored products and to the work.
4. Store moisture-sensitive products in weathertight enclosures.
5. Store indoors if necessary to keep temperature and humidity within ranges required by manufacturer.
6. Store unpacked and loose products on shelves, in bins, or in neat groups of like items.
7. Arrange storage to provide access for inspection and inventory.
8. Periodically inspect and remedy damage and noncompliance with required conditions.
9.

C. Loose Granular Materials: Store on solid surfaces in well-drained area; prevent mixing with foreign materials.

D. Exterior Storage:

1. Cover products subject to weather damage with impervious sheet covering; provide ventilation to avoid condensation.
2. Provide surface drainage to prevent runoff or ponded water from damaging stored products.
3. Prevent damage and contamination from refuse and chemically injurious materials and liquids.
4. Store fabricated products on substantial platforms, blocking, or skids above the ground, sloped to drain.

E. Long-Term Storage of Equipment:

1. Service equipment on a regularly scheduled basis; keep log of servicing.

2. Attach manufacturer's service instructions to each item, with notice of enclosed instructions on exterior of package.

END OF SECTION 01 600

SECTION 01 60 00 – Attachment A
SUBSTITUTION REQUEST FORM

To: Lindsey Rhoden, AIA
McMillan Pazdan Smith Architecture
47 Rankin Ave, Suite 141
Asheville, NC 28801

Project Name: **WCU | H.F. ROBINSON ADMINISTRATION BUILDING – 2ND FLOOR RENOVATIONS**

The undersigned request that the following product be considered for substitution in lieu of the specified item in Specifications:

Section _____ Page _____ Paragraph _____

Description of Item:

_____

_____

_____

Proposed Substitution:

_____

_____

_____

The Contractor shall also submit with this request for approval the sworn and notarized statement below which includes all of the following representations by the Contractor:

1. He has thoroughly reviewed the plans and specifications.
2. He has investigated the proposed product or method and determined that it is equal or better in all respects to that specified and that it fully complies with all requirements of the Contract Documents;
3. He will meet all contract obligations with regard to this substitution.
4. He will coordinate installation of accepted substitutions into the work, making all such changes and any required schedule adjustments, at no additional cost to the Owner, as may be required for the Work to be complete in all respects;
5. He waives all claims for additional costs and additional time related to substitutions which consequently become apparent. He also agrees to hold the Owner harmless from claims for extra costs and time incurred by other subcontractors and suppliers, or additional services which may have to be performed by the Architect for changes for extra work that may, at some later date, be determined to be necessary in order for the Work to function in the manner intended in the Contract Documents;
6. He will provide the same warranty and guarantee, and perform any work required in accordance therewith, for the substitution that is applicable to the specified item for which the subject is requested;
7. Material will be installed, handled, stored, adjusted, tested and operated in accordance with that which, with manufacturer's recommendation and as specified in the Contract Documents;
8. In all cases new materials will be used unless this provision is waived by notice from the Owner or his Architect, or unless otherwise specified in the Contract Documents;
9. All material and workmanship will be in every respect in accordance with that which, in the opinion of the Architect, is in conformity with approved modern practice;

10. He has provided accurate cost data on the proposed substitution in comparison with the product or method specified.

Signed this_____day of _____

(SEALS)

_____

_____
Title

State of North Carolina, County of _____

Subscribed and sworn to before me this_____day of_____20_____.

Notary Public: _____

My Commission Expires: _____

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Coordination of Owner-installed products.
6. Progress cleaning.
7. Starting and adjusting.
8. Protection of installed construction.
9. Correction of the Work.

B. Related Requirements:

1. Section 011000 "Summary" for limits on use of Project site.
2. Section 013300 "Submittal Procedures" for submitting surveys.
3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
4. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

C. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of **96 inches** in occupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 011000 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
5. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
   a. Use containers intended for holding waste materials of type to be stored.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Section "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 7300

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

B. Related Requirements:

1. Section 024119 "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.

1.3 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 PERFORMANCE REQUIREMENTS

A. General: Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials**.** including the following:

1. Demolition Waste:
    a. Rough hardware.
    b. Doors and frames.
    c. Door hardware.
    d. Windows.
    e. Glazing.
    f. Metal studs.
    g. Gypsum board.
    h. Acoustical tile and panels.

i. Carpet.
j. Carpet pad.
k. Demountable partitions.
l. Equipment.
m. Cabinets.
n. Piping.
o. Supports and hangers.
p. Sprinklers.
q. Mechanical equipment.
r. Electrical conduit.
s. Lighting fixtures.
t. Lamps.
u. Ballasts.
v. Electrical devices.

2. Construction Waste:
   a. Metals.
   b. Carpet and pad.
   c. Gypsum board.
   d. Piping.
   e. Electrical conduit.
   f. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
      1) Paper.
      2) Cardboard.
      3) Boxes.
      4) Plastic sheet and film.
      5) Polystyrene packaging.
      6) Wood crates.
      7) Plastic pails.

1.5 ACTION SUBMITTALS

A. Waste Management Plan: Submit 3 copies of plan within 7 days of date established the Notice to Proceed.

1.6 INFORMATIONAL SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Report must be submitted in WCU's Contractor Waste Management Form, Attachment B, at the end of this section. Include the following information:
   1. Material category.
   2. Generation point of waste.
   3. Total quantity of waste in tons; coordinate submittal requirements with Appendix J
   4. Quantity of waste recycled, both estimated and actual in tons.

5. Total quantity of waste recovered (salvaged plus recycled) in tons.
6. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

B. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

C. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.7 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination" and WCU Design Standards Appendix J. Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of waste management coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

1.8 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to ASTM E 1609, WCU's Design and Construction Standards - Appendix J, and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of demolition and construction waste generated by the Work.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures. Contractor to use Contractor Waste Management Form at end of Specification section and found in WCU Design Standards – Appendix J.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
3. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.

4. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:

1. Total quantity of waste.
2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
3. Total cost of disposal (with no waste management).
4. Revenue from recycled materials.
5. Savings in hauling and tipping fees by donating materials.
6. Savings in hauling and tipping fees that are avoided.
7. Handling and transportation costs. Include cost of collection containers for each type of waste.
8. Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."

B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

1. Distribute waste management plan to everyone concerned within three days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:

1. Clean salvaged items.
2. Store items in a secure area until installation.
3. Protect items from damage during transport and storage.

4. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Lighting Fixtures: Separate lamps by type and protect from breakage.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
    a. Inspect containers and bins for contamination and remove contaminated materials if found.
2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

A. Metals: Separate metals by type.

1. Remove and dispose of bolts, nuts, washers, and other rough hardware.

B. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

C. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

D. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.

E. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.

1. Store clean, dry carpet and pad in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

F. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

G. Conduit: Reduce conduit to straight lengths and store by type and size.

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.

2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction and per WCU Design Standards – Appendix J.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

Coordinator or Safety Office for removal of wastes in accordance with the pre- determined disposal designations.

Management of Regulated Demolition Debris

Designer Waste Information Form

Project Name: WCU HF Robinson Administration Building - 2nd Floor Renovation			**Date**: 9/18/19
Project Designer: McMillan Pazdan Smith Architecture			
Asbestos		N	
Decontamination/Cleaning Liquids		N	
Lead Paint		N	
Fluorescent Lamps		N	
Ballast (PCB & Non PCB)		N	
Electrical Equipment		Y	
Mercury Containing Equipment		N	
Batteries		N	
Contaminated Benches, Cabinets, Floors, and Walls		N	
Caulking		N	
Ducts		N	
Fume Hoods		N	
Metal Piping		N	
Hazardous Materials Storage and Gas Cabinets		N	
Refrigeration Equipment (		N	
Roofing Materials		N	
Sink Traps (laboratories only)		N	
Smoke Detectors		N	
Emergency Exit Signs		Y	
Oil		N	
Fuel Tanks		N	
Salvageable Equipment, Fixtures, and Materials		N	
Other:			
Other:			
Other:			
Other:			
Other:			
Other:			

Other:			
Other:			
Other:			
Other:			
Other:			
Other:			

Management of Regulated Demolition Debris

Contractor Waste Management Form			
Project Name:			
Contact Information			
WCU Project Manager:			
Contractor Name:		Subcontractor Name:	
Address:		Address:	
Phone Number:		Phone Number:	
Onsite Contact:		Emergency Contact:	
Phone Number:		Phone Number:	
Emergency Contact:			
Phone Number:			
Recycling/Reclamation Facility:		Phone Number:	
Treatment/Disposal Facility:		Phone Number:	
Wastes of Concern			
Type	Container Type*	Storage Location	Comments
Asbestos			
Decontamination/ Cleaning Liquids			
Lead Paint			
Fluorescent Lamps			
Ballast (PCB or Non PCB)			
Mercury Containing Equipment			
Batteries			
Sink Traps (labs only)			
Oil			
Scrap Tires			
White Goods			
Other:			
Other:			
Other:			
Other:			
Other:			
Other:			
*Container Type – Roll-off, Tank, Drum (specify size), Boxes, Other (specify)			
Signature		Date	
Please complete this form and e-mail to the Project Manager			

END OF SECTION 01 7419

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Warranties.
3. Final cleaning.

B. Related Sections include the following:

1. Division 01 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
2. Division 01 Section "Execution" for progress cleaning of Project site.
3. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
4. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
5. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
6. Divisions 02 through 49 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 PROJECT ACCEPTANCE

A. Preliminary Procedures: Before requesting inspection for determining date of project acceptance, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
5. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
6. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
7. Complete startup testing of systems.
8. Submit test/adjust/balance records.

9. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
10. Advise Owner of changeover in heat and other utilities.
11. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
12. Complete final cleaning requirements, including touchup painting.
13. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for project acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of project acceptance after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
2. Submit certified copy of Architect's project acceptance inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of the list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
    a. Project name.

b. Date.

c. Name of Architect

d. Name of Contractor.

e. Page number.

1.6 WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Final Completion is indicated.

B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.

2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, in areas disturbed by construction activities, of rubbish, waste material, litter, and other foreign substances.

b. Remove tools, construction equipment, machinery, and surplus material from Project site.

c. Clean exposed interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition.

d. Remove debris and surface dust from limited access spaces, including, plenums, shafts, and similar spaces.

e. Sweep concrete floors broom clean in unoccupied spaces.

f. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.

g. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.

h. Remove labels that are not permanent.

i. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

j. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

k. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

l. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

m. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

n. Leave Project clean and ready for occupancy.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Final Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.

2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

   a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01 7700

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.

1.3 INFORMATIONAL SUBMITTALS

A. Attendance Record: For each training module, submit list of participants and length of instruction time.

1.4 CLOSEOUT SUBMITTALS

1. At completion of training, submit complete training manual(s) for Owner's use prepared and bound in format matching operation and maintenance manuals and in PDF electronic file format on compact disc.

1.5 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

1.6 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
   a. System, subsystem, and equipment descriptions.
   b. Performance and design criteria if Contractor is delegated design responsibility.
   c. Operating standards.
   d. Regulatory requirements.
   e. Equipment function.
   f. Operating characteristics.
   g. Limiting conditions.
   h. Performance curves.
2. Documentation: Review the following items in detail:
   a. Emergency manuals.
   b. Operations manuals.
   c. Maintenance manuals.
   d. Project record documents.
   e. Identification systems.
   f. Warranties and bonds.
   g. Maintenance service agreements and similar continuing commitments.
3. Emergencies: Include the following, as applicable:
   a. Instructions on meaning of warnings, trouble indications, and error messages.
   b. Instructions on stopping.
   c. Shutdown instructions for each type of emergency.
   d. Operating instructions for conditions outside of normal operating limits.
   e. Sequences for electric or electronic systems.
   f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
   a. Startup procedures.
   b. Equipment or system break-in procedures.
   c. Routine and normal operating instructions.
   d. Regulation and control procedures.
   e. Control sequences.
   f. Safety procedures.
   g. Instructions on stopping.
   h. Normal shutdown instructions.
   i. Operating procedures for emergencies.
   j. Operating procedures for system, subsystem, or equipment failure.
   k. Seasonal and weekend operating instructions.
   l. Required sequences for electric or electronic systems.
   m. Special operating instructions and procedures.
5. Adjustments: Include the following:
   a. Alignments.

b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:
   a. Diagnostic instructions.
   b. Test and inspection procedures.
7. Maintenance: Include the following:
   a. Inspection procedures.
   b. Types of cleaning agents to be used and methods of cleaning.
   c. List of cleaning agents and methods of cleaning detrimental to product.
   d. Procedures for routine cleaning
   e. Procedures for preventive maintenance.
   f. Procedures for routine maintenance.
   g. Instruction on use of special tools.
8. Repairs: Include the following:
   a. Diagnosis instructions.
   b. Repair instructions.
   c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
   d. Instructions for identifying parts and components.
   e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
   1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
   2. Owner will furnish an instructor to describe Owner's operational philosophy.
   3. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

   1. Schedule training with Owner with at least 14 days' advance notice.

D. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

END OF SECTION 01 7900

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Selective demolition of building elements for alteration purposes.
3. Salvage of existing items to be reused or recycled.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at project site.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
3. Review areas where existing construction is to remain and requires protection.

1.4 INFORMATIONAL SUBMITTALS

A. Predemolition Photographs or Video: Submit before Work begins.

B. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property for dust control. Indicate proposed locations and construction of barriers.

C. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner other tenants' on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

1.5 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.

2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.

a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.

b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.

c. Equipment to Be Removed: Disconnect and cap services and remove equipment.

d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.

e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
5. Dispose of demolished items and materials promptly.

B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.

5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 4119

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Wood blocking**,** cants, and nailers.
2. Plywood backing panels.

1.3 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal (114 mm actual) in least dimension.

B. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NLGA: National Lumber Grades Authority.
2. SPIB: The Southern Pine Inspection Bureau.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
3. Provide dressed lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 15 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS – ALL CONCEALED WOOD BLOCKING, PLYWOOD BACKING PANELS SHALL BE FIRE RETARDANT TREATED

A. General: Comply with performance requirements in AWPA C20 (lumber).

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

1. Use treatment that does not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to

accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.

3. Interior Type A: Use where exterior type is not indicated.

C. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

D. Application: Treat [all rough carpentry unless otherwise indicated.] [items indicated on Drawings, and the following:]

1. Concealed blocking.
2. Roof construction.
3. Plywood backing panels.
4. Concealed plywood sheathing.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.

B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content and any of the following species:

1. Mixed southern pine; SPIB.
2. Spruce-pine-fir; NLGA.
3. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
4. Eastern softwoods; NeLMA.

C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

2.5 PLYWOOD BACKING PANELS

A. Backing Panels: DOC PS 1, Exterior, AC, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch (13-mm) nominal thickness.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M

B. Power-Driven Fasteners: NES NER-272.

C. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).

D. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

E. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry assemblies and equal to four times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

2.7 MISCELLANEOUS MATERIALS

A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Install plywood backing panels by fastening to studs; coordinate locations. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.

C. Do not splice structural members between supports unless otherwise indicated.

D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.

E. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

F. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

H. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

C. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

3.3 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 1000

SECTION 06 41 16 – ARCHITECTURAL WOOD CASEWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-faced architectural cabinets.
2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets unless concealed within other construction before cabinet installation.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product, including high-pressure decorative, laminate, adhesive for bonding plastic laminate, fire-retardant-treated materials, and cabinet hardware and accessories.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show details full size.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcing specified in other Sections.
3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.

C. Samples:

1. Plastic laminates, for each color, pattern, and surface finish.

1.3 QUALITY ASSURANCE

A. Fabricator Qualifications: Architectural Woodwork Institute certified fabricator specializing in performing the work of this section with minimum 5 years experience.

B. Installer Qualifications: Arrange for interior architectural woodwork installation by a firm that can demonstrate successful experience in installing architectural woodwork items similar in type and quality to those required for this Project.

1.4 FIELD CONDITIONS

A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.

B. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

1.6 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade indicated and, where the following products are part of interior woodwork, with requirements of the referenced product standards that apply to product characteristics indicated:

1. Hardboard: AHA A135.4.
2. Medium-Density Fiberboard: ANSI A208.2.
3. Particleboard: ANSI A208.1, Grade M-2.
4. Softwood Plywood: PS 1.
5. Hardwood Plywood and Face Veneers: HPVA HP-1.

B. Fiberboard: ANSI A208.2, Grade MD-21, 48 lb. density.

C. Particleboard: ANSI A208.1, Grade M-2 made with phenol-formaldehyde resins.

1. Provide moisture resistant particleboard for tops receiving sinks.

D. High-Pressure Decorative Laminate: NEMA LD 3, Grade GP-28 for vertical surfaces and GP50 for countertops.

1. Colors, Patterns, and Finishes: Provide selections indicated.
2. Laminate Attachment: Bond laminate materials to core material with catalyzed PVA glue with a minimum average pressure of 90 PSI and average 180 degree temperature.
3. Edge banding for Plastic Laminate: Rigid PVC extrusions, through color with satin finish, 1 mm thick. Hot melt adhesive application.

E. Semi-exposed Plastic Laminate Casework Materials: Comply with the following:

1. Thermo-fused Melamine Laminate: Permanently thermo-fused melamine laminate, fused to core using average pressure of 320 PSI and average 320 degrees F. temperature. Shall meet ALA 1996 specification standards, as tested against the high pressure laminate NEMA LD 3-1995, VGS.028 specification standards.
2. Plastic Laminate Cabinet Liner: High-pressure decorative laminate cabinet liner complying with NEMA LD 3, CL 20.

a. a. Laminate Attachment: Bond laminate materials to core material with catalyzed PVA glue with a minimum average pressure of 90 PSI and average 180 degree temperature.

3. Edge-banding : Rigid PVC extrusions, through color with satin finish, 1 mm thick. Hot melt adhesive application.

F. Adhesive for Shop Bonding of Plastic Laminate: Contact cement.

2.2 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 8 Section "Door Hardware."

B. Hardware Standard: Comply with BHMA A156.9 for items indicated by reference to BHMA numbers or referenced to this standard.

C. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA code number indicated.

1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
2. Satin Stainless Steel, Stainless-Steel Base: BHMA 630.

D. For concealed hardware provide manufacturer's standard finish that complies with product class requirements of BHMA A156.9.

E. Cabinet Hinges: Blum Compact 39C, 3-dimensional adjustable, 110 degree open angle, slide on technique, all metal hinge with automatic steel closing mechanism.

F. Drawer and Shelf Slides: Accuride 3832, telescoping full extension steel ball bearing slide, 100 pound capacity, bright electro-zinc finish. Provide 150 pound capacity slides at photo and for file drawers.

G. Drawer and Cupboard Locks: Cylindrical type, 5-pin tumbler and cam, brass with chrome-plated finish, complying with BHMA A156.11, Grade 1.

1. National Cabinet Lock No. C8073-14A.
2. Provide minimum of 3 keys per lock and 6 master keys.
3. Each department shall be keyed according to end user’s instructions.

H. Door and Drawer Pulls: Bar Pull, Solid aluminum with brushed finish.

I. Adjustable Shelf Clips: Knape & Vogt .” Spoon Clip in Bright Chrome.

2.3 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: **Fire-retardant-treated softwood lumber**, kiln dried to less than 15 percent moisture content.

B. Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1 for applicable requirements.

1. For metal framing supports, provide screws as recommended by metal-framing manufacturer.

C. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.

D. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors.

Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

A. Wood Glue: Aliphatic- or phenolic-resin wood glue recommended by manufacturer for general carpentry use.

2.4 FABRICATION

A. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

B. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

C. Shop-cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and, where located in countertops and similar exposures, seal edges with a water-resistant coating.

D. Fabricate casework, countertops and millwork items in strict accordance with AWI P-200, Section 400A, Custom grade unless noted otherwise. Minimum nominal thickness for cabinet components shall meet AWI Quality Standard 400-G-8.

E. Plastic Laminate Casework: Custom grade, with flush overlay construction without face frame cabinet construction unless indicated otherwise.

1. Body members - ends, bottom, divisions, rails and tops: .028" laminate over .020" cabinet liner or melamine particleboard, all exposed and semi-exposed sides.
2. Shelves: Thermoset Decorative Overlay (melamine)with PVC edging on all four edges.
3. Backs: Thermoset Decorative Overlay (melamine).
4. Drawer Members: 5/8 inch thick melamine particleboard,.
5. Drawer Fronts: .028" laminate over .020" cabinet liner particleboard.
6. Cabinet Doors: .028" laminate over .020" cabinet liner or melamine particleboard.
7. Edging: Band all exposed edges of plywood with 1 mm PVC.
8. 8. Base Toe Kick: Hardwood plywood with plastic laminate or, resilient base specified in Section 09650, Resilient Flooring.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition cabinets to average prevailing humidity conditions in installation areas.

3.2 INSTALLATION

A. Grade: Install cabinets to comply with same grade as item to be installed.

B. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).

C. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

D. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork.

E. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

1. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.

2. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches (400 mm) o.c. with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish

END OF SECTION 06 41 16

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Silicone joint sealants.
   2. Urethane joint sealants.
   3. Latex joint sealants.

B. Related Sections:
   1. Section 042000 "Unit Masonry" for masonry control and expansion joint fillers and gaskets.
   2. Section 079500 "Expansion Control" for building expansion joints.
   3. Section 078446 "Fire-Resistive Joint Systems" for sealing joints in fire-resistance-rated construction.
   4. Section 088000 "Glazing" for glazing sealants.
   5. Section 092900 "Gypsum Board" for sealing perimeter joints.
   6. Section 093000 "Tiling" for sealing tile joints.
   7. Section 095123 "Acoustical Tile Ceilings for sealing edge moldings at perimeters with acoustical sealant.

1.3 PRECONSTRUCTION TESTING

A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
   1. Use manufacturer's standard test method to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.

B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
   1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
   2. Conduct field tests for each application indicated below:
      a. Each kind of sealant and joint substrate indicated.
   3. Notify Architect seven days in advance of dates and times when test joints will be erected.

1.4 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS.

A. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

C. Product Information substantiating low VOC compliance.

D. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

E. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

F. Field-Adhesion Test Reports: For each sealant application tested.

G. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

1.7 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: 5 years from date of Final Completion.

B. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.

2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

D. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

E. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Dow Corning Corporation; **790**
   b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
   c. May National Associates, Inc.; **Bondaflex Sil 728 NS**
   d. Pecora Corporation; **301 NS**
   e. Sika Corporation, Construction Products Division; SikaSil-C990.
   f.

B. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following
   a. BASF Building Systems; Omniplus.
   b. Dow Corning Corporation; 786 Mildew Resistant.
   c. GE Advanced Materials - Silicones; Sanitary SCS1700.
   d. May National Associates, Inc.; Bondaflex Sil 100 WF.
   e. Tremco Incorporated; Tremsil 200 Sanitary.

2.3 URETHANE JOINT SEALANTS

A. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Sika Corporation, Construction Products Division; Sikaflex - 15LM.
   b. Tremco Incorporated; Vulkem 921
   c. Pecora Corporation;

2.4 LATEX JOINT SEALANTS

A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. BASF Building Systems; Sonolac.
   b. Bostik, Inc.; Chem-Calk 600.
   c. May National Associates, Inc.; Bondaflex 600
   d. Pecora Corporation; AC-20+.
   e. Schnee-Morehead, Inc.; SM 8200.
   f. Tremco Incorporated; Tremflex 834.

2.5 ACOUSTICAL JOINT SEALANTS

A. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

2.6 POLYISOBUTYLENE JOINT SEALANTS

A. General Purpose Joint Sealant: ASTM C1311.

1. Products: Basis of Design: Tremco Butyl Sealant

2.7 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.8 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.
    d. Direct applied finish systems.
3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.
4. Tooling of joints with finger(s) is not allowed

G. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:
    a. Perform 1 test for each **100 feet (300 m)]** of joint length thereafter or 1 test per each floor per elevation.
2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Final Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces **JS-1**.

1. Joint Locations:
   a. Control and expansion joints on exposed interior surfaces of exterior walls.
   b. Perimeter joints of exterior openings where indicated.
   c. Tile control and expansion joints.
   d. Vertical joints on exposed surfaces of interior unit masonry, concrete, walls, and partitions.
   e. Perimeter joints between interior wall surfaces and frames of interior doors and windows
   f. Other joints as indicated.
2. Joint Sealant: Latex
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors

B. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces **JS-#2 .**

1. Joint Sealant Location:
   a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
   b. Tile control and expansion joints where indicated.
2. Joint Sealant: Single component, nonsag, mildew resistant, acid curing .
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces **JS-3.**

1. Joint Location:
   a. Acoustical joints where indicated.
   b. Other joints as indicated.
2. Joint Sealant: Acoustical
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

END OF SECTION 07 9200

SECTION 08 12 13 - HOLLOW METAL FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes hollow-metal frames.

B. Related Requirements:

1. Section 08 1416 "Flush Wood Doors" for wood doors installed in hollow-metal frames.

1.2 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include elevations, frame profiles, metal thicknesses, preparations for hardware, and other details.

C. Schedule: Prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Product test reports.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited too:

1. Ceco Door Products; an Assa Abloy Group company.
2. Curries Company; an Assa Abloy Group company.
3. Fleming-Baron Door Products.
4. Steelcraft; an Ingersoll-Rand company.

2.2 INTERIOR FRAMES

A. Heavy-Duty Frames: SDI A250.8, Level 2. At locations indicated in the Door and Frame Schedule

1. Physical Performance: Level A according to SDI A250.4.
2. Materials: 16 gage,
3. Construction: Mitered, Full profile welded.
4. Profile: Double Rabbet

2.3 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suite frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.

2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042.

2.4 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.

3. Jamb Anchors: Provide number and spacing of anchors as follows:

a. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Provide minimum three anchors per jamb.

4. Door Silencers: Except on weather-stripped frames, drill stops to receive three door silencers on strike of single door frames.

C. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce frames to receive nontemplated, mortised, and surface-mounted hardware.

2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

2.5 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer to exposed surfaces of frames, including galvanized surfaces. Apply rust-inhibitive enamel or paint after fabrication, either air-drying or baking, suitable as a base for specified finish paints complying with ANSI A250.10.

1. Shop Primer: SDI A250.10.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

3.2 INSTALLATION

A. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

a. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.

b. Install frames with removable stops located on secure side of opening.

c. Remove temporary braces necessary for installation only after frames have been properly set and secured.

d. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.

4. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

a. Squareness: Plus or minus 1/16 inch measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

b. Alignment: Plus or minus 1/16 inch measured at jambs on a horizontal line parallel to plane of wall.

c. Twist: Plus or minus 1/16 inch measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

d. Plumbness: Plus or minus 1/16 inch measured at jambs at floor.

3.3 ADJUSTING AND CLEANING

A. Final Adjustments: Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow-metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 08 1213

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-core doors with wood veneer faces.
2. Factory finishing flush wood doors.

B. Related Requirements:

1. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of door indicate door core materials and construction, veneer species, type and characteristics. Include factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:

1. Dimensions and locations of blocking.
2. Dimensions and locations of mortises and holes for hardware.
3. Dimensions and locations of cutouts.
4. Undercuts.
5. Requirements for veneer matching.
6. Doors to be factory finished and finish requirements.
7. Fire-protection ratings for fire-rated doors.

C. Samples: For factory-finished doors.

1.3 INFORMATIONAL SUBMITTALS

A. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.4 QUALITY ASSURANCE

A. Doors to comply with WDMA IS 1A04 Window and Door Manufacturers Association, AWS Section 9 (Architectural Woodwork Institute), or AWI with quality certification program (QCP)

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in plastic bags or cardboard cartons.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
   b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
2. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Algoma Hardwoods, Inc.
2. Marshfield Door Systems, Inc.
3. Eggers Industries.
4. VT Industries, Inc.

2.2 FLUSH WOOD DOORS, GENERAL

A. WDMA I.S.1-A Performance Grade:

1. Heavy Duty unless otherwise indicated.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors as indicated.

1. Construction: Five ply. Fabricate doors by hot-press method, bonding faces, crossbands, and core together in a single operation with Type 1 glue. Doors manufactured by cold pressing of manufactured or pre-manufactured components will not be accepted.
2. Grade: Premium, with Grade AA faces.
3. Species: White Maple
4. Cut: Plain Sliced
5. Core: Particleboard. ANSI A208.1, Grade LD-2, made with binder containing no urea-formaldehyde.
6. Crossbands: Wood-based composites of a minimum thickness of 1/16". Crossbands and face veneers are laminated to the core with Type 1 interior use glue using the Hot Press method. Crossbands must extend the full width of the door. Minimum properties include internal bond of 100 psi and density of 50 lbs. per cubic foot.
7. Stiles (Vertical Edges) – Matching Hardwood (one piece).
8. Rails (Horizontal Edges) – Solid Wood
9. Blocking: Composite blocking in particleboard-core doors as needed to eliminate through-bolting hardware. Provide solid blocks at lock edge and top of door for closer.

2.4 LIGHT FRAMES

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.

1. Wood Species: Same species as door faces
2. Profile: Flush rectangular beads
3. At wood-core doors include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

2.5 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied.

C. Openings: Factory cut and trim openings through doors.

1. Light Openings: Trim openings with moldings of material and profile indicated.

2.6 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.

B. Transparent Finish:

1. Grade: Equivalent to WDMA TR-6 and System 10.
2. Finish: Enviroclad UV Coating
3. Staining: As selected by Architect from manufacturer's full range
4. Sheen: Satin

PART 3 - EXECUTION

3.1 INSTALLATION

A. Hardware: For installation, see Section 08 7100 Door Hardware.

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

1. Install fire-rated doors according to NFPA 80.

C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.2 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

C. If required, protect doors following installation from damage that may occur as a result of project completion.

END OF SECTION 08 1416

SECTION 08 71 00 – DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Installation of all electrified and mechanical door hardware items is described and required to be provided in other related Sections of these Specifications.

Hardware supplier must be an authorized, direct factory distributor of all door hardware and access control products specified herein to insure compliance and service of these products.

C. Unless otherwise approved by the Architect / Engineer, furnish all door hardware items as described in the door hardware schedule.

1.2 SUMMARY

A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.

B. This Section includes the following:

1. Butt Hinges
2. Cylinders and Keys
3. Mortise Latchsets and Locksets
4. Door Closers
5. Wall Stops
6. Kick Plates
7. Self-Adhesive Gasketing
8. Door Silencers

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

1. Division 05 - Metal Fabrications
2. Division 06 - Carpentry
3. Division 07 - Joint Sealers
4. Division 08 - Hollow Metal Doors And Frames
5. Division 08 - Wood Doors
6. Hardware specified under other Sections is excluded from this Section.

1.3 REFERENCES

A. Standards of the following as referenced:

1. 2010 ADA Standards for Accessible Design
2. American National Standards Institute, Inc. (ANSI)
3. Door and Hardware Institute (DHI)
4. International Building Code (2015 Edition)

5. Intertek Testing Services - Warnock Hersey (ITS-WH)
6. Life Safety Code (NFPA 101, 2015 Edition)
7. National Electrical Code (NFPA 70, 2017 Edition)
8. North Carolina State Building Code (2018 Edition)
9. Standard for Fire Doors and Other Opening Protectives (NFPA 80, 2013 Edition)
10. Underwriter's Laboratories, Inc. (UL)

B. Regulatory standards of the following as referenced:

1. Department of Justice, Office of the Attorney General, *Americans with Disabilities Act,* Public Law 101-336 (ADA)
2. ICC/ANSI A117.1: *Accessible and Usable Buildings and Facilities, 2009 Edition.*

1.4 SYSTEM DESCRIPTION

A. Refer to applicable headings for system description for electric hardware products.

1.5 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 01 - Submittal Procedures; for submittal procedures.

B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements. Clearly highlight each submitted item and data applicable to this project on manufacturer's cut sheets. Arrange cut sheets in an order in which each item appears in the hardware sets.

C. Door hardware / access control systems schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Door Hardware Schedule Content: Based on hardware indicated, organize schedule into vertical format "hardware sets" indicating complete designations of every item required for each door or opening. Use specification Set Numbers with any variations suffixed with A, B, etc.. Do not deviate or rename from originally specified Set Numbers. Include the following information:

a. Type, style, function, size, and finish of each hardware item.
b. Name and manufacturer of each item.
c. Fastenings and other pertinent information.
d. Location of each hardware set cross referenced to indications on drawings both on floor plans and in door and frame schedule.
e. Explanation of all abbreviations, symbols, and codes contained in schedule.
f. Mounting locations for hardware.
g. Door and frame sizes and materials.
h. Keying information.
i. Provide a complete and detailed system of operating and elevation diagrams specifically developed for each opening requiring electrified hardware, except openings where only electromagnetic door holders and/or door position switches are specified. Provide these diagrams with the hardware schedule submittals, for approval. The following shall be included:

(1) Point-To-Point wiring diagram.
(2) Elevation of each door.

(3) Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.

j. Cross reference numbers used within schedule deviating from those specified.

(1) Column 1: State specified item and manufacturer.
(2) Column 2: State prior approved substituted item and its manufacturer.

2. Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g.: hollow metal frames) which is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of hardware schedule.

3. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

D. Samples of each type of exposed hardware unit in finish indicated and tagged with full description for coordination with schedule. Submit samples prior to submission of final hardware schedule.

1. Samples will be returned to the supplier. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated in the work, within limitations of keying coordination requirements.

E. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

This is a requirement of the door hardware supplier to furnish all templates of each required door hardware item to the suppliers of the hollow metal doors and frames. No templates shall be sent until all door hardware items have been approved.

F. Contract closeout submittals: At the completion of this project, furnish to Owner two (2) copies of an Owner's Operation and Maintenance Manual. This manual shall consist of PDF files with the following technical information.

1. Maintenance instructions for each door hardware item.
2. Manufacturers' catalog cut-sheets for each of their respective products.
3. Parts list for each of the manufacturers' respective products.
4. Final "Approved" Door Hardware Schedule.
5. Final "Approved" Keying Schedule.
6. Warranty: Completed and executed warranty forms.

1.6 QUALITY ASSURANCE

A. General Contractor's Investigation: Prior to Contract Execution, the General Contractor shall have thoroughly investigated the entities such as employees, consultants, sub-contractors, manufacturers, suppliers, etc., and other entities that will be performing work or supplying materials, products, equipment, or systems for this project, to ensure that they comply with all of the qualifications and requirements mentioned or implied in the Contract Documents. If it is later determined that any of the previously mentioned entities do not comply with the qualifications and requirements specified in the Contract Documents, the General Contractor will be required to replace that entity with a qualified entity at no increase in Contract Sum or Contract Time.

B. Single Source Responsibility: Obtain each type of hardware (latch and lock sets, hinges, closers, security equipment, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.

C. Qualifications of Supplier: A recognized architectural door hardware supplier, with warehousing facilities, who has been furnishing hardware and installation in the Project's vicinity for a period of not less than 4 years. The supplier shall be, or shall employ, a certified Architectural Hardware Consultant (AHC) and Security Consultant who is available, at reasonable times during the course of the work, for consultation about the Project's hardware requirements, to the Owner, Architect, and Contractor. A certified Architectural Hardware Consultant (AHC) and Security Consultant shall prepare all hardware and access control schedules. Supplier shall be responsible for proper coordination of all finish hardware items and access control items with related sections, to insure compatibility of products.

1. Hardware supplier must be an authorized, direct factory distributor of all door hardware and access control products specified herein to insure compliance and service of these products.

2. Require supplier to meet with Owner to finalize keying requirements and to obtain final instructions in writing.

D. Qualifications of Installer: The hardware installer shall have documented experience in the installation of hardware of similar quantities and types as required for this project. **The installer's qualifications shall be submitted to the architect, in writing, for approval by the architect before any work shall commence**.

E. Fire-Rated Openings: Furnish door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of the Authorities Having Jurisdiction. Furnish only items, of door hardware, that are listed and are identical to products tested by UL, ITS-WH, FM, or other testing and inspecting organization acceptable to the Authorities Having Jurisdiction, for use on types and sizes of doors indicated, in compliance with the requirements of fire-rated door and door frame labels.

Project requires door assemblies and components that are compliant with positive pressure and S Label requirements. Specifications must be cross-referenced and coordinated with door and frame manufacturers to ensure that total door opening engineering is compatible with UL10C Standard for Positive Pressure Fire Tests of Door Assemblies.

F. Product Qualifications: Manufacturers names and numbers are used to indicate the standards of design and quality. Submittals should include a sheet listing grade of item, duty rating (if applicable) and finish.

G. Substitutions: All substitution requests are required to be submitted prior to the bid date and complying with the procedures and time frame as outlined in Division 01, General Requirements. Approval of submitted products is at the discretion of the architect and his hardware consultant.

H. General Contractor, hardware distributor, and installers shall count, coordinate, and store all door hardware and access control items herein, verifying complete counts of all items scheduled and furnished. The manufacturers' and Owner's representatives will inspect the installation of the door hardware and access control items during that phase of construction. Any deficiencies in installation of all materials included herein shall be corrected before installation continues.

I. At the Project's Completion, the Owner's Representative shall accompany the Architect and General Contractor during the Door Hardware Items punch list phase of the project close-out, insuring the Owner's Representative is familiar with all applications and systems, as installed. Refer to additional requirements under 3.0 EXECUTION.

J. Pre-Installation Meeting: Prior to door hardware installation, the General Contractor / Construction Manager shall request a hardware installation meeting to be held at the project's location. This meeting shall convene no later than one month prior to the hardware's installation. The types of hardware this meeting shall include are: locksets, exit devices, and door closers. The manufacturer's representatives of the above listed products, in conjunction with the hardware supplier for this project, shall conduct the installation training. All hardware installers shall be required to attend this meeting to receive certificate of authorized training. This meeting shall serve as door openings coordination and review of all shop drawings from related trades prior to the hardware installation.

The Hardware Supplier shall include any related meeting costs in their proposal.

1.7 PRODUCT HANDLING

A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.

B. Packaging of door hardware is the responsibility of the supplier. As material is received by the hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set numbers to match the set numbers of the approved hardware schedule. Two or more identical sets may be packed in the same container.

C. Door hardware supplier shall deliver all individually packaged hardware items promptly to the place of installation (Shop or Project Site); direct factory shipments are not acceptable unless agreed upon beforehand. Hardware supplier shall coordinate delivery times and schedules with the contractor.

D. Inventory door hardware jointly with the General Contractor, representatives of the hardware supplier, and the hardware installer, until each is satisfied that the count is correct.

E. At the time of the hardware delivery, the door hardware supplier in conjunction with the Contractor shall verify and check in all hardware items. The Contractor must report all shortages (discrepancies with shipping documents) within five (5) working days.

F. General Contractor shall provide a secure lock-up for the door hardware and security equipment delivered to the Project, but not yet installed. Control handling and installation of the hardware items that are not immediately replaceable, so that completion of the work will not be delayed by hardware losses, both before and after installation.

1.8 WARRANTY

A. All materials must be warranted against defects in workmanship and materials for a period of one (1) year from date of acceptance of this project, unless otherwise noted. Any evidence of misuse or abuse voids all warranties. These warranties shall be each manufacturer's standard written warranty.

B. Special Warranties:

1. Mortise Latchsets and Locksets: Ten (10) Year Period.
2. Door Closers: Thirty (30) Year Period.

3. Self-Adhesive Gasketing: Three (3) Year Period.

C. Any manufacturer whose standard written warranty does not equal or exceed the requirements listed above must provide a letter stating that they will extend their warranty to comply with the requirements of this specification.

D. All of the manufacturer's fasteners and attachments supplied with each hardware item must be installed to maintain the manufacturer's fire listing and/or warranty.

E. Refer to Division 01 - Closeout Procedures; for additional warranty requirements.

1.9 MAINTENANCE

A. Maintenance Tools and Instructions: The General Contractor shall furnish a complete set of specialized tools and maintenance instructions as needed for the Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

B. Parts Kits: Furnish manufacturers' standard parts kits for locksets, exit devices, and door closers.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

Substitutions: Where specific manufacturers and their products are listed as "acceptable manufacturers", provide those products from specified manufacturers; subject to compliance with specified requirements stated herein.

Any request for substitutions shall be submitted prior to the bid date and complying with the procedures and time frame as outlined in Division 01 - Instructions To Bidders. Approved substitutions will be provided by addendum only.

Substitutions will not be allowed where only one manufacturer and their products are listed.

A. BUTT HINGES

1. Acceptable Manufacturers:
   a. Hager- BB1279 Series (Standard Weight), BB1199 (Heavy Weight)
   b. McKinney- TA27 Series
   c. Stanley- FBB Series

2. Characteristics:
   a. Tested to be in accordance with ANSI / BHMA A156.1, grade 1
   b. Type: Five (5) knuckle, full mortise, ball bearing.
   c. Templates: Furnish only template-produced units.
   d. Fasteners: Furnish Phillips flat-head screws complying with the following requirements.
      (1) For metal doors and frames, install machine screws into drilled and tapped holes.
      (2) For wood doors and frames, install threaded-to-the-head wood screws.
      (3) For fire-rated wood doors, install #12 x 1-1/4 inch, threaded-to-the-head steel wood screws.

(4) Finish screw heads to match surface of hinges or pivots.

e. Hinge Pins: Except as otherwise indicated, furnish hinge pins as follows:
(1) Out-Swing Exterior Doors: Non-removable pins.
(2) Out-Swing Interior Doors: Non-rising pins with Non-removable pins.
(3) In-Swing Exterior / Interior Doors: Non-rising pins.
(4) Tips: Flat button and matching plug. Finished to match leaves.

f. Size: Size hinges in accordance with the specified manufacturer's published recommendations.

g. Quantity: Furnish one pair of hinges for all doors up to 5'-0" high. Furnish one additional hinge for each additional 2-1/2 feet or fraction thereof.

B. CYLINDERS AND KEYS

1. Acceptable Manufacturers:
a. Corbin Russwin, Inc.; An ASSA ABLOY Group company (C-R).

2. Characteristics:
a. Tested to be in accordance with ANSI / BHMA A156.5, Grade 1.
b. Existing Key System: Provide all permanent interchangeable core cylinders keyed into Western Carolina University's' existing "Corbin Russwin" key system for this project.
c. Equip all cylinders and locksets with the manufacturer's standard 6-pin, interchangeable core, tumbler cylinders.
d. Furnish cylinders and locksets with temporary, brass / keyed, "Construction" interchangeable cores for the duration of the time of construction. Construction cores, operating keys, and control keys shall not be part of Owner's Permanent Key System or furnished on same keyway (or key section) as Owner's Permanent Key System. Construction cores, operating keys, and control keys are the property of the manufacturer and shall be returned when Permanent cores and keys are installed. Remove these "Construction" interchangeable cores ONLY when directed by Architect and / or Owner.
e. Furnish final permanent interchangeable cores and keys, for installation by Owner.
f. Metals: Construct lock cylinder parts from brass or bronze, stainless steel, or nickel silver.
g. Comply with Owner's instructions for keying requirements and, except as otherwise indicated, furnish individual change keys for each lock that is not designated to be keyed alike with a group of related locks.

(1) Permanently inscribe each key with the number of the lock that identifies the cylinder manufacturer's key symbol, and notation, "DO NOT DUPLICATE".

h. A keying meeting between the Owner and a representative of the successful door hardware distributor shall be arranged subsequent to the return of the Approved Door Hardware Schedule. A keying schedule will be established by the door hardware distributor's representative and submitted to the Owner, for approval. After the Owner's review, the keying schedule shall be returned to the distributor's representative such that the permanent cores and keys can be prepared on a timely basis.
i. Permanent cores and keys shall be transmitted directly to Owner by the manufacturer. Owner shall be responsible for installation of the permanent cores and the return of the construction cores and keys back to the manufacturer.
j. Key Material: Furnish keys of nickel silver only.
k. Key Quantities: Furnish the following quantities of keys for the entire project.
(1) Five (5) Each - Construction Master Keys
(2) Two (2) Each - Construction Control Keys

(3) Zero (0) Each - Permanent Grand Master Keys
(4) Five (5) Each - Permanent Master Keys (For Each Area)
(5) Two (2) Each - Permanent Control Keys
(6) Four (4) Each - Permanent Change Keys (For Each Keyed Door Opening)

Deliver all construction interchangeable cores and keys to the General Contractor. Deliver all permanent interchangeable cores and keys to the Owner, via Registered Mail.

C. MORTISE LATCHSETS AND LOCKSETS

1. Acceptable Manufacturers:
   a. Corbin Russwin, Inc.; An ASSA ABLOY Group company (C-R) - ML2000 Series x "Lustra (LWM)" Trim Design.

2. Characteristics:
   a. Conforms to and/or exceeds all ANSI / BHMA A156.13, Series 1000, Grade 1 Operational, Grade 2 Security. ANSI / ASTM F476-84 Grade 30, U.L. Listed. Conform to and/or exceed 800,000 cycle ANSI Grade 1 requirements.
   b. Latchsets and locksets shall have all functions available in a one size case, fabricated from heavy wrought steel, zinc dichromate plated for corrosion resistance and lubricity of internal parts. Cases shall be closed on all sides to protect internal parts.
   c. Handing of all latchsets and locksets shall be reversible without disassembly of lockcase.
   d. Latchsets and locksets shall have adjustable, beveled and armored fronts, with standard 2-3/4" (70 mm) backsets, with full 3/4" (19 mm) throw two or three-piece mechanical stainless steel anti-friction latchbolts, one-piece stainless steel 1" throw deadbolts, and stainless steel auxiliary bolts.
   e. All latchsets and locksets with latchbolts, regardless of trim design, shall be listed by Underwriters Laboratories for 3-hour fire rated and lesser classified doors.
   f. Lock trim (knobs, levers, sectional or escutcheon) shall be throughbolted through the lockcase to assure correct alignment and proper operation.
   g. Latchsets and locksets shall be furnished with replaceable breakaway spindles, designed to resist excessive force from vandalism, preventing damage to lever trim and internal lock case components.
   h. Lever handles shall be one-piece, solid, brass, bronze, or stainless steel.
   i. Armor fronts, escutcheons, and roses shall be fabricated from brass, bronze, or stainless steel.
   j. Strikes shall be 16 gauge, curved, brass, bronze or stainless steel, with 1" deep strike boxes, and furnished with lips of sufficient lengths to clear trim and protect clothing.

D. DOOR CLOSERS

1. Acceptable Manufacturers:
   a. LCN- 4040XP Series
      [Coordinate additional characteristics per WCU DCS Appendix G, Section 3.6.1] https://www.wcu.edu/WebFiles/FM_WCU_Design_Standards_rev11.09.18.pdf (p.205)

2. Characteristics:

a. Door closers shall have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder; which have been tested and certified under ANSI Standard A156.4, Grade 1.
b. Hydraulic fluid shall be of an all weather type, requiring no seasonal closer adjustment.
c. Spring power shall be continuously adjustable over the full range of closer sizes, and allowing for reduced opening force for the physically handicapped. Hydraulic regulations shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed and back check.

   Pressure Relief Valves (PRV) shall not be acceptable.

d. All closers shall have solid forged steel main arms and where specified shall have a spring loaded stop in the soffit shoe; as indicated in Door Hardware Sets. Where door travel on out-swing doors must be limited, use spring loaded stop in the soffit shoe type closers. Auxiliary stops are not required when spring loaded stop in the soffit shoe type closers are used.
e. Closers shall have non-metallic full, plastic, covers, which provides complete enclosure.
f. All closers shall be certified to exceed Ten Million (10,000,000) full load cycles by a recognized independent testing laboratory. All closers shall be of one manufacturer and shall maintain the manufacturer's thirty (30) year warranty.
g. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units complying with ADA and ANSI A117.1 provisions for door opening force.
h. Closers shall be attached utilizing through bolts with wood and machine screws.
i. Closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors shall provide for corridor clear width as required by code. Where possible, mount closers inside rooms.
j. Powder coating finish to be certified to exceed 100 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification.

   Lacquer or painted finish on metal components shall not be acceptable.

k. Where indicated in Door Hardware Sets, door closers shall be furnished with a Special Rust Inhibitor Pre-Treatment.

E. WALL STOPS

1. Acceptable Manufacturers:
   a. Burns Manufacturing- 565 Series
   b. Ives- WS Series
   c. McKinney- WS02 Series

2. Characteristics:
   a. Tested to be in accordance with ANSI / BHMA A156.16, Grade 1.
   b. Wall stops shall have a solid forged brass housing with a concealed, in the convex bumper, attachment. Furnish with wood screw and plastic anchors.

F. KICK PLATES

1. Acceptable Manufacturers:
   a. Burns Manufacturing- KP50 Series

2. Characteristics:

a. Tested to be in accordance with ANSI / BHMA A156.6, Grade 1.
b. All kick plates shall be US18 gauge (.050") thick of stainless steel material.
c. Fabricate kick plates not more than 2 inches less than door widths on the "Push" side; or as indicated in Door Hardware Sets.
d. Heights:
(1) Kick Plates shall be 8 inches in height.
e. Bevel all four (4) edges.
f. Fabricate kick plates with countersunk screw holes.
g. Furnish kick plates with #6 x 5/8" truss head, stainless steel, sheet metal screws.

G. SELF-ADHESIVE GASKETING

1. Acceptable Manufacturers:
a. Pemko- 192 Series
b. National Guard Products, Inc- 5020 Series
c. Zero International, Inc.; Division of Allegion, PLC (ZER)- 8144 Series

2. Characteristics:
a. Self-adhesive gasketing shall conform to ANSI / BHMA A156.22 for Door Gasketing Systems, as well as, ASTM E283-1984.
b. Gasketing shall be furnished extruded from high grade silicone, with pressure sensitive, double backed, self-adhesive.
c. Gasketing shall be classified by UL.

H. DOOR SILENCERS

1. Acceptable Manufacturers:
a. Burns Manufacturing, Inc. – 500 Series
b. IVES; Division of Allegion, PLC (IVE) - SR64 Series
c. Hager- 307D Series

2. Characteristics:
a. Tested to be in accordance with ANSI / BHMA A156.16, Grade 1.
b. Silencers shall be fabricated from a gray, opaque, rubber material, and featuring a pneumatic design that, once installed, forms an air pocket to absorb shock, reduce noise of door closing, eliminate door rattle, and provide constant tension for door latches or locks.
c. Silencers shall be installed into pre-drilled hollow metal door frames, which if installed properly, shall become Tamper-Proof.
d. Silencers shall be installed into pre-drilled wood door frames. To prevent removal, a small brad shall be driven into the stop strips of the wood frames and through the stems of the silencers.
e. Furnish three (3) for each single door, four (4) for each single "Dutch" door, and two (2) for each pair of doors.

2.2 MATERIALS AND FABRICATION

A. Manufacturer's Name Plate: Do not use manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise acceptable to Architect.

1. Manufacturer's identification will be permitted on rim of lock cylinders only.

B. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI / BHMA A156 series standards for each type of hardware item and with ANSI / BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.

1. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.

2. Provide screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible, including "prepared for paint" surfaces to receive painted finish.

3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of adequately fastening the hardware. Coordinate with wood doors and metal doors and frames where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.

2.3 HARDWARE FINISHES

A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets (or push-pull units if no latch of lock sets).

B. Provide finishes that match those established by ANSI or, if none established, match the Architect's sample.

C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with the manufacturer's standards, but in no case less than specified by the referenced standards, for the applicable units of hardware.

D. The designations used to indicate hardware finishes are those listed in ANSI / BHMA A156.18, "Materials and Finishes", including coordination with the traditional U.S. finishes, shown by certain manufacturers for their products.

1.	Butt Hinges	US26D (652) Satin Chromium
2.	Permanent Interchangeable Core Cylinders	US26D (626) Satin Chromium
3.	Mortise Latchsets and Locksets	US26D (626) Satin Chromium
4.	Door Closers	AL (689) Powder Coated Aluminum
5.	Wall Stops	US26D (626) Satin Chromium
6.	Kick Plates	US32D (630) Satin Stainless Steel

7.	Self-Adhesive Gasketing	BLACK (Silicone)
8.	Door Silencers	GREY (Rubber)

PART 3 - EXECUTION

3.1 INSTALLATION

A. Mount hardware units at heights indicated in the following applicable publications, except as specifically indicated or required to comply with governing regulations and, except as otherwise indicated, by the Architect.

1. “Recommended Locations for Builders Hardware for Standard Steel Doors and Frames” by the Door and Hardware Institute.

B. Install each hardware item in compliance with the manufacturer’s instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 09 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.

C. Sets units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

D. Where scheduled, door pulls shall be through-bolted with bolt heads concealed behind push plates.

E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

F. Set thresholds, for interior doors, in a full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 07 - Joint Sealers.

G. Gasketing and Seals: Comply with manufacturer’s instructions and recommendations to the extent installation requirements are not otherwise indicated.

H. Hardware installer shall be responsible for installation of all mechanical and electromechanical hardware items contained within this specification, in accordance with the manufacturer’s technical installation guidance, and in addition to all applicable code requirements.

I. Provide concealed blocking at all wall stop locations

3.2 ADJUSTING, CLEANING, AND DEMONSTRATING

A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.

1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, the hardware installers shall return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

B. Clean adjacent surfaces soiled by hardware installation.

C. Door Hardware Supplier's Field Service:

1. Instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

D. Architect's Hardware Consultant's Field Service:

1. Inspect door hardware items for correct installation and adjustment after complete installation of the door hardware.

2. File a written report of this inspection directly to the Architect.

E. Continued Maintenance Service: Approximately six (6) months after the acceptance of hardware in each area, the installer shall return to the project and re-adjust every item of hardware to restore proper function of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of any current or predictable problems (of substantial nature) in the performance of the hardware and furnish copy to the Owner's Agent / Representative.

3.3 HARDWARE SCHEDULE

HARDWARE GROUP NO. 1

FOR USE ON DOOR #(S):

202	205	206	207	208	209
210	212	213			

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	BB1279 4.5 X 4.5	652	HAG
1	EA	OFFICE LOCKSET	ML2054 LWM M34 CT6	626	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	WALL STOP	WS401CVX	US26D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 2

FOR USE ON DOOR #(S):
201A

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	EA	BUTT HINGE	BB1199 4.5 X 4.5	652	HAG
1	EA	CLASSROOM LOCKSET	ML2055 LWM CT6	626	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	DOOR CLOSER	4040XP REGULAR TBWMS	AL	LCN
1	EA	KICK PLATE	KP50 10" X 1-1/2" LDW B4E CSK	US32D	BUR
1	EA	WALL STOP	WS401CVX	US26D	IVE
1	EA	SELF-ADHESIVE GASKETING	8144S-BK	BLACK	ZER

FIELD VERIFY COMPATIBILITY OF NEWLY SPECIFIED DOOR HARDWARE ITEMS WITH FACILITY'S EXISTING DOOR AND FRAME.

IF THERE EXISTS ANY DISCREPANCIES BETWEEN THE NEWLY SPECIFIED DOOR HARDWARE ITEMS AND EXISTING DOOR HARDWARE ITEMS, THESE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT.

CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARING FACILITY'S EXISTING DOORS AND FRAMES TO ACCEPT ALL NEWLY SPECIFIED DOOR HARDWARE ITEMS AND PATCHING OF ANY AND ALL EXISTING HOLES DUE TO THE REMOVAL OF DOOR OPENINGS' EXISTING DOOR HARDWARE ITEMS.

PATCHING OF ANY AND ALL EXISTING HOLES SHALL BE PERFORMED TO THE SATISFACTION OF THE ARCHITECT AND/OR OWNER.

HARDWARE GROUP NO. 3

FOR USE ON DOOR #(S):
211

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	BB1279 4.5 X 4.5	652	HAG
1	EA	STOREROOM LOCKSET	ML2057 LWM CT6	626	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	WALL STOP	WS401CVX	US26D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 4

FOR USE ON DOOR #(S):
201B

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	BUTT HINGE	BB1199 4.5 X 4.5 NRP	652	HAG
1	EA	STOREROOM LOCKSET	ML2057 LWM CT6	626	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	DOOR CLOSER	4040XP RW/PA TBWMS	AL	LCN
1	EA	KICK PLATE	KP50 10" X 1-1/2" LDW B4E CSK	US32D	BUR
1	EA	WALL STOP	WS401CVX	US26D	IVE
3	EA	SILENCER	SR64	GREY	IVE

HARDWARE GROUP NO. 5

FOR USE ON DOOR #(S):
203

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	EA	BUTT HINGE	BB199 4.5 X 4.5 NRP	652	HAG
1	EA	STOREROOM LOCKSET	ML2057 LWM CT6	626	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	DOOR CLOSER	4040XP RW/PA TBWMS	AL	LCN
1	EA	KICK PLATE	KP50 10" X 1-1/2" LDW B4E CSK	US32D	BUR
1	EA	WALL STOP	WS401CVX	US26D	IVE
1	EA	SELF-ADHESIVE GASKETING	8144S-BK	BLACK	ZER

END OF SECTION 087100

SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Doors.
2. Windows.

1.2 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems that are produced, fabricated, and installed to withstand normal thermal movement and impact loading (where applicable), without failure including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; and other defects in construction.

1.3 ACTION SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.

C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Preconstruction adhesion and compatibility test report.

1.5 QUALITY ASSURANCE

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: GANA's "Glazing Manual."

B. Single-Source Responsibility for Glass: Obtain primary glass of each (ASTM C 1036) type and class indicated from one source for each product.

C. Single-Source Responsibility for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.7 WARRANTY

A. Manufacturer's Special Warranty for Glass Products: Manufacturer's standard form in which glass manufacturer agrees to replace glass units that deteriorate within specified warranty period. Deterioration of glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning glass contrary to manufacturer's written instructions.

1. Warranty Period: 10 years from date of Final Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

B. Strength: fully tempered glass, Kind FT heat-treated float glass.

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:.

1. For monolithic-glass lites, properties are based on units with lites of thickness indicated.
2. For laminated-glass lites, properties are based on products of construction indicated.
3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.

2.2 GLASS PRODUCTS

A. Manufacturers: Subject to compliance with requirements, provide one of the following:

a. AFG Industries, Inc.;
b. Guardian Industries Corp.;
c. Pilkington North America;
d. PPG Industries, Inc.;

B. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

C. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

2.3 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:

1. EPDM complying with ASTM C 864.
2. Silicone complying with ASTM C 1115.
3. Thermoplastic polyolefin rubber complying with ASTM C 1115.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned silicone gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.

1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

2.4 GLAZING SEALANTS

A. General:

1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Dow Corning Corporation; 790.
   b. Pecora Corporation; 890.
   c. Sika Corporation, Construction Products Division; SikaSil-C990.

2.5 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.

2.6 MISCELLANEOUS GLAZING MATERIALS

A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

B. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

C. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

D. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

E. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.7 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

2.8 GLAZING TYPES

A. Type GL-1: Single Safety Glazing: Non fire-rated

1. Applications: Provide this type in the following locations:
   a. Glazed lites in doors as indicated
2. Type: Fully tempered float glass
3. Tint: Clear

4. Thickness: As indicated, 1/4 inch minimum for interior single glazing.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches.

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

3.5 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

END OF SECTION 08 80 00

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
2. Suspension systems for interior gypsum ceilings and soffits.

1.2 ACTION SUBMITTALS

A. Product Data: Provide data on metal framing and accessories.

B. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance requirements.

1.3 QUALITY ASSURANCE

A. Single Source Responsibility for Steel Framing: Obtain steel framing assemblies from a single manufacturer.

B. Installer Qualifications: Company specializing in performing work similar in type and scope to that required for use on this Project, with minimum 5 years of documented experience.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: Provide materials and construction identical to those tested according to ASTM E 119.

2.2 FRAMING SYSTEMS

A. Manufacturers: Metal Framing, Connectors, and Accessories. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include:

1. Dietrich Metal Framing
2. MBA Building Supplies
3. Steel Network Inc.
4. Substitutions: See Section 01 6000 – Product Requirements

B. Protective Coating: Comply with ASTM A 1003. Galvanized G40 (Z120) or equivalent corrosion resistance coating complying with ASTM C 645.

C. Steel Studs and Runners: ASTM C 645

1. Depth: 3-5/8 inches, 2-1/2 inches, unless otherwise noted.
2. Flange Length: 1-1/4 inch

D. Slip-Type Head Joints: Where indicated, provide the following in thickness not less than indicated for studs and in width to accommodate depth of studs:

1. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes due to deflection of structure above.

E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Minimum Base-Metal Thickness: 0.018 inch.

F. Cold-Rolled Channel Bridging: Steel, 0.053-inch minimum base-metal thickness, with minimum 1/2-inch wide flanges.

1. Depth: 1-1/2 inches
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch thick, galvanized steel.

G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Depth: 7/8 inch, 1-1/2 inches

H. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch minimum uncoated-metal thickness of 0.018 inch, and depth required to fit insulation thickness indicated.

2.3 AUXILIARY MATERIALS

A. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.2 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Structural Isolation: Isolate steel framing from building structure at locations indicated and as shown on the drawings. Do not bridge building control and expansion joints with steel framing or furring members.

C. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

D. Install studs so flanges within framing system point in same direction.

E. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

a. Install two studs at each jamb unless otherwise indicated.

b. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

a. Firestop Track: Where rated partitions are provided, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

END OF SECTION 09 2216

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Interior gypsum board and accessories
2. Gypsum board finishing
3. Backing Panels

1.3 ACTION SUBMITTALS

A. Product Data: For data on gypsum board, accessories, and joint finishing systems.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility for Gypsum Products: Obtain each type of gypsum panel product from a single manufacturer.

B. Installer Qualifications: Company specializing in performing work similar in type and scope to that required for use on this Project, with minimum 5 years of documented experience.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

PART 2 - PRODUCTS

2.1 INTERIOR GYPSUM BOARD MATERIALS

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

1. American Gypsum.
2. CertainTeed Corp.
3. Georgia-Pacific Gypsum LLC.
4. Lafarge North America Inc.
5. National Gypsum Company.
6. USG Corporation.
7. Substitutions: Refer to Section 01 6000 – Product Requirements.

B. Gypsum Wallboard, Type X: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch
2. Long Edges: Tapered
3. Finish: Level 4

C. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Thickness: 1/2 inch
2. Long Edges: Tapered
3. Finish: Level 4

D. Glas-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M, with fiberglass mat laminated to both sides and with manufacturer's standard edges.
   1. Core: 5/8 inch, Type X

E. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.
   1. Thickness: **1/2 inch (15.9 mm)**.
   2. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.2 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.
   1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
   2. Special Shapes:
      a. Cornerbead at outside corners, unles otherwise indicated.
      b. Architectural reveal bead.
      c. U-Bead at exposed panel edges.
      d. LC-Bead at exposed corners.
      e. Tapered fin drywall reveal where gypsum board assemblies abut dissimilar materials.

B. Aluminum Trim: ASTM B 221 Alloy 6063-T5.

2.3 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M and as recommended by gypsum board manufacturer for project conditions

B. Joint Tape for Interior Gypsum Board: 2 inch wide, coated glass fiber mesh tape for joints and corners, except as otherwise indicated.

C. Joint Compound for Interior Gypsum Board: Ready-mixed vinyl-based. For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

D. Joint Compound for Backing Panels:
   1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.4 AUXILIARY MATERIALS

A. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

B. Sound Attenuation Blankets: 3 ½ inch insulation, see drawings.

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS

A. Comply with ASTM C 840 and manufacturer’s instructions.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

D. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4 wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

E. Install trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

1. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
2. Not more than 30 feet apart on walls and ceilings over 50 feet long.

F. Prefill open joints and damaged surface areas.

G. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

H. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.

I. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

1. Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

K. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
   a. Primer and its application to surfaces are specified in Section 09 9123 "Interior Painting."
2. Level 5 at corridors [See WCU DCS Section C10.1.10]

3.2 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 2900

SECTION 09 51 23 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes acoustical panel and concealed suspension systems for ceilings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified including:

1. 6 inch x 6 inch sample of each tile type and color.
2. Set of 12 inch long samples of suspension system members.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Manufacturer's Installation Instructions.

C. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

B. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Extra Acoustical Units: Quantity equal to 2 percent of total installed.
2. Extra Suspension System Components: Each type of exposed system components, equal to 2 percent of amount installed.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to NVLAP.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE/SEI 7. The IBC Seismic Design Category for the site is "C."

B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers that may be incorporated into the Work include, but are not limited to, the following:

1. Basis of Design: Armstrong World Industries, Inc.
2. USG Interiors, Inc.; Subsidiary of USG Corporation
3. CertainTeed Corp.

2.3 ACOUSTICAL PANEL CEILINGS, GENERAL

A. Acoustical Tile Standard: Comply with ASTM E 1264.

B. Metal Suspension System Standard: Comply with ASTM C 635.

C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

2.4 ACOUSTICAL PANELS

A. ACT-1: Basis-of-Design Product: “School Zone – Fine Fissured 1820” manufactured by Armstrong World Industries. Subject to compliance with requirements.

1. Classification: Type III, Form 2, Fire Rated
2. Color: White
3. LR: Not less than 0.82
4. NRC: Not less than 0.8, Type E-400 mounting according to ASTM E 795.
5. CAC: Not less than 40
6. Edge/Joint Detail: Tegular.
7. Thickness: 3/4 inch
8. Modular Size: 24 inch x 24 inch

2.5 METAL SUSPENSION SYSTEM

A. Manufacturers: Subject to compliance with requirements. Same as acoustical tiles.

B. Basis-of-Design Product: “Prelude XL – 15/16” manufactured by Armstrong World Industries. Subject to compliance with requirements.

1. Color: Flat White, Corrosion Resistant Enamel
2. Structural Classification: Heavy duty system.
3. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Manufacturer's standard moldings for edges and penetrations complying with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing and substrates to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine acoustical tiles before installation. Reject acoustical tiles that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install acoustical tile ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders, and comply with layout shown on reflected ceiling plans.

C. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

D. Arrange directionally patterned acoustical tiles as indicated on reflected ceiling plans.

E. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers without attaching to permanent metal forms, steel deck, or steel deck tabs.

1. Where attaching to existing suspended ceiling secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

2. When framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.

F. Install edge moldings and trim of type indicated at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical tiles.

G. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

H. Arrange directionally patterned acoustical tiles as follows:

1. As indicated on reflected ceiling plans.

3.3 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim and edge moldings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace tiles and other ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 5123

SECTION 09 65 00 - RESILIENT FLOORING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Resilient tile flooring.

B. Resilient base.

C. Installation accessories.

1.2 REFERENCE STANDARDS

A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

B. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile.

C. ASTM F1861 - Standard Specification for Resilient Wall Base.

D. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings;

E. Resilient Floor Covering Institute.

1.3 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Extra Flooring Material: 50 square feet of each type and color.
2. Extra Wall Base: 10 linear feet of each type and color.

1.4 QUALITY ASSURANCE

A. Warrantee: Manufacturer and Installer shal guarantee Resilient Tile Flooring installation for a period of 5 years from the date of Substantial Completion in accordance with WCU's Design and Construction Guidelines.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.

B. Store all materials off of the floor in an acclimatized, weather-tight space.

C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

D. Protect roll materials from damage by storing on end.

E. Do not double stack pallets.

1.6 FIELD CONDITIONS

A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 - PRODUCTS

2.1 TILE FLOORING

A. Vinyl Tile: Printed film type, with transparent or translucent wear layer [LVT-1].

1. Manufacturers:
   a. Interface, Basis of Design:
   b. Johnsonite, a Tarkett Company: www.johnsonite.com.
   c. Metroflor Corporation; Aspecta Five LVT: www.aspectaflooring.com.
   d. Milliken & Company: www.miliken.com.
2. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.
3. Plank Tile Size: 6 by 48 inch.
4. Wear Layer Thickness: 0.028 inch.
5. Total Thickness: 0.125 inch.
6. Pattern: Level Set.
7. Color: As indicated on drawings.

2.2 RESILIENT BASE

A. Resilient Base: ASTM F1861, Type TV, vinyl, thermoplastic; top set Style B, Cove.

1. Manufacturers:
   a. Burke Flooring: www.burkeflooring.com.
   b. Johnsonite, a Tarkett Company; : www.johnsonite.com.
   c. Roppe Corp: www.roppe.com.
2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
3. Height: 4 inch.
4. Thickness: 0.125 inch.
5. Finish: Satin.
6. Length: Roll.
7. Color: As indicated on drawings.

2.3 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.

B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer .

C. Moldings, Transition and Edge Strips: Vinyl of types and for locations indicated in Drawings from same manufacturer as vinyl base.

D. Sound Control Underlayment: Recycled ethylene vinyl acetate (EVA) sheet membrane with non-woven polyester fleece facer.

1. Manufacturers:
   a. Same as Resilient Flooring Manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

3.2 PREPARATION

A. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions. Grind concrete substrates to provide a level and cleaned subsurface to comply with manufacturer's written instructions.

B. Prohibit traffic until filler is fully cured.

3.3 INSTALLATION - GENERAL

A. Install in accordance with manufacturer's written instructions.

B. Spread only enough adhesive (perimeters only) as recommended by manufacturer to permit installation of materials before initial set.

C. Fit joints and butt seams tightly.

D. Set flooring in place, press with heavy roller to attain full adhesion.

E. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

F. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.

1. Resilient Strips: Attach to substrate using adhesive.

G. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

H. Install flooring in recessed floor access covers, maintaining floor pattern.

3.4 INSTALLATION - SOUND CONTROL UNDERLAYMENT

A. Install in accordance with underlayment manufacturer's instructions.

3.5 INSTALLATION - TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.

B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.

C. Install tile to basket weave pattern unless otherwise indicated in Drawings. Allow minimum ½ full size tile width at room or area perimeter.

D. Install plank tile with a random offset of at least 6 inches from adjacent rows.

3.6 INSTALLATION - RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 24 inches between joints.

B. Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold. At exposed ends, use premolded units.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

3.7 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean and seal in accordance with manufacturer's written instructions.

C. Coordinate final finish materials with Owner to confirm compatibility with their future floor maintenance protocol.

3.8 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

3.9 SCHEDULE

A. See Finish Schedule on Drawings.

END OF SECTION 09 65 00

SECTION 09 68 13 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes modular carpet tile.

1.2 ACTION SUBMITTALS

A. Product Data: Provide data on specified products, describing physical and performance characteristics, sizes, patterns, colors available, and method of installation.

B. Shop Drawings: Show the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Type of subfloor.
3. Type of installation.
4. Pattern of installation.
5. Pattern type, location, and direction.
6. Pile direction.
7. Location and type of flooring transition strips

C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association.

B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104.

1.7 FIELD CONDITIONS

A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

B. Store materials in area of installation for minimum period of 24 hours prior to installation.

1.8 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials within specified warranty period.

1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.

B. Material Warranty: Provide carpet manufacturer's warranty agreeing to replace material that does not meet requirements or fails in materials within the specified warranty period. Warranty shall be non-prorated, covering all costs including freight.

1. Wear: 10 year, no more than 10 percent loss of face yarn.
2. Edge Ravel: Lifetime of carpet, no edge ravel in normal use, wet or dry.
3. Backing: Lifetime of carpet.
4. Delamination: Lifetime of carpet, no delamination in ordinary use, wet or dry.
5. Tuft Bind: Lifetime of carpet, 20 lb average tuft bind, wet or dry.
6. Moisture Barrier: Lifetime of the carpet, no degradation of moisture barrier.
7. Static: Lifetime of carpet, 3.0 kv when tested per AATC-134 test method.

C. Installation Warranty Period: Provide non-prorated warranty against any installation related failure, covering all costs including freight, labor and material, cosigned by the flooring contractor.

1. Warranty period: Lifetime of carpet.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers that may be incorporated into the Work include, but are not limited to, the following:

1. Basis of Design: Interface, Inc.
2. Milliken
3. Tandus Centiva

2.2 CARPET TILE: CPT1

A. Basis-of-Design Product: Interface. Subject to compliance with requirements.

1. Color:
2. Installation Method:
3. Size: 50cm x 50cm Tile
4. Pile Characteristic: Tufted Textured Loop
5. Density: 16.7 oz. per cubic yard minimum
6. Backing System:
7. Applied Soil-Resistance Treatment:

2.3 INSTALLATION ACCESSORIES

A. Connectors: Recommended by carpet tile manufacturer

PART 3 - EXECUTION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
2. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions. Grind concrete substrates to provide a level and cleaned subsurface to comply with manufacturer's written instructions.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.

B. Installation Method: As recommended in writing by carpet tile manufacturer.

C. Maintain dye lot integrity. Do not mix dye lots in same area.

D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.

G. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:

1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
2. Remove yarns that protrude from carpet tile surface.
3. Vacuum carpet tile using commercial machine with face-beater element.

B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 09 6813

SECTION 09 91 23 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the field application of paint systems on interior substrates.

1.2 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples: For each type of paint system and in each color and gloss of topcoat.

C. Product List: For each product indicated. Include printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials from the same product run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 1 gallon of each material and color applied.

1.5 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
    a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
    b. Other Items: Architect will designate items or areas required.
2. Final approval of color selections will be based on mockups.
    a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to:

1. Basis of Design: The Sherwin Williams Company
2. Benjamin Moore & Co.
3. PPG Architectural Finishes

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Primers, Sealers, and Undercoaters: 200 g/L.

D. Low-Emitting Materials: Interior paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. Colors: As selected by Architect from manufacturer's full range

2.3 PRIMERS/SEALERS

A. Primer Sealer, Latex, Interior: MPI #50

1. Sherwin Williams: ProMar 200 Zero VOC Latex Primer
2. Benjamin Moore: EcoSpec Interior Latex Primer – N372
3. PPG Architectural: PVA Wall Interior Primer Sealer

2.4 METAL PRIMERS

A. Primer, Galvanized, Water Based: MPI #134

1. Sherwin Williams: Pro Industrial Pro-Cryl Universal Primer

2. Benjamin Moore: IronClad Latex Low Luster Enamel – C363
3. PPG Architectural: CorroStop Ultra Metal Primer

2.5 WATER-BASED PAINTS

A. Latex, Interior, (Gloss Level 2): MPI #44, Flat, Ceilings
   1. Sherwin Williams: ProMar 200 Zero VOC Latex Flat
   2. Benjamin Moore: EcoSpec WB Interior Latex Flat – N373
   3. PPG Architectural: Diamond 450 No VOC Interior Premium

B. Latex, Interior, (Gloss Level 3): MPI #52, Egg Shell, Walls
   1. Sherwin Williams: ProMar 200 Zero VOC Latex Egg-Shell
   2. Benjamin Moore: EcoSpec WB Interior Latex Egg-Shell – N374
   3. PPG Architectural: Diamond 450 No VOC Interior Premium

C. Latex, Interior, Gloss, (Gloss Level 5): MPI #141, Semi-Gloss, Hollow Metal Frames
   1. Sherwin Williams: Pro Industrial Zero VOC Acrylic Semi-Gloss Coating
   2. Benjamin Moore: Impervex Latex High Semi-Gloss Enamel - 309
   3. PPG Architectural: DevFlex QuickDry Waterborne Semi-Gloss – 4208QD

2.6 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

B. Patching Material: Latex Filler.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
   1. Gypsum Board: 12 percent.
   2. Masonry (Clay and CMU): 12 percent

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
   1. Gypsum Board: Verify that finishing compound is sanded smooth.

D. Proceed with coating application only after unsatisfactory conditions have been corrected.
   1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

A. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 INTERIOR PAINTING SCHEDULE

A. Metal Substrates - Unprimed (Aluminum, Steel):

1. Latex over Waterborne Primer System:
   a. Prime Coat: Primer, galvanized, water based MPI #134.
   b. Intermediate Coat: Latex, interior, matching topcoat.
   c. Topcoat: Latex, interior, gloss, (Gloss Level 5)

B. Clay - Masonry Substrates:

1. Latex System:
   a. Prime Coat: Primer sealer, latex, interior**,** MPI #50, matching topcoat.
   b. Intermediate Coat: Latex, interior, matching topcoat.
   c. Topcoat: Latex, interior, (Gloss Level 3), MPI #52

C. Gypsum Board Substrates:

1. Latex System (Walls):
   a. Prime Coat: Primer sealer, latex, interior**,** MPI #50.
   b. Intermediate Coat: Latex, interior, matching topcoat.
   c. Topcoat: Latex, interior, (Gloss Level 3), MPI #52
2. Latex System (Ceilings):
   a. Prime Coat: Primer sealer, latex, interior**,** MPI #50.
   b. Intermediate Coat: Latex, interior, matching topcoat.

c. Topcoat: Latex, interior, (Gloss Level 2), MPI #44

END OF SECTION 09 9123

SECTION 12 36 00 - COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Countertops for architectural cabinet work.

1.02 RELATED REQUIREMENTS

A. Section 06 41 00 - Architectural Wood Casework.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards.

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0.

C. NEMA LD 3 - High-Pressure Decorative Laminates.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

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

C. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

PART 2 PRODUCTS

2.01 COUNTERTOPS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.
   1. Laminate Sheet, Type HGS: NEMA LD 3, Grade HGS, 0.048 inch nominal thickness.
      a. Manufacturers:
         1) Wilsonart; Wilsonart High Pressure Laminate: www.wilsonart.com
         2) Formica Corporation; Formica Laminate: www.formica.com.
         3) Panolam Industries International, Inc Pionite; Panolam High Pressure Laminate: www.pionitelaminates.com.
      b. Finish: Matte, gloss rating of 5 to 20.
      c. Surface Color and Pattern: As indicated on drawings.
   2. Exposed Edge Treatment: Square, substrate built up to minimum 1-1/4 inch thick; covered with matching laminate.
   3. Back and End Splashes: Same material, same construction.
   4. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Custom Grade.

2.02 MATERIALS

A. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; join lengths using metal splines.

B. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

C. Cove Molding for Top of Splashes: Rubber with semi-gloss finish and T-spline to fit between splash and wall; 1/2 inch by 1/2 inch.
   1. Color: As selected by Architect from manufacturer's full line.

D. Joint Sealant: Mildew-resistant silicone sealant, white.

2.03 FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
   1. Join lengths of tops using best method recommended by manufacturer.
   2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
   3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
   1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
   2. Height: 4 inches, unless otherwise indicated.

C. Wall-Mounted Counters: Provide brackets as indicated on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch.

C. Seal joint between back/end splashes and vertical surfaces.

3.04 CLEANING

A. Clean countertops surfaces thoroughly.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Final Completion.

END OF SECTION 12 36 00

SECTION 22 01 10 - PLUMBING GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 REFERENCES & INTENT

A. All work of this Division shall comply with the requirements of Division 1.

B. Study all drawings and specifications before submitting bids.

C. Work under this Division includes all essential labor, materials, tools, equipment, transportation, insurance, temporary protection, supervision and incidental items for proper installation and operation of all systems even though not specifically mentioned or indicated.

D. Field verify all building dimensions. The drawings are not to be scaled for final dimensions. However, the equipment is to be installed substantially as shown.

E. It is the intent of these specifications and drawings to provide for finished systems of the quality specified, properly tested, balanced and ready for operation. This includes all devices and accessories required to make the work complete even though such items may not be expressly shown or specified. Drawings and specifications are complementary and must be so construed to determine the full scope of work.

F. Job site Conditions: The Contractor shall visit the site and familiarize himself with the existing conditions before submitting this bid. Failure to do so does not relieve the Contractor from completing the work as specified herein and after. Requests for additional payments due to the Contractor's failure to allow for work conditions will be rejected.

1.2 WORK INCLUDED

A. The following work is specifically included without limiting the generality implied by these specifications and drawings.

1. All plumbing scope of work as specified herein and as shown on the plans.
2. Work includes all piping, supports, anchors, insulation, labeling and identification.
3. All associated cutting and patching.

B. Bidders shall examine equipment plans and specifications and include in their bids all labor and material required for complete installation and connection of equipment which is properly a part of their trade even if it is not provided in the equipment specifications.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division-1 Specification sections and other Division 22 specification sections, apply to work of this section. Related work is specified in other divisions as follows:

1. Division 31 - Excavating.
2. Division 31 - Filling, Backfilling, and Finish Grading.
3. Division 3 - Cast-In-Place Concrete.
4. Division 5 - Metal Fabrications: Access doors.
5. Division 9 - Painting.

1.4 STANDARDS AND CODES

A. All equipment with electrical components shall bear the UL label.

B. The following minimum standards apply wherever applicable:

AGA	American Gas Association, Inc.
ANSI	American National Standards Institute, Inc.
ANSI B 31.9	Building Services Piping Code

ASME/ASME Code Sec.9	American Society of Mechanical Engineers Boiler and Pressure Vessel Code-Welding and Brazing Qualifications
ASTM	American Society for Testing Materials
AWWA	American Water Works Association
AWWA C651	Disinfecting Water Mains
NBFU	National Board of Fire Underwriters
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Act
MSS	Manufacturer's Standardization Society of the Valves and Fittings Industry
UL	Underwriters laboratories, listed Product Directories

North Carolina Plumbing Code, 2002 – International Plumbing Code 2000

C. In the event there are conflicts between specifications and standards or codes, standards or codes shall govern unless specifications are in excess of standards.

1.5 QUALITY ASSURANCE

A. All work shall be accomplished in a neat, workmanlike manner by experienced journeymen.

B. All work shall be performed at such times as are required by the progress of the job.

C. Plumbing equipment and fixture installation shall be by a licensed plumber specializing in performing the work of this section with minimum 3 years experience.

D. Materials and installation shall be in accordance with North Carolina State Building Code current edition.

1.6 PERMITS AND FEE

A. Make application for all necessary permits and pay applicable fees.

1.7 STRUCTURAL STEEL AND CONCRETE

A. Structural members may not be pierced without prior written approval of the Engineer.

1.8 WATERPROOFING

A. Waterproofed floors and walls may not be penetrated without prior written approval of the Engineer.

1.09 WORK SCHEDULE

A. Work schedule shall be in accordance with Division 1.

1.10 PROTECTION OF EQUIPMENT

A. Provide all necessary protection and be fully responsible for material and equipment stored or installed on the site.

B. Material or equipment stolen or damaged shall be replaced at no additional cost to the Owner.

C. Provide protection against theft, physical damage and the entry of dirt, water, corrosive fumes into the material and equipment.

D. Maintain protective covers for the duration of construction. Store equipment, such as controls, subject to damage by moisture and temperature extremes in a dry, heated space.

1.11 FIRE SAFETY

A. Fire Watch: Provide a fire watch wherever welding, brazing, cutting or other processes involving an open flame or potential for generating sparks is used. Fire watch shall consist of a person with a 10 pound carbon dioxide fire extinguisher. While on fire watch, the person so assigned shall have no other duties or assignments.

B. Fire Blanket: In addition to providing a fire watch, use an approved fire blanket to cover any combustible materials in the immediate area.

1.12 GUARANTEES

A. Furnish written guarantee, 1 year labor and materials, on all work in accordance with requirements of General Conditions. Partial approval of a portion of work does not affect the validity of guarantee.

1.13 SUBMITTALS

A. It shall be noted that submittals processed by the Engineer are not change orders; that the purpose of submittals is to demonstrate to the Engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install, and by detailing the fabrication and installation methods he intends to use. If deviations, discrepancies or conflicts between submittals and the contract documents in the form of design drawing and specifications are discovered either prior to or after submittals are processed by the Engineer, the design drawings and specifications shall control and shall be followed. The engineer may also require the contractor to submit samples of proposed or specified equipment for approval, with the samples to be returned to the contractor upon request.

B. Prior to procurement or manufacturing, submit for approval appropriate shop drawings, manufacturer's catalog data, and/or descriptive literature giving performance data, physical size, wiring diagrams, configuration, capacity, installation instructions, dimensions including rough-in dimensions, pipe connection sizes, trim, and finishes material, etc., for all items under this Division.

C. Field verify the characteristics of all specified equipment before preparing shop drawings. This shall include available space, available voltages, suitability of substrate for receiving the specified equipment, etc.

D. Where different products have to work together, it is the contractor's responsibility to select manufacturers whose products are visually or technically compatible.

E. Prepare listing of plumbing fixture, specialty items, and piping materials for the project. A sample schedule is included at the end of this section to complete this requirement. Provide all information represented. Plumbing materials shall not be delivered to the building until the Architect has inspected and approved the completed listing.

1.14 RECORD DOCUMENTS

A. During construction, keep an accurate record of all changes and deviations from contract documents. Upon completion of this installation, the contractor shall submit to the Engineer maintenance manuals and marked up prints indicating any installed work that is different from what is shown on the drawings.

PART 2 - PRODUCTS

2.1 QUALITY OF MATERIAL

A. Plumbing equipment manufacturer shall be a company specializing in manufacturing the products specified in this section with minimum three years experience. Equipment of the same general type shall be of the same make. Brand names and catalog numbers included with equipment or material specifications are used to indicate quality, rating or operating characteristics of the equipment or material.

B. All materials provided shall be new and shall be approved by the Underwriter's Laboratories, Inc. wherever that agency has applicable standards.

PART 3 - EXECUTION

3.1 CLEARANCE AND RESTORATION OF SITE

A. It may be required to temporarily remove existing ceiling tiles, piping, duct, conduits, etc. to introduce new work as specified in this Division. Contractor, after installation of new work, shall reinstall, reconnect removed items to match the existing. Installation of any new equipment shall not compromise existing fire ratings of rated assemblies. All penetrations shall be sealed to existing conditions per ALL guidelines for penetration protections. Provide offsets if required in existing piping, ducts etc. to introduce new work.

3.2 COORDINATION

A. Install all work to permit removal or maintenance of equipment and fixtures without damage to the equipment, fixtures, or the building.

B. Verify equipment space requirements, condition of substrate, voltages, etc. at the time of shop drawing submission and advise the engineer of any conflict.

C. Do not rough prior to receipt of approved shop drawings.

3.3 EQUIPMENT ARRANGEMENT AND SUPPORT

A. Support plumb, rigid and true to line all work, including equipment, fixtures, and piping furnished under this Division. Study thoroughly architectural, mechanical drawings and all related drawings to determine how equipment, fixtures and piping are to be supported, mounted or suspended.

B. Provide extra steel bolts, inserts, pipe stands, brackets and accessories for proper support as required whether or not shown on drawings. When directed, furnish for approval a drawing showing supports.

3.4 FINAL ADJUSTMENT AND TESTING

A. General: Provide all testing, preliminary and final adjustment of instrumentation for this purpose. Conduct all tests in full compliance with applicable codes prior to covering or concealing work by insulation, enclosures, etc.

B. Material found to be defective shall not be repaired. It shall be replaced with new material which tests satisfactorily. Defective workmanship only may be corrected after discovery of defect by tests.

C. Working Tests: Subject all equipment and controls to simultaneous and continuous working tests for a period of one day prior to final inspection. Make adjustments, repairs and equipment replacements as required.

3.5 LABELS, IDENTIFICATION AND TAGS

A. Label plumbing equipment and specialty items in conformance with Division 23 Section “Mechanical Painting and Identification”.

3.6 IDENTIFICATION OF ABOVE CEILING EQUIPMENT

A. Equipment, controls, valves, dampers and other devices needed service, adjustments or maintenance but located in concealed spaces and above the ceiling shall be marked on surfaces visible from floor.

B. A small phenolic tag, plastic or clear tape label, or simple color dot sticker placed on ceiling grid at approximate location of the device shall be utilized.

C. The selected marking scheme shall be coordinated with the Owner before implementation. The marking scheme shall be accompanied by a schedule or legend which shall be included in O&M manual and posted in mechanical room.

3.7 OWNER'S RIGHT TO TEST SYSTEMS

A. Should, in the opinion of the Engineer, and during the guarantee period, reasonable doubt exist as to the proper functioning of any equipment installed under this Contract, the right is reserved for the Owner and Engineer to perform any test deemed practical to determine whether such equipment is functioning properly and performing at required capacity. If such tests show proper functioning, the cost of the test will be paid by the Owner. If the tests indicate a deficiency in equipment capacity or performance, the Contractor shall pay the cost of the test and also make good any deficiencies shown by the test to the full satisfaction of the Owner and the Engineer.

3.8 CLEANING UP

A. The contractors performing work under this section shall at all times keep the premises and the building in a neat and orderly condition and any instructions of the Engineer in regard to the storing of material, protective measures, cleaning up of debris, etc. shall be explicitly followed. At the completion of the job, all equipment shall be cleaned to the satisfaction of the Owner.

B. Buildings will be occupied during installation of the new addition and/or alterations as described hereinafter. Thus, special care shall be taken during installation to protect equipment and other furniture in the buildings from dust and debris generated during installation of work specified in this Division.

3.9 INSPECTION CERTIFICATES

A. Obtain all inspections required by law, ordinances, rules, and regulations of the authorities having jurisdiction and obtain and furnish to the Engineer certificates of such inspections, pay all fees, charges, and other expenses in connection therewith.

3.10 FINAL REVIEW

A. Final review and tests of the completed construction shall be performed in the presence of the Engineer or his representative and shall be at such times as are convenient to the Engineer.

B. Final tests shall show conclusively that all fixtures and equipment perform their intended and specified functions and that all work complies with the provisions of these specifications.

C. All material, equipment, and instruments required for the tests shall be furnished by the Contractor at his own expense.

END OF SECTION 22 01 10

SECTION 22 01 50 - BASIC MATERIALS AND METHODS

PART I - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

A. Division 1.

B. Section 220110 - General Requirements

1.2 DESCRIPTION

A. Pipe and fittings shall be in accordance with specifications listed herein and shall be installed as outlined under applicable Divisions of the specifications. Materials shall be new and free of manufacturing defects or damage.

1.3 QUALIFICATIONS

A. The pressure ratings of pipe and fittings shall be compatible with maximum pressures anticipated in respective systems.

PART 2 - PRODUCTS

2.1 DRAIN AND WASTE PIPING ABOVE GROUND

A. Service weight cast iron with no hub fittings, elastomeric coupling with stainless steel bands, ASTM C 1277.

2.3 VENT PIPING

A. Service weight cast iron with no hub fittings, elastomeric coupling with stainless steel bands, ASTM C 1277.

2.4 SLEEVES

A. Waterproof

1. Sleeves through exterior walls below grade shall be a water-tight seal consisting of rubber sealing elements and a Delrin plastic pressure plate with length compatible to wall thickness. "Link Seal," Wayne Michigan, Wade, Zurn, or approved equal.

B. Walls and Floors

1. Sleeves through poured through concrete walls and floors, and non-bearing partition walls shall be linear polyethylene as manufactured "Crete Sleeve", Sperzel Division, Tyler or Charlotte Pipe.

2. Sleeves through waterproof floors or where exposed in rooms with floor drains shall be coated cast iron with flashing device and under deck clamp. J.R. Smith #1720, Josam, Wade or Zurn.

3. General Provision for Sleeves: Provide sleeves for all pipe passing through masonry fire walls, floors, foundation walls or ceilings of concrete or masonry construction. Provide a Schedule 40 galvanized steel pipe (unless specified otherwise in Item 2.03 B 1 or 2) large enough to clear pipes by 1/4 inch all around. No sheet metal sleeves are to be permitted. All floor sleeves shall extend 1/2 inch above floor. Sleeves at walls and ceilings shall be flush at wall lines. For insulated pipes, sleeves shall be larger than the outside diameter of the insulation and insulation shall be continuous through the sleeves. Sleeves shall be machine cut at right angles to centerline of pipe and deburred. No flame cut sleeves will be permitted.

2.5 ESCUTCHEONS

A. Escutcheons: Use chrome-plated B & C Type 40 flush escutcheons on ceiling and wall. At

floors, use Ritter No. 36-A deep cup chrome-plated escutcheon. Use Ritter, Grabler, Blaw-Knox, or equal. Escutcheons shall be used at all piping in finished areas. Escutcheons on insulated piping shall fit insulation tightly.

2.6 FLASHING

A. Sheet Lead

1. Sheet lead for general use shall weigh at least 4 pounds per square foot.

B. Sheet Copper

1. Sheet copper for general use shall weigh at least 12 ounces per square foot and conform to ASTM B152.

PART 3 - EXECUTION

3.1 SLEEVES

A. Provide for all pipes passing through floors, walls and ceilings.

B. Sleeves shall be of sufficient size to receive insulation and of proper length to terminate 1" above finished surfaces.

C. Sleeves for covered lines shall fit over covering without unnecessarily large clearances.

D. Pipe sleeves shall be caulked with non-hardening caulking to prevent transmission of noise between floors and walls.

E. Sleeves for piping from mechanical rooms shall be made air and vapor tight by caulking with UL listed fireproof caulking equivalent to 3M cp 25 N/S.

F. Sleeves and UL approved details shall be provided at all penetrations passing through rated facilities.

3.2 ESCUTCHEONS

A. Provide for all exposed piping passing through floors, walls or ceilings of all spaces including equipment rooms.

3.3 FLASHING

A. Vent Piping

1. Sanitary Vent: Extend vent 18 inches above roof.

END OF SECTION 22 01 50

SECTION 22 07 00 - PLUMBING INSULATION

PART 1 - GENERAL REQUIREMENTS

1.1 WORK INCLUDED

A. Provide insulation for piping and equipment installed under this contract, as indicated on the drawings and specified herein, including, but not limited to:

1. Domestic hot and cold water piping, valves and fittings.
2. Exposed drain and hot water piping below handicapped fixtures.

1.2 SUBMITTALS

A. Submit manufacturer's product data on all insulation products specified, including thermal resistance values, flame and smoke ratings, UL listing, and manufacturers published installation recommendations.

1.3 GENERAL REQUIREMENTS

A. For the purpose of this specification, the term "exposed" is generally intended to mean work that is visible in finished spaces and above lay-in tile ceilings. The term "concealed" is generally intended to mean work that is installed behind walls, plastered ceilings, and under floors.

B. Where subject to freezing, cover piping and fittings with single piece, double the thickness normally specified.

C. All insulation, jackets, adhesives, and other insulation materials shall be UL rated, non-combustible, with maximum permanent flame spread rating of 25, and a smoke developed rating of 50 or less and fuel contributed of 50 or less when tested in accordance with ASTM E-84. Submit smoke and flame spread ratings for every material proposed to use.

D. Unless otherwise indicated, insulation thickness or "R" value shall conform to ASHRAE Standard 90-75, and the North Carolina State Building Code, Volume X - Energy.

E. Where differences occur between any referenced standard or code the most stringent requirements shall apply.

F. All products shall be free of asbestos.

G. All insulation work shall be done by skilled tradesmen, normally employed in this field.

PART 2 - PRODUCTS

2.1 MATERIALS - GENERAL

A. Type 1 - Fiberglass pipe insulation.

1. Fiberglass sectional molded insulation, minimum density of 3.5 lb/cu.ft. with factory applied white vapor barrier jacket, .25 BTU/hr. /Sq. Ft. / Deg. F. / in. conductivity at 75 deg. F, conforming to ASTM C-547 67.
2. The jacket shall be foil-scrim-kraft laminate. Jackets shall be vapor sealed with continuous self sealing lap strips. End joints shall be similarly sealed with factory furnished butt strips with pressure sealing adhesive.
    a. Manufacturers:
        (1) Johns Manville - J-M Flame safe AP
        (2) PPG Industries
        (3) Owens Corning
        (4) Certainteed – Certablue
        (5) Knauf
3. Insulation for valves, fittings and unions shall be the same thickness as the pipe insulation

by any of the following methods, including both insulation and cover.

a. Insulate with one pound per cubic foot density fiberglass blanket wrapped firmly under compression (minimum 2 to 1) and secure with number 20 gauge annealed steel wire.

b. Insulate with molded fiberglass fittings secured with number 20 gauge annealed steel wire.

c. Miter fiberglass piping insulation to form fittings, secured with number 20 gauge annealed steel wire. Use preformed angels where possible. Fiberglass batt type insulation shall NOT be used.

d. Cover with pre-molded one piece PVC fitting covers secured by banding. If additional securing is required, taping and stapling may be used. Covers shall be sealed with vapor barrier pressure sensitive tape. Color to match cover.

e. Cover with a smooth coating of cement. Open weave glass fabric to be smoothly adhered and coated with lagging adhesive. Lap glass on fabric at least 1" on itself and 2" on adjoining pipe insulation.

4. Seal all joints ands seams with tape as recommended by manufacturer.

B. Type 2 – Flexible Pipe Insulation

1. Material – Flexible, closed cell, elastomeric thermal insulation, minimum k value .27 at 75°F conforming to ASTM C 534.

2. Fittings - Sleeve type fitting covers and miter cut tubular form.

3. Manufacturers:

a. Armstrong - Armaflex AP or Self Seal 2000

b. Johns Manville - Aerotube II

c. Rubatex No. R-180-J

2.2 FIELD APPLIED JACKETS

A. Canvas Jacket: UL listed fabric, 8 oz/sq yd, plain weave cotton treated with dilute fire retardant lagging adhesive.

PART 3 - EXECUTION

3.1 GENERAL

A. Apply insulation in strict accordance with manufacturer's instructions.

B. All surfaces must be free of dirt, dust, grease, oil, scale or loose particles before insulation.

C. Do not cover fittings until required tests have been completed and accepted.

D. Insulation shall be continuous passing through walls. Size sleeves accordingly to accommodate insulation. Where insulation passes through floor or wall sleeves, pack the space outside of the insulation and inside of the sleeve with fiberglass blanket. Seal with fire rated sealant on fired rated partitions.

E. For cold lines for condensation protection or for safety protection of hot lines unions shall be insulated as follows:

1. Covering shall be terminated at each end of the union and sealed.

2. Cover union with separate section of insulation, routed out to fit over union, of section of pipe insulation whose inside diameter matches the outside diameter of the adjoining insulation, lap adjoining insulation on both sides by 3", seal vapor tight plastic tape.

F. Patching: Where connections are made to existing piping patch all existing insulation to match existing.

G. Provide insulation saddles and shields at hangers to prevent deformation or penetration of

insulation by contact with hangers.

H. Cover pipe with canvas jacket in all exposed locations.

3.2 DOMESTIC WATER PIPING

A. Type 1- For cold water piping, 1/2 " thickness for all piping.

B. Type 1- For hot water piping , 1” thickness for all piping.

SECTION 22 07 00

SECTION 22 11 16 - DOMESTIC WATER PIPING

PART 1 - GENERAL REQUIREMENTS

1.1 WORK INCLUDED

A. Provide domestic hot and cold water piping as indicated on the drawings and as specified herein, including;

1. Pipe and fittings
2. Valves
3. Testing
4. Potable water system sterilization.

1.2 CODES AND STANDARDS

A. Comply with the provisions of the following codes and standards.

1. North Carolina State and Building Code.
2. Local codes, ordinances, and requirements.

1.3 SUBMITTALS

A. Submit manufacturer's product data on pipe, valves and fittings.

PART 2 - PRODUCTS

2.1 WATER PIPING

A. Above ground water piping shall be type "K" copper with solder joints. Solder for potable water systems shall be lead free, 95 /5 Tin/Antimony. Appropriate fittings shall be used for all turns, and joints.

2.2 ESCUTCHEONS

A. Use chrome-plated flush escutcheons on ceiling and wall. At floors, use deep cup chrome-plated escutcheon. Escutcheons shall be used at all piping in finished areas. Escutcheons on insulated piping shall fit insulation tightly.

PART 3 - EXECUTION

3.1 PIPE AND FITTINGS INSTALLATION

A. Changes in pipe sizes shall be made with reducing fittings.

B. All uninsulated water piping exposed in finished rooms shall be chrome plated.

C. Use dielectric connections for all joints of dissimilar metals. Protect insulating material if heat is applied to fitting.

D. Make copper piping joints with 95-5 solder, and no corrosive solder paste. Flux and solder combinations are not permitted.

E. Grade piping to low points and provide drain valves.

F. Provide domestic water branch piping to fixtures and make final connections to fixtures provided by this or other contractors.

G. Do not rough piping inside spaces, partitions, stud wall voids, plenums, or cavities subject to potential to potential freezing.

H. Provide valves at inlet and outlet of each piece of equipment, at each fixture, on branch lines and where indicated on the drawings.

I. Provide escutcheons for exposed piping passing through walls, floors or ceilings.

3.2 POTABLE WATER SYSTEM STERILIZATION

A. All pipe and fittings connected to and forming a part of a potable water supply shall be sterilized. Sterilization shall be accomplished after the pipe has passed the hydrostatic pressure tests. The method used by the contractor shall be in full accordance with the requirements of the AWWA Specification C-601, and state and local Departments of Health.

B. All new piping shall be filled with not less than 25, nor more than 50 parts per million (ppm) of available chlorine and held in contact with such for not less than 24 hours. Final tests after 24 hours shall show a minimum residual chlorine content of 25 ppm in all parts of the system. All chlorine introduced into the system shall be totally dissolved. The introduction of solid hypochlorite directly into the system is prohibited.

C. Sterilization tests shall be repeated as often as necessary and as directed by the architect and/or Department of Health, until the minimum residual chlorine content has been maintained. The chlorine solution shall be thoroughly flushed prior to placing the new sections of piping in service. The contractor is cautioned that the spent chlorine solution must be disposed of in such as way as not to be detrimental to plant, animal of aquatic life.

D. Certification of bacteriological testing for quality of the domestic water shall be conducted, accepted by the Project Engineer and submitted to the State Construction Office prior of request for final inspection and Beneficial or Final Occupancy Permit.

END OF SECTION 22 11 16

SECTION 22 11 19 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 REFERENCED SECTIONS

A. Drawings, Standard General Conditions of the Contract including Supplementary General Conditions, Division-1 Specification Sections, Specification Divisions and Sections as referenced in Division 22 Section “Plumbing General Requirements”, and Division 22 Specification Sections as follows apply to work of this section:

1. Section 220110 - Plumbing General Requirements
2. Section 224000 - Plumbing Fixtures
3. Section 220150 - Basic Materials and Methods
4. Section 220700 - Plumbing Insulation

1.2 SUBMITTALS

A. Submit under provisions of Division 1, and Division 22, “Plumbing General Requirements” the following:

1. Manufacturer’s catalog data, installation, dimensions (including rough in dimensions)
2. Operating and maintenance data for plumbing specialty items
3. Catalog data and material certification for pipe materials and fittings.

B. Provide for all items as listed in this section.

1.3 QUALITY ASSURANCE

A. Equipment of the same general type shall be of the same make.

B. Brand names and catalog numbers included with equipment or material specifications are used to indicate quality, rating or operating characteristics of the equipment of material.

C. All materials provided shall be new and shall be approved by the Underwriter’s Laboratories, Inc., wherever that agency has applicable standards.

D. All work shall be accomplished in a neat, workmanlike manner by experienced journeymen.

E. All work shall be performed at such times as are required by the progress of the job.

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience.

B. Installer: NC State licensed plumber specializing in performing the work of this section with minimum 3 years experience.

1.5 REGULATORY REQUIREMENTS

A. Installation and materials shall be in conformance with the North Carolina State Building Code current edition

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Division 1 and Division 220110, Plumbing General Requirements.

1.7 SYSTEM COMPLETION

A. Provide all bolts, nuts, gaskets, sleeves, hangers, supports, miscellaneous valves and fittings, and specialties required for complete installation of the piping and equipment to be provided.

PART 2 - PRODUCTS

2.1 FLOOR DRAINS

A. ANSI A112.21.1, coated cast iron two piece body with double drainage flange, weep holes, reversible clamping collar, and square, adjustable nickel-bronze strainer; Model Z-415S, as manufactured by Zurn, or equal by Josam, J. R. Smith, or Wade. Provide with Trap Guard in lieu of trap primers. Manufactured by Provent or Equal.

2.2 CLEANOUTS

A. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw; as manufactured by Josam, or equal by Zurn, J. R. Smith, or Wade.

2.3 HOSE BIBBS

A. Bronze or brass with integral mounting flange, hose thread spout, integral vacuum breaker, loose key operated as indicated, in conformance with ANSI/ASSE 1011; as manufactured

by Wilkins, Watts, J.R. Smith,. Nibco, Woodford, or Crane.

2.4 WATER HAMMER ARRESTORS

A. ANSI A112.26.1; All stainless steel construction, meets standards PDI WH-201 and ASSE 1010, filled with glycerin, pressurized with argon, size as indicated by PDI WH 201 letter designation; Series 75000 as manufactured by Josam, or equal by J.R. Smith, or Zurn.

2.5 GLOBE VALVES

A. Up To and including 2 inches, MSS SP-80, Class 150 body and union bonnet of ASTM B62 cast bronze, threaded ends, inside screw rising stem of bronze, stainless steel plug-type disk, stainless steel seat rings, brass packing gland, Teflon impregnated packing, and malleable-iron handwheel.

B. Up to and including 2 inches, MSS SP-80, Class 200 and Class 300, body and union bonnet of ASTM B 61, cast bronze, threaded ends, stainless steel plug-type disc, stainless steel seat ring, inside screw rising stem of bronze, brass packing gland, Teflon-impregnated packing, and malleable-iron handwheel.

C. Over 2 inches, MSS SP-85, Class 125 and Class 250 iron body and bonnet ASTM A 126, Class B cast iron, flanged ends, outside screw and yoke, with Teflon-impregnated packing and two-piece packing gland assembly, and malleable-iron handwheel.

2.6 ANGLE VALVES

A. Up to and including 2 Inches, MSS SP-80, Class 150, body and union bonnet of ASTM B 62 bronze, inside rising stem of bronze, brass packing gland, Teflon- impregnated packing, and malleable-iron handwheel.

B. Up to and including 2 Inches, Class 300, body and union bonnet of ASTM B 61 bronze, inside rising stem of bronze, plug disc and seat ring of stainless steel, and malleable- iron handwheel.

C. Over 2 inches, Class 125, Iron body, MSS SP-85, bronze mounted with body and bonnet ASTM A 126, Class B cast iron, flanged ends, outside screw and yoke, with Teflon-impregnated packing and two-piece packing gland assembly, and malleable iron hand-wheel.

2.7 BALL VALVES

A. Up to, and including 2 inches: 150# W.O.G. rating up to 200 F, two-piece-brass bodies,

B. replaceable reinforced Teflon seat, conventional port, blow-proof stem, chrome-plated brass ball, union, threaded, or soldered ends.

2.8 TRAP PRIMERS

A. Brass trap primer to discharge a metered amount of water upon pressure change. Provide floor drains with prime connection. PPP or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that excavations are required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Coordinate cutting and forming of roof and floor construction to receive drains to required invert elevations.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever joining dissimilar metals.

C. Route piping in orderly manner and maintain gradient.

D. Install piping to conserve building space and not interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

G. Provide Sleeves for all pipes passing through floors, walls and ceilings, of sufficient size to receive insulation and of proper length to terminate 1" outside finished surfaces. Pipe sleeves shall be caulked with non-hardening caulking to prevent transmission of noise between floors and walls.

H. Pipe Penetrations through fire partition walls shall be made by UL penetration detail as indicated with caulking with UL listed fireproof caulking.

I. Provide clearance for installation of insulation and access to valves and fittings.

J. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with specified in Division 8.

K. Establish elevations of buried piping outside the building to ensure not less than 3 ft of cover.

L. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

M. Provide support for utility meters in accordance with requirements of utility companies.

N. Prepare pipe, fittings, supports, and accessories not prefinished, ready for finish painting. Refer to Division-9

O. Excavate in accordance with Division 31 for work of this Section.

P. Backfill in accordance with Division 31 for work of this Section.

Q. Install bell and spigot pipe with bell end upstream.

R. Install valves with stems upright or horizontal, not inverted.

S. Provide one plug valve wrench for every ten plug valves sized 2 inches and smaller, minimum of one. Provide each plug valve sized 2-1/2 inches and larger with a wrench with set screw.

T. Install in accordance with manufacturer's instructions.

U. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system. Encase exterior cleanouts in concrete flush with grade.

V. Pipe relief from back flow preventer to nearest drain.

W. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatories, sinks, water closet flush valves, and washing machine outlets.

3.4 APPLICATION

A. Use grooved mechanical couplings and fasteners only in accessible locations.

B. Install unions downstream of valves and at equipment or apparatus connections.

C. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.

D. Install gate, or ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

3.5 ERECTION TOLERANCES

A. Establish invert elevations, slopes for drainage to 1/8 or 1/4 inch per foot, as required. Maintain gradients. Slope water piping and arrange to drain at low points.

3.6 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. After all tests have been satisfactorily completed, disinfect the entire domestic water distribution system, including all supply outlets, with hypochlorites by the tablet method in general accordance with ANSI/AWWA C651.

B. Provide a minimum of 2 bacteriological test locations at ends of lines.

3.7 SERVICE CONNECTIONS

A. Provide new sewer services. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.

B. Provide new water service complete with by-pass valves pressure reducing valve, and sand strainer.

C. Provide sleeve in wall for service main and support at wall with reinforced concrete bridge. Caulk enlarged sleeve and make watertight with pliable material. Anchor service main inside to concrete wall.

END OF SECTION 22 11 19

SECTION 22 40 00 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 REFERENCED SECTIONS

A. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division-1 Specification sections and other Division 22 specification sections, apply to work from this section.

B. Section 220110 - Plumbing General Requirements

C. Section 221119 - Plumbing Piping and Specialties

1.2 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by basic designation.

B. Air conditioning and refrigeration institute (ARI)

1. ANSI/ARI 1010 - Drinking Fountains and Self-Contained, Mechanically Refrigerated Drinking Water Coolers.
2. AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
    a. ANSI/ASME A112.6.1M - Supports for off-the-floor Plumbing Fixtures for Public
    b. ANSI/ASME A112.18.1M - Plumbing Fixture Fittings
    c. ANSI/ASME A112.19.1M - Enameled Cast Iron Plumbing Fixtures
    d. ANSI/ASME A112.19.2M - Vitreous China Plumbing Fixtures
    e. ANSI/ASME A112.19.3M - Stainless Steel Plumbing Fixtures (Designed for Residential Use)
    f. ANSI/ASME A112.19.5 - Trim for Water Closet Bowls, Tanks, and Urinals
    g. ANSI/ASME A112.19.6 - Hydraulic performance Requirements for Water closets and Urinals
3. AMERICAN SOCIETY OF SANITARY ENGINEERS (ASSE)
    a. ASSE 1037 - Pressurized Flushing Devices (Flush-o-meters) for Plumbing Fixtures

C. Submit under provisions of Division 1 and Division 22 “Plumbing General Requirements”: listing of plumbing fixtures, including manufacturer’s catalog data, installation instructions, dimensions including rough-in dimensions, pipe connection sizes, trim, and finishes. Provide certification from Manufacturer that lead based solders were not used in fabrication of electric water coolers or fountains. No fixtures shall be delivered to the building until the Architect has inspected and approved the complete listing of fixtures.

D. Perform Work in accordance with State of North Carolina Building Code (International Plumbing Code as modified by the NC Code Council).

E. Deliver products to site, store, protect, and handle under provisions of Division 1. Accept fixtures on site in factory packaging. Inspect for damage. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

F. Verify that the field measurements are consistent with the dimensions as indicated on approved shop drawings. Confirm that millwork is constructed with adequate provision for the installation of countertop fixtures.

PART 2 - PRODUCTS

2.1 Unless specifically indicated otherwise, each plumbing fixture shall be provided with a trap, waste, and water fittings with connections as indicated, each plumbing fixture shall be provided complete for the specified function (including water inlet(s) and waste outlet(s)), and except for

stainless steel fixtures, the fixture color shall be white.

2.2 Vitreous china plumbing fixtures, ASME 112.19.2M, shall be thoroughly fused so that a fractured surface shall show a homogeneous mass, free from pores and with close grain. Glaze shall cover all surfaces that are exposed when the fixture is installed in its normal manner. Vitreous china fixture manufacturers shall be American Standard, Eljer or Kohler.

2.3 Stainless steel fixtures, 302 stainless steel, of the specified thickness, and undercoated with a sound absorbent material. Provide drillings to match faucet selection, stainless steel or chrome plated brass strainer, with trap and tailpiece to match.

2.4 Enameled cast iron fixtures, ASME 112.19.1M, shall be of one piece, high grade cast iron, minimum thickness of 1/8", sound, true to form, and free from porosity, cracks, or any other defects. The enamel shall be applied by a method to thoroughly fuse the enamel to the metal. Acid resisting enamel shall be acid resisting throughout.

2.5 Make terrazzo bases or receptors of marble chips cast in white portland cement to produce a compressive strength of not less than 3000 psi 7 days after casting. Provide brass body drains with chromium-plated strainers cast integral with terrazzo.

2.6 Acrylic fixtures and bases shall be fiberglass reinforced, safety textured, and shall meet standard ASTM E162 for flammability and NFPA 258 for smoke density. Whirlpool system shall be UL approved.

2.7 Exposed piping, trimming and fittings shall be chromium or nickel plated brass with polished surfaces. Floor and wall plates shall be chromium plated brass.

2.8 STAINLESS STEEL SINKS

A. Countertop Stainless Steel Sink Product: ANSI/ASME A112.19.3M, 18-gage stainless steel with integral mounting rim, single compartment with undersides coated with sound dampening material. Provide top-mounted ANSI/ASME A112.18.1M cast brass single lever faucet, 8-inch swing spout with 1.5 gpm aerator, and stainless steel drain outlet with cup strainers. Provide 1-1/2-inch adjustable cast-brass P-trap with cleanout plug and drain piping to vertical vent stack. ADA compliant.

B. Accessible sinks shall have a maximum depth of 6", knee clearance at the front edge of the sink of 29", and knee clearance under the sink as indicated in NCSBC Volume 1C, 11.11. Hot water supply and drain lines shall not encroach within the knee clearance and shall be covered with pipe insulation packages specific to this application.

C. Acceptable manufacturers: American Standard, Kohler, Elkay, Just

PART 3 - EXECUTION

3.1 SETTING COMPOUNDS AND GASKETS

A. Provide watertight and gas tight seals between flanges and fixtures with plumbing fixture-setting compound. In sealing connections, use neither rubber gaskets nor putty. Seal watertight all voids between the flange and the floor below the fixture with plumbing-fixture-setting compound or other approved sealing material.

3.2 OUTLET FLANGES AND ENDS OF SOIL PIPES

A. Provide outlet flanges and ends of soil pipes set the correct distance from the face of the floor or wall to make a joint with the gasket and fixture.

3.3 WATER SUPPLY BRANCH PIPING

A. Provide all exposed water supply branch piping (including valves and fittings) not more than 6 feet above the floor in toilet rooms and all piping below lavatories finished and chromium-plated.

B. Do not bury water pipe in floor construction of any toilet room.

C. Where water piping is not sized on the drawings, comply with the sizing requirements of the National Standard Plumbing Code.

D. Provide each hot and cold water supply to each service sink, kitchen sink, battery of lavatories, and laundry trays with a ball valve or compression stop in an accessible location near the fixture.

E. Provide a ball valve on the connection to each wall hydrant, lawn faucet, and water cooler.

F. Do not use stop cocks in lieu of ball valves.

G. Run risers and drops supplying toilet rooms in chases, furred spaces, or shafts where possible.

3.4 FIXTURE HEIGHTS

A. Sink: 34 inches to top of rim for accessible lavatories.

END OF SECTION 22 40 00

SECTION 23 05 10
BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.01 REFERENCES & INTENT

A. All work of this Division shall comply with the requirements of the Drawings, General Conditions, Supplementary General Conditions and Division 01 Specifications section.

B. Study all drawings and specifications before submitting bids.

C. Work under this Division includes all essential labor, materials, tools, equipment, transportation, insurance, temporary protection, supervision and incidental items for proper installation and operation of all systems even though not specifically mentioned or indicated.

D. Drawings are diagrammatic. Drawings are not intended to be absolutely precise and do not specify or show every offset, fitting, and component. The purpose of the drawings is to indicate a system concept, the main components of the systems, and the approximate geometrical relationships. Based on the systems concept, the main components, and the approximate geometrical relationships, the contractor shall provide all other components and materials necessary to make the systems fully complete and operational. Contractor shall route piping or provide offsets to avoid interference with structural elements, equipment, electrical panels and junction boxes, etc. Verify locations, dimensions, flow directions, etc. before construction.

E. It is the intent of these specifications and drawings to provide for finished systems of the quality specified, properly tested, balanced and ready for operation. This includes all devices and accessories required to make the work complete even though such items may not be expressly shown or specified. Drawings and specifications are complementary and must be so construed to determine the full scope of work.

F. Jobsite Conditions. The Contractor shall visit the site and familiarize himself with the existing conditions before submitting his bid. Failure to do so does not relieve the Contractor from completing the work as specified herein and after. Requests for additional payments due to the Contractor's failure to allow for work conditions will be rejected.

1.02 WORK INCLUDED

A. The following work is specifically included without limiting the generality implied by these specifications and drawings.
   1. All mechanical scope of work specified herein and as shown on the plans. Contractor should review all drawings and include all items that are a part of his scope.
   2. All associated wiring, cutting and patching.

B. Bidders shall examine equipment plans and specifications and include in their bids all labor and material required for complete installation and connection of equipment which is properly a part of their trade even if it is not provided in the equipment specifications.

1.03 STANDARDS AND CODES

A. All equipment with electrical components shall bear the UL label.

B. The following minimum standards apply wherever applicable:

ANSI	American National Standards
ASTM	American Society for Testing Materials
NBFU	National Board of Fire Underwriters
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Act
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc.

North Carolina Building Code
Any Other Applicable local and State Codes

C. In the event there are conflicts between specifications and standards or codes, standards or codes shall govern unless specifications are in excess of standards.

1.04 PERMITS AND FEE

A. Make application for all necessary permits and pay applicable fees.

1.05 STRUCTURAL STEEL AND CONCRETE

A. Structural members may not be pierced without prior written approval of the Engineer.

1.06 WATERPROOFING

A. Waterproofed floors and walls may not be cut.

1.07 WORK SCHEDULE

A. Work schedule shall be in accordance with Division 01.

B. Any demolition or installation work producing excessive dust or noise deemed to be disruptive or possibly unsafe to building operations must be, at the Owner's discretion, performed after normal working hours.

1.08 PROTECTION OF EQUIPMENT

A. Provide all necessary protection and be fully responsible for material and equipment stored or installed on the site. Material or equipment stolen or damaged shall be replaced at no additional cost to the Owner.

B. Provide protection against theft, physical damage and the entry of dirt, water or corrosive fumes into the material and equipment. Maintain protective covers for the duration of construction. Store equipment, such as controls, subject to damage by moisture and temperature extremes in a dry, heated space.

C. For all cutting, burning and welding operations a burn permit is required. This permit may be obtained from the University at no cost.

1.09 FIRE SAFETY

A. Fire Watch: Provide a fire watch wherever welding, brazing, cutting or other processes involving an open flame or potential for generating sparks is used. Fire watch shall consist of

a person with a 10 pound carbon dioxide fire extinguisher. While on fire watch, the person so assigned shall have no other duties or assignments.

B. Fire Blanket: In addition to providing a fire watch, use an approved fire blanket to cover any combustible materials in the immediate area.

1.10 GUARANTEES

A. Furnish written guarantee in accordance with requirements of General Conditions. Partial approval of a portion of work does not affect the validity of guarantee.

1.11 SHOP DRAWINGS

A. It shall be noted that shop drawing submittals processed by the Engineer are not change orders; that the purpose of shop drawing submittals is to demonstrate to the Engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install, and by detailing the fabrication and installation methods he intends to use. If deviations, discrepancies or conflicts between shop drawing submittals and the contract documents in the form of design drawing and specifications are discovered either prior to or after shop drawing submittals are processed by the Engineer, the design drawings and specifications shall control and shall be followed. The Engineer may also require the contractor to submit samples of proposed or specified equipment for approval with the samples to be returned to the contractor upon request.

B. Prior to procurement or manufacturing, submit for approval appropriate shop drawings and/or descriptive literature giving performance data, physical size, wiring diagrams, configuration, capacity, material, etc., for all items under this Division including the following:
1. TAB
2. Insulation
3. Air Inlets and Outlets
4. DDC Controls

C. The contractor shall visit the site and familiarize himself with the project

requirements and the field conditions before preparing shop drawings and ordering equipment. Field verify the characteristics of all specified or existing equipment before preparing shop drawings. This shall include available space, available voltages, suitability of substrate for receiving the specified equipment, etc. Where existing equipment is re-used, he shall verify dimensions, capacities, horse-power, etc. and bring any discrepancies to the attention of the Engineer.

D. Where different products have to work together, it is the Contractor's responsibility to select manufacturers whose products are visually and/or technically compatible.

E. Prepare listing of all equipment and materials for the project. A sample schedule is included at the end of this section to complete this requirement. Provide all information represented.

1.12 RECORD DRAWINGS

A. During construction, keep an accurate record of all changes and deviations from contract documents. Upon completion of this installation, the contractor shall submit to the Engineer marked up prints indicating any installed work that is different from what is shown on the drawings. Complete and accurate drawings shall be submitted to the Owner at the conclusion of this project. All changes will be reflected in CAD format. Marked-up as-built drawings will not be permitted.

PART 2 – PRODUCTS

2.01 QUALITY OF MATERIAL

A. Equipment of the same general type shall be of the same make. Reference is made to relays, motors, valves, motor starters, contactors, etc.

B. Brand names and catalog numbers included with equipment or material specifications are used to indicate quality, rating or operating characteristics of the equipment or material.

C. All materials provided shall be new and shall be approved and labeled by the Underwriter's Laboratories, Inc., or other accredited third party agency, wherever such agency has applicable standards. All work shall be accomplished in a neat, workmanlike manner by experienced journeymen. All work shall be performed at such times as are required by the progress of the job.

D. All components, equipment and systems shall comply with ASHRAE 90.1 and any other applicable ASHRAE standard.

PART 3 - EXECUTION

3.01 CLEARANCE AND RESTORATION OF SITE

A. It may be required to temporarily remove existing ceiling tiles, piping, duct, conduits, etc. to introduce new work as specified in this Division. Contractor, after installation of new work, shall reinstall, reconnect removed items to match the existing. Installation of any new equipment shall not compromise existing fire

ratings of rated assemblies. All penetrations shall be sealed to existing conditions per UL guidelines for penetration protections. Provide offsets if required in existing piping, ducts etc. to introduce new work.

3.02 COORDINATION

A. Install all work to permit removal of equipment without damage to the equipment or the building. Verify equipment space requirements, condition of substrate, voltages, etc. at the time of shop drawing submission and advise the Engineer of any conflict.

B. Coordinate equipment locations as well as piping and conduit routing with Owner's representative to optimize all present and foreseen future space usage and clearance requirements.

C. Do not rough prior to receipt of approved shop drawings.

3.03 EQUIPMENT INSTALLATION AND SUPPORT

A. Install all equipment where indicated, in accordance with manufacturer's published installation instructions, and with recognized industry practices to ensure that equipment complies with requirements and serves intended purposes. Consult with Engineer if said instructions or practices conflict with the drawings/specifications.

B. Support plumb, rigid and true to line all work and equipment furnished under this Division. Study thoroughly architectural, mechanical drawings and all related drawings to determine how equipment, piping, ductwork, etc., are to be supported, mounted or suspended. Provide extra steel bolts, inserts, pipe stands, brackets and accessories for proper support as required whether or not shown on drawings. When directed, furnish for approval a drawing showing supports.

C. Any system component which may require maintenance, such as control valves, manual valves, strainers, etc. shall not be installed over electrical equipment, machinery, control panels or floor openings.

3.04 FINAL ADJUSTMENT AND TESTING

A. General: Provide all testing, preliminary and final adjustment of instrumentation for this purpose. Conduct all tests in full compliance with applicable codes prior to covering or concealing work by insulation, enclosures, etc. Material found to be defective shall not be repaired. It shall be replaced with new material which tests satisfactorily. Defective workmanship shall be corrected.

B. Working Tests: Subject all equipment and controls to simultaneous and continuous working tests for a period of one day prior to final inspection. Make adjustments, repairs and equipment replacements as required.

3.05 LABELS, IDENTIFICATION AND TAGS

A. All components or equipment shall be identified using 3/4 inch high permanent

engraved bakelite nameplates or 3/4 inch high anodized aluminum nameplates - white letter - black background, with minimum 1/4 inch high letters. Nameplates shall be permanently attached with pin-head screws to device or to wall or mounting panel above device. Stick-on type labels will not be acceptable.

3.06 OWNER'S RIGHT TO TEST SYSTEMS

A. Should, in the opinion of the Engineer, and during the guarantee period, reasonable doubt exist as to the proper functioning of any equipment installed under this Contract, the right is reserved for the Owner and Engineer to perform any test deemed practical to determine whether such equipment is functioning properly and performing at required capacity. If such tests show proper functioning, the cost of the test will be paid by the Owner. If the tests indicate a deficiency in equipment capacity or performance, the Contractor shall pay the cost of the test and also make good any deficiencies shown by the test to the full satisfaction of the Owner and the Engineer.

3.07 CLEANING UP

A. The contractors performing work under this section shall at all times keep the premises and the building in a neat and orderly condition and any instructions of the Engineer in regard to the storing of material, protective measures, cleaning up of debris, etc. shall be explicitly followed. At the completion of the job, all equipment shall be cleaned to the satisfaction of the Owner.

B. The building will be occupied during installation of the new addition and/or alterations as described hereinafter. Thus, special care shall be taken during installation to protect equipment and other furniture in the buildings from dust and debris generated during installation of work specified in this Division.

3.08 INSPECTION CERTIFICATES

A. Obtain all inspections required by law, ordinances, rules, and regulations of the Authorities having jurisdiction and obtain and furnish to the Engineer certificates of such inspections, pay all fees, charges, and other expenses in connection therewith.

3.09 FINAL REVIEW

A. Final review and tests of the completed construction shall be performed in the presence of the Engineer or his representative and shall be at such times as are convenient to the Engineer. Final tests shall show conclusively that all equipment performs its intended and specified function and that all work complies with the provisions of these specifications. All material, equipment, and instruments required for the tests shall be furnished by the Contractor at his own expense.

3.10 EQUIPMENT DELIVERY AND PROTECTION

A. All material shall be delivered and unloaded by the Contractor within the project site as directed by the Owner.

B. The Contractor shall protect all material and equipment from breakage, theft or weather damage.

3.11 OPERATING INSTRUCTIONS

The Contractor shall provide a minimum of sixteen (16) hours of personal instruction to Owner's personnel in the proper operation of all equipment specified and provided. The instruction shall be provided by factory trained and certified competent personnel.

Maintenance Manuals shall be submitted in three (3) copies in vinyl 3-ring binders. Each binder shall have the following:

1. Service telephone number of the installing company, including an emergency number.
2. Contact person, phone number, and address of manufacturer or distributor where equipment was purchased.
3. The manufacturing company's operating and maintenance manuals for each piece of equipment.
4. Copies of all approved shop drawings.

Furnish for each building permanent type charts, framed under glass, mounted where directed as follows:

1. Service organizations with day and night telephone numbers.

PRODUCTS LISTING FORM

INSTRUCTIONS:

Do not use the terminology "as specified", rather indicate specifically the product proposed.

Prepared by: _____

_____

Date: _____ Project:

SPEC. SECTION	ITEM	MANUFACTURER

END OF SECTION

SECTION 23 05 93
TESTING AND BALANCING OF HVAC SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings, Notice to Bidders and Standard General Conditions of the Construction Contract, including Supplementary General Conditions and Division-1Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. The Testing and Balancing (TAB) work shall be done by an agency certified by AABC. The Agency shall show proof of having successfully completed at least five projects of equal size and scope within the previous three years. If the contractor is not so qualified, he shall subcontract the work to a qualified subcontractor.

B. Immediately after the award of a contract, the contractor shall perform a Design Review of the mechanical plans and specifications. He shall identify any omissions or discrepancies that will preclude the proper balancing of the systems and report same to the Owner in a formal report.

C. Test and balance HVAC air and hydronic systems as shown and specified on the schedules and Contract Documents and make submittals as described in this Section.

1.03 SUBMITTALS

A. Submit the following to the Owner's Representative for approval:
1. Inspection reports (prior to and during testing and balancing).
2. Other tests, records, certifications and reports as specified in this Section.
3. AABC Certification.
4. List of instruments actually used for each test. Include instrument calibration dates.
5. TAB report including preliminary and final balance data sheets (see Paragraph 3.05). Also submit to Engineer for record.

1.04 REFERENCE STANDARDS

A. Unless shown or specified otherwise, the TAB work shall comply with the following:
1. AABC National Standards for Field measurements and Instrumentation.
2. ASHRAE 110-1985: Method of Testing Performance of Laboratory Fume Hoods.
3. HVAC Systems Testing, Adjusting, and Balancing, Sheet Metal & Air Conditioning Contractor's National Association, Inc. (SMACNA), 1993.

1.05 QUALITY ASSURANCE

A. The organization performing the TAB work shall be certified by the AABC.

B. The work shall be performed by regular employees specifically trained in the total balancing of air, steam and hydronic systems. The work shall be continuously conducted under the direct supervision of a certified Test and Balance Engineer by AABC and who is experienced in testing and balancing of HVAC systems.

PART 2 – PRODUCTS

A. Not Used

PART 3 - EXECUTION

3.01 GENERAL

A. Adjust, test and confirm air flow rates, pressure drops, pressures, temperature and heat transfer performance of HVAC system, including chilled water systems, hot water heating systems, supply, return, outdoor air systems, including all associated pumps, heat exchangers, coils, VAV boxes, valves and performing accessories.

B. Provide preliminary and final (2 phases) testing and balancing. Initiate preliminary testing and balancing immediately after certification of fan/pump performance (before controls, ceilings, walls, etc. are completed). Confirm macro level performance of devices. The preliminary phase shall be followed by a submitted written report of system shortcomings which prohibit final balancing. Following preliminary testing and balancing, if balancing or control devices are not operating correctly, report these conditions to the Owner's Representative, who shall coordinate required corrections so that balancing can continue.

C. Perform the work using methods and test forms published by AABC National Standards for Field Measurements and Instrumentation.

D. Do not start final testing and balancing until each system has been certified to be complete.

E. Using controls and devices installed, test and balance air conditioning systems with maximum attainable internal load (lights and equipment), or simulated maximum load using automatic temperature controls, whichever is closest to design operating conditions.

F. Do the final testing and balancing of air handling systems with finished ceilings and partitions in place and doors closed.

G. Use volume control devices to regulate air quantities only to the extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation. Minimize use of balancing devices to throttle flow. When balanced, all volume control devices in the path to the terminal with the highest pressure drop shall be fully open. Adjust OA intake on AHU's according to drawings, schedules, and specifications.

H. Have on the job site the AABC standards referred to herein, and make them available to the Mechanical Contractor and the Owner's Representative.

I. Coordinate with the Commissioning Agent to review balancing procedures for in advance of system balancing and to provide for participation of the Commissioning Agent during one day of system balancing.

J. The Owner's Representative shall witness final testing and balancing of all system. The Testing and Balancing Contractor shall notify the Owner's Representative two (2) working days prior to each system being tested and/or balanced.

K. Repair or replacement of finished products damaged as a result of testing, balancing and inspection work shall be the responsibility of the Contractor.

3.02 INSTRUMENT CALIBRATION

A. Provide written certification of the accuracy of all instruments furnished or used for Testing and Balancing. Show date and method of calibration. All instruments shall have been calibrated within six (6) months prior to the estimated completion date of balancing work.

B. Verify the accuracy of permanently-installed flow-measuring primary elements and their read- out instruments, thermometers, sensors and pressure gauges furnished under this contract. Verification may be by calculation and calibration of the primary element and read-out instrument, or by an independent measurement of the flow, temperature or pressure of the flow, of the same flowing medium using calibrated instruments. Submit a report of certification, verification, or inaccuracy of all calibrations.

3.03 BALANCING PROCEDURES AND RELATED WORK

A. Balancing shall achieve design air and hydronic flow rate, within a tolerance of 5% to+10% on major equipment (AHUs, Fans, Pumps) and +/- 10% at terminal points (air outlets, inlets, transfer air quantities, coil water flow rates, etc.).

B. Verify that all thermostats and other controls and the devices they control (such as valves, dampers, constant volume, variable volume and fan terminal boxes) operate as they are intended and in the sequence specified. Report device failures in bi–weekly reports.

C. Where indicated on drawings and/or schedules, constant volume terminal boxes shall have associated manual volume dampers adjusted such that, when VAV box is indexed to its highest cfm position, the terminal box automatic damper will be in its wide-open position.

D. Where inlet vanes are utilized, when the fan is indexed to full cfm at design static pressure, the inlet vanes shall be in their maximum open position (to be accomplished by adjusting fan rpm).

E. Replace sheaves after the correct fan rpm has been established with properly sized fixed sheaves. Check and verify fan rpm following sheave replacement

with fixed sheaves.

F. Permanently-installed flow-measuring elements may be used to accomplish balancing after accuracy has been verified with certified calibrated instruments. Records and report read-outs of these instruments for all flows even if not required for testing and balancing results.

G. Where solid-state variable speed controls have been provided, adjust and mark controls for proper setting to produce the design flow.

H. Protect read-out instruments from damage, and return them in good working order to the Mechanical Contractor.

I. Only direct-flow measurement may be used. Do not use indirect calculations, such as a heat
balance or pressure drop in a heat exchanger.

J. Balance air system minimum and maximum damper positions for correct operation at both maximum design outside air and minimum outside air, maximum and minimum return air, etc. Clearly mark min OA damper position on shaft and duct.

K. Balance air systems in all modes of operation, including unoccupied, occupied, warm-up, cool-down, Halon evacuation, and smoke control modes. Report on a room-by-room basis on the total flow of each room. Confirm flow at occupied and unoccupied modes.

L. Provide required openings for duct traverses. Seal test holes in ducts with snap-in plugs. In addition, plugs shall be air tight type and/or sealed air tight in 1% and dust collection leak class systems. Tape is not permitted. Repair insulation where damaged. Mark insulation where readings were taken.

M. Record the test data for each motor, fan, pump, air system, heat exchanger, boiler, cooling tower, chiller, condenser, and heat pump. Apply temperature, barometric and other correction factors for non-standard conditions and record in report.

N. Record the clean filter pressure drop across all air filter at design operating cfm after final balancing.

3.04 TEST AND RECORDS

A. Submit a separate test report for each air and hydronic system outlining actual temperatures, pressure drops and flow rates at all terminal devices (e.g., terminal boxes, air terminals, hoods, coils, etc.) And compare totals to the flow measurements taken at the source (e.g., fans and pumps) and to the design parameters.

B. Record test data where applicable on AABC test forms.

C. In addition to data required on NEBB forms, the following additional information is required for all scheduled equipment:
1. Motors: Type, frame, number, serial number, and calculated brake

horsepower and efficiency at final condition.

2. Pumps:
   a) Design Data: Impeller size, motor hp, net positive suction head (NPSH) required at design flow, and total dynamic head (TDH) at zero flow.
   b) Test Data: Suction and discharge pressures at full flow (not throttled to obtain rated flow), and zero flow.
3. Hydronic Systems: GPM in each significant branch, and position of each balancing valve.
4. Fan and Pump Systems: For systems controlled by static pressure, assure by test and recording that devices, including high limit controls are calibrated to perform in accordance with Contract Documents, and provide design static pressure at the most demanding location. Furnish and coordinate static pressure setpoint of controls, as applicable, with Controls Contractor.

3.05 TESTING AND BALANCING REPORTS

A. Submit preliminary and final testing and balancing reports for approval.

B. Arrange recorded data by system, using the appropriate designations as established in the Contract Documents. Submit six signed, bound and indexed copies of both preliminary and final reports per building to the Owner's Representative.

C. Where actual measurements recorded for the final balance show deviation of more than the specified tolerance from the design, and the deviation cannot be corrected by balancing with the installed layout and elements, note this deviation in the final report with recommendations for corrective action.

D. In those cases where recorded data can be reasonably interpreted to be inaccurate, inconsistent or erroneous, the Owner's Representative may request additional testing and balancing. The Testing and Balancing Contractor shall, at no additional cost to the Owner, perform such re-testing and re-balancing as directed by and in the presence of the Owner's Representative.

E. Where, in the opinion of the Testing and Balancing Contractor, there is excessive vibration, movement or noise from any piece of equipment, ductwork, or piping, these conditions should be noted in the final report with recommendations for corrective action.

END OF SECTION

SECTION 23 07 00
MECHANICAL INSULATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings, Standard General Conditions of the Construction Contract, including Supplementary General Conditions, Division-1 Specification sections and other Division 23 specification sections, apply to work of this section.

1.02 RATING

A. All insulation systems, including jackets and adhesives shall be U.L. rated and FM approved. All insulation for indoor use shall have a maximum permanent flame spread rating of 25 or less and a smoke developed rating of 50 or less, as tested by ASTM E 84 (NFPA 255) method. Outdoor mechanical insulation may have flame spread index of 75 and smoke developed index of 150. Submit smoke and flame ratings for every material proposed for use.

B. Make: Certain Teed, Owens Corning, Johns Manville, Knauf and PPG.

1.03 SCOPE

A. Furnish and install insulation for the following:
1. Supply ducts in ceiling spaces.

1.04 QUALITY ASSURANCE

A. Insulation contractor shall be member of either the National Insulation Association (NIA) or the Southeastern Insulation Contractors Association (SEICA).

1.05 SUBMITTALS

A. Submit evidence of membership in NIA or SEICA.

B. Submit manufacturer's technical product data and installation instructions for each type of mechanical insulation. Submit schedule showing manufacturer's product number, k-value, thickness, and furnished accessories for each mechanical system requiring insulation.

C. Submit, if requested by Designer, manufacturer's sample of each piping insulation type required, and of each duct and equipment insulation type required. Affix label to sample completely describing product.

PART 2 - PRODUCTS

2.01 DUCT INSULATION

A. Type A: Vapor Seal Duct Insulation

1. Material: Fiberglass duct wrap 1 lb. density with FSK facing complying with ASTM C1290. Maximum K-factor of .31 at 75ºF. Jacket shall be FSK aluminum foil reinforced with fiber glass yarn and laminated to fire resistant kraft paper, secured with UL listed pressure sensitive tape and outward clinch expanding staples and vapor barrier mastic. Johns Manville Microlite or equal by Owens Corning or Knauf.
2. Thickness shall be 2 inches.

B. Type B: Vapor Seal Duct Insulation - Rigid
1. Fiberglass ductboard complying with ASTM C612, Type I. 3 lb. density with maximum K-factor of 0.23 at 75º F mean temperature. Jacket shall be FSK aluminum foil reinforced with fiber glass yarn and laminated to fire resistant kraft paper, secured with UL listed pressure sensitive tape and outward clinch expanding staples and vapor barrier mastic. Johns Manville 800 or equal by Owens Corning or Knauf.
2. Thickness shall be 1-1/2 inches.
3. In exposed locations, such as mechanical rooms, cover insulation with canvas jacket. Canvas jacket shall be UL listed fabric, 8 oz/sq yd, plain weave cotton treated with dilute fire retardant lagging adhesive.

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. All insulation shall be applied by experienced pipe coverers and journeymen in accordance with best trade practice. Work shall be as recommended by manufacturer's latest printed installation directions. Test, inspect, and clean all surfaces to be insulated before applying insulation. Take all possible precautions to protect work of other trades. Provide protective covering as required to accomplish this and be responsible for returning all equipment and material to its original new condition and appearance where damage occurs due to neglect.

B. Protect insulation where supported in hangers by means of inserts or saddles sufficiently large to prevent crushing of insulation.

C. Apply adhesive to exposed risers to prevent slipping and turning.

D. Butt covering neatly to walls, floors, ceiling. Apply bands at end and position so band covers gap between surface and insulation where exposed.

E. At butt ends of insulation the jacket material shall be pulled over exposed ends and secured with bands to give a neat and finished appearance. Exposed fiberglass material will not be permitted.

F. In location where it will be exposed to view do not apply insulating cement until there is heat on lines.

G. Do not cover nameplates on equipment.

H. Do not insulate vibration eliminators.

3.02 DUCT INSULATION SHALL BE APPLIED AS FOLLOWS

A. Type A: Vaporseal Duct Insulation.
   1. All supply air ducts.

B. Type B: Rigid Duct Insulation – not used

3.03 SPECIFIC REQUIREMENTS

A. Type A Insulation:
   1. Fiberglass duct wrap insulation shall be applied over clean, dry sheetmetal duct. Before applying the insulation all joints and seams shall be sealed air tight. Duct wrap shall be installed to allow maximum fullness at corners. Minimum thickness at corners is one inch. Insulation shall be butted tightly at joints and vapor barrier facing shall be overlapped at minimum of 2 inches. Insulation shall be butted tightly at joints and vapor barrier facing shall be overlapped at minimum of 2 inches. Insulation should be removed from lap prior to stapling. All seams shall be stapled approximately 6 inches on center with outward clinching staples, then sealed with a foil vapor barrier tape, or vapor barrier mastic. Where ducts are over 24 inches in width, the duct wrap shall be additionally secured to the bottom of rectangular ducts with mechanical fasteners spaced on 18 inch centers (maximum), to prevent sagging of insulation. Seal penetrations so as to provide a vapor-tight system.

B. Type B Insulation:
   1. FSK faced insulation boards shall be applied using mechanical fasteners such as weld pins or stick clips. Fasteners shall be located not less than 3 inches from each edge or corner of the board. Pin spacing along the duct should be no greater than 12 inches on centers. Additional pins or clips may be required to hold the insulation tightly against the surface where cross breaking is used for stiffening. Weld pin lengths must be selected to insure tight fit but avoid "oil canning" effect.
   2. Apply vapor seal FSK pressure-sensitive patches. Rub hard with the nylon sealing tool to insure a tight bond and a vapor seal. All insulation edges and butt joints are to be sealed with pressure-sensitive joint sealing tape to match the jacket. Rub hard with nylon sealing tool. Use 3 inch wide tapes on the flat surfaces, or where edges are shiplapped and stapled. Five (5) inch wide tape can be used in lieu of shiplapping.
   3. Precautions: Keep all contact adhesive surfaces clean. Use nylon sealing tool to prevent wrinkles and fishmouths. Ductwork or radius may require pre-scoring to allow the board to conform to the surface.

C. Insulation shall be installed according to manufacturer recommendations. Insulation over the expansion joint and the flexible section shall be loose and of adequate length to permit the movement of pipe.

D. Provide insulation shield equivalent to Fee and Mason Fig. 81 at each support.

3.05 DO NOT INSULATE

A. Vibration eliminators.

END OF SECTION

SECTION 23 31 00
DUCTWORK AND DAMPERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 QUALITY ASSURANCE

A. Codes and Standards:
   1. NFPA Compliance: Comply with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems" and NFPA 90B “Standard for the Installation of Warm Air Heating and Air Conditioning Systems”.
   2. SMACNA Duct Construction Standards – 1995
   3. SMACNA Duct Leakage Test Procedures – 1985

1.03 SUBMITTALS

A. Submit in accordance with requirements of 230510.

PART 2 - PRODUCTS

2.01 DUCTWORK MATERIALS

A. Sheet Metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ASTM A 527, lock forming quality; with G 90 zinc coating in accordance with ASTM A 525.

2.02 FABRICATION

A. All low velocity sheetmetal ductwork shall be constructed in accordance with recommendations of Low Pressure Duct Construction Standard, of Sheet Metal and Air Conditioning Contractors National Association, Inc., Fifth Edition, 1976, AIA File No. 30-D-4, hereafter abbreviated SMACNA-I and latest recommendations of the ASHRAE equipment. Duct systems shall be complete including all duct fittings, turning vanes, hangers, and supports shown on drawings and in SMACNA-I. Reference to plate numbers and figure numbers apply to this Duct Manual.

B. Shop fabricated ductwork in maximum 8-ft lengths, unless otherwise indicated. Preassemble work in shop to greatest extent possible, so as to minimize field assembly of systems. Disassemble systems only to extent necessary for shipping and handling. Match-mark sections for reassembly and coordinated installation.

C. Shop fabricate ductwork of gages and reinforcement complying with SMACNA

"HVAC Duct Construction Standards" in accordance with the following:

Application	Construction Pressure STD
Supply Ductwork upstream of Air Terminals	+3" W.G.
Supply Ductwork – single zone units and downstream of Air Terminals	+1" W.G.

D. Cross-break all flat panels between bracing except where rigid insulation is applied.

E. Elbows shall be standard radius or square with air foil double vanes, round duct elbows shall be of five piece construction.

F. Transitions shall be made with maximum angle of 15 degrees with straight duct for diverging flow, 20 degrees for contracting flow.

G. Trim Collars: Wherever duct passes exposed to view through walls, the opening shall be framed with 1 inch x 1 inch x 1/8 inch angles on both sides of partitions with corners mitered, welded and ground smooth.

2.03 TURNING VANES

A. Shall be installed in all square elbows. Vanes shall be manufactured from minimum 26 gauge electro-galvanized steel and sides shall be manufactured from minimum 24 gauge electro-galvanized steel with assembled slots located on design center of 2-1/8 inches. Turning vanes shall be high-efficiency profile. Submit shop drawing for approval.

2.04 FLEXIBLE DUCT CONNECTIONS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

B. Connector: Fabric crimped into metal edging strip.
1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd.
2. Net Fabric Width: Approximately 6 inches wide.
3. Metal: 3 inch wide, 24 gage galvanized steel.

2.05 DUCT TEST HOLES

A. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.06 VOLUME CONTROL DAMPERS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

B. Single Blade Dampers: Fabricate for duct sizes up to 6 x 30 inch.

C. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade

sizes 8 x 72 inches. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.

D. End Bearings: Except in round ductwork 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.

E. Quadrants: Provide locking, indicating quadrant regulators on single and multi-blade dampers. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters. Where rod lengths exceed 30 inches provide regulator at both ends.

PART 3 - EXECUTION

3.01 INSTALLATION OF METAL DUCTWORK

A. Assemble and install ductwork to achieve properly sealed and noiseless (no objectionable noise) systems, capable of performing each indicated service. Install each run with minimum number of joints. Align ductwork accurately at connections, within 1/8" misalignment tolerance and with internal surfaces smooth. Rigid round, rectangular and flat oval metal ducts shall be installed with support systems in accordance with SMACNA HVAC duct construction standards. Horizontal ducts shall have a support within two feet of each elbow and within four feet of each branch intersection. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and to prevent buckling.

B. Duct joints in low pressure rectangular ducts shall be made with locking seam joints. Seal all duct joints, both longitudinal and transverse, with mastic, thickly applied. Crossbreak duct walls per SMACNA recommendations.

C. All duct takeoffs shall be made with 45 degree side entries.

3.02 VOLUME CONTROL DAMPERS

A. Provide where specified above, where indicated on drawings and in all branches or at all supply, return air, exhaust or transfer openings required to balance system whether or not specifically shown on drawings.
   1. Adjustable quadrant or indicating device: All dampers.
   2. Accessibility: Where dampers are hidden behind furred spaces, damper rods shall be adjustable from flush mounted boxes similar to the Young concealed damper regulator.

3.03 FLEXIBLE DUCT CONNECTIONS

A. Install at all fans, ventilating units and ducts crossing building expansion joints and where condensation may occur. Use double fabric of approved flame-proof material similar to Ventfab. However, asbestos containing materials shall not be used. Material used shall be applicable for intended use. Assemble to duct and blower with washer strip of 1 inch x 1/8 galvanized steel, bolted in o.c. leaving 2

inch slack at joints.

3.04 ADJUSTING AND CLEANING

A. Clean ductwork internally, unit by unit as it is installed, of dust and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or, where ductwork is to be painted, might interfere with painting or cause paint deterioration.

B. Temporary Closure: At ends of ducts which are on site but not yet installed, or are not connected to equipment or air distribution devices at time of ductwork installation, provide temporary closure of polyethylene film or other covering which will prevent entrance of dust and debris until time connections are to be completed.

C. Clean and seal existing ducting with interior lining to be reused.

3.05 TESTING

A. All medium pressure ductwork (between the air handling units and terminal units) shall be pressure tested per SMACNA guidelines. Representative samples totaling 25% of the total medium pressure ductwork shall be tested at a pressure equal to the pressure class rating for that section of duct.

B. The Engineer and Owner shall be notified at least 24 hours in advance of each test so the tests can be witnessed. The contractor shall maintain a log of pressure tests.

END OF SECTION

SECTION 23 37 15
AIR OUTLETS AND INLETS

PART 1- GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

A. Extent of air outlets and inlets work is indicated by drawings and schedules, and by requirements of this section.

B. Codes and Standards:
1. ARI Compliance: Test and rate air outlets and inlets in accordance with ARI 650 "Standard for Air Outlets and Inlets".
2. ASHRAE Compliance: Test and rate air outlets and inlets in accordance with ASHRAE 70 "Method of Testing for Rating the Air Flow Performance of Outlets and Inlets".
3. The grille shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.
4. AMCA Compliance: Test and rate louvers in accordance with AMCA 500 "Test Method for Louvers, Dampers and Shutters".
5. AMCA Seal: Provide louvers bearing AMCA Certified Rating Seal.
6. NFPA Compliance: Install air outlets and inlets in accordance with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems".

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data for air outlets inlets including the following:
1. Schedule of air outlets and inlets indicating drawing designation, room location, number furnished, model number, size, and accessories furnished.
2. Data sheet for each type of air outlet and inlet, and accessory furnished; indicating construction, finish, and mounting details. Performance data for each type of air outlet and inlet furnished, including aspiration ability, temperature and velocity traverses, throw and drop, noise criteria ratings, and minimum one-year warranty. Indicate selections on data.
3. Shop Drawings: Submit manufacturer's assembly-type shop drawing for each type of air outlet and inlet, indicating materials and Maintenance
4. Data: Submit maintenance data, including cleaning instructions for finishes, and spare parts lists. Include this data, product data, and shop drawings in maintenance manuals.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver air outlets and inlets wrapped in factory-fabricated fiberboardtype containers. Identify on outside of container type of outlet or inlet and location to be installed. Avoid crushing or bending and prevent dirt and debris from entering and settling in devices.

PART 2 - PRODUCTS

2.01 RECTANGULAR CEILING SUPPLY DIFFUSERS

A. Manufacturers and style:
1. Match existing in renovated portions of the facility.

B. Type: Square, Fixed pattern, five diffuser vanes to discharge air in four way pattern.

C. Frame: Ceiling grid or surface mount type. Reference architectural reflected ceiling plan for type of frame. Reference mechanical floor plan and schedule for size of face and duct.

D. Fabrication: Aluminum with baked enamel off-white finish.

E. Damper: Not required.

PART 3- EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.

C. Install diffusers to ductwork with air tight connection.

D. Provide balancing dampers on duct take-off to all diffusers, and grilles and registers except wall return grills.

E. Paint ductwork visible behind air outlets and inlets matte black. Refer to Division 9.

END OF SECTION

SECTION 26 00 50 - ELECTRICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

A. It is the responsibility of the electrical contractor to notify the Office of the State Electrical Inspector at the State Construction Office to schedule required inspections including rough-in, above ceiling and final inspections.

B. All work, materials, etc., shall be furnished and installed, whether or not specifically shown on the drawings and/or called for in the specifications, which may be necessary to comply with all of the requirements, due to the exigencies of the work, to complete the work and the contract in a satisfactory and approved manner.

C. The work to be done under this contract shall consist of furnishing all equipment, labor, materials required for the items listed in the proposal, and/or as shown on the contract drawings, together with all devices, connectors, splices and appurtenances, required for a safe, clean, complete and ready for service, reliable, substantial and rugged working installation, to the satisfaction of the Engineer and to execute the intent of this contract and these specifications.

D. The Contractor shall be responsible for determining the proper connection points for all power, control, and signal wiring installed under this contract, regardless of whether the connection points are in equipment furnished under this contract, existing equipment, or equipment furnished by others. The Contractor shall include in his bid prices any field surveys, wire tracing or other work required to ascertain the proper connection points for all wiring.

E. It is the intent of these specifications that the Contractor shall furnish equipment and material which is suitable for the purpose and for installation in the location as is.

F. It is also the intent of the specification that the equipment, materials and accessories, as furnished, shall be complete in all respect and ready to operate.

G. The specifications cover the general design, construction arrangement, and certain particular features, but do not purport to cover all details entering into the design of the equipment and accessories.

H. Minor revisions in construction details will be made to accommodate equipment proposed and approved on the drawings thereof, submitted by the Contractor. Major revisions shall not be made nor shall equipment be submitted for approval which cannot be installed in structures of the approximate dimensions and character specified herein.

I. Further, it is also the intent of these specifications to provide a complete contract including items which may be omitted or not shown but which are considered normal and accepted engineering practice for this type of contract at no additional cost to the Owner.

J. All work shall be done in a thorough and workmanlike manner and shall conform to the best modern practice in the manufacture and installation of high-grade equipment and materials. Wherever possible, all parts shall be made according to standard gauge to facilitate replacement and repair.

K. All materials furnished under these items shall be the best of their respective kinds and shall be free from defects in design and workmanship.

L. All materials or equipment not meeting the specified requirements, as determined by the Designer, shall be rejected, and shall be replaced at once by the Contractor with materials or equipment of the specified type and quality, at no cost to the Owner.

M. All materials for which no detailed specifications are given herein shall be of the quality and character best adapted and suitable for the purpose for which they are to be used and shall be subject to the approval of the Engineer.

N. Where any material or article or the maker or distributor thereof is specified by name, this is done for the purpose of more clearly describing the type or quality desired. Any material or

article of equal quality, merit and performance, in the opinion of the Engineer, will be acceptable, if approval is given in writing.

O. All materials furnished and work done by the Contractor shall be subject to the inspection of the Engineer. Defective materials shall be removed from the site of the work and defective work repaired or replaced as directed. Facilities for handling and inspection of materials and equipment and for access to the work in progress, shall at all times be furnished by the Contractor.

P. Where any delay is encountered in carrying out work due to unfavorable operating conditions, the Contractor shall not be entitled to additional compensation therefore, but the time allowed equivalent to the period of actual delay.

1.2 DESCRIPTION OF WORK

A. Work includes all labor and electrical equipment to install the HVAC system.

B. Unless specifically dimensioned, the work shown on the drawings is diagrammatic, and is intended only to show general arrangement.

C. Include in the work, all accessories and devices necessary for the intended operation or perfection of any system, whether or not specifically shown or specified.

D. The term ″Furnish″ shall mean to obtain and supply to the job site. The term ″Install″ shall generally mean to fix in position and connect for use. Where language indicates that one party or trade is to ″install″ and another is to ″connect″, the term ″install″ shall mean only to fix in position, and ″connect″ shall mean to make electrical connections to. The term ″Provide″ shall mean to furnish and install.

E. Furnish all documentation, such as shop drawings, as-built drawings, operation and maintenance manuals, certification and perform all required testing as herein specified.

1. Testing & Start-Up: Assist MC in startup of all equipment. Provide As-Built Documentation, start-up and test protocol.
2. As Built Documentation: Provide a minimum of (4) sets of Ring Binders per each system with the following minimal content:
    a. Floorplans, Partial Floorplans
    b. Elevations of Control Cabinets
    c. General schematic and detailed loops wiring diagrams and associate termination lists for the basement and 1st floor wiring.
    d. CD with all programming and conclusive documentation. Every line of code shall be properly commented to facilitate future debugging and modifications.

1.3 STANDARD OF QUALITY

A. The specifications establish the standards of quality required, either by description or by references, to brand name, name of manufacturers or manufacturer's model number. All materials shall be new unless noted otherwise.

B. Where one product only is specifically identified by name or manufacturer's model number, the Contractor shall base his bid on the use of the named product. Where multiple names are used, the Contractor shall base his bid on the use of any of those products named.

1.04 SUBMITTALS

A. Engineer’s review of shop drawings is solely for the benefit of the Owner and in no way relieves the contractor from his obligations to furnish materials which satisfy the requirements of his contract and the design intent.

B. Shop drawings, product data and samples shall be submitted as required by the General Conditions or Project Requirements and as supplemented by this section.

C. When a specific specification section identifies that no submittal is required, the contractor shall provide the specified materials without submittals.

D. Provide to the Engineer, a schedule of shop drawing submissions identifying submittal target dates.

E. The Contractor shall review, approve and submit shop drawings, with promptness so as to cause no delay in his work or in that of others. No submissions will be accepted by the Engineer without the signed review and approval of the Contractor.

F. The Contractor shall check and verify pertinent field measurements, and quantities of equipment and materials required.

1.5 PROTECTION OF WORK

A. Each Contractor is responsible for the protection of his materials, equipment, and completed work as defined in the General or Project Requirements and as supplemented herein.

B. All openings into any part of the conduit systems, all fixtures and equipment must be securely covered or otherwise protected to prevent damage due to dropped tools or materials, work by others or intrusion of grit, dirt, water, snow, ice or other foreign matter. Remove burrs, dirt, paint spots and debris. The Contractor shall be held responsible for all damage done to unprotected work or materials.

1.6 STEEL AND CONCRETE WORK FOR ELECTRICAL EQUIPMENT

A. Steel: Provide all miscellaneous steel supports and anchors required for equipment and materials installed under this Specification. Manual of Construction by American Institute of Steel Construction latest edition shall be followed in design and construction except that the second sentence of paragraph 4.2.1., Section 4 of Division 5, page 5-177 will not apply. Structural steel members shall conform to ASTM A36, and shall have a shop applied coat of rust inhibiting paint. Welding of steel shall conform to American Welding Society, Standard Code for Arc and Gas Welding in Building Construction. Bolts, nuts and washers for structural steel framing and concrete embedment shall be high tensile type minimum 3/4" diameter conforming to ASTM A325. Slotted-steel channel supports shall have flange edges turned toward web, and 9/16 inch diameter slotted holes at a maximum 2 inches o.c., in webs.

B. Channel depth: 2-1/2 inches minimum.

C. Channel thickness: selected to suit structural loading.

D. Fittings and Accessories: Products of the same channel manufacturer. Channel supports and fittings shall be hot dip galvanized steel.

1.7 COUNTERFLASHING

A. Where conduits or other items pass through any roof, wall or other exterior component, provide counter flashing as required.

1.8 EQUIPMENT BY OTHERS

A. Summary of Work, together with other technical sections in the Project Manual, describe equipment that will be furnished by the Owner or from other sources.

B. The responsibility for setting, installation and protection of such equipment will be defined in other sections of the Project Manual.

C. Provide services rough-in for and make final connections to this equipment as shown and specified.

D. Provide coordination to assure clearances required for moving equipment to final location.

1.9 MOVING OF EQUIPMENT

A. Verify that electrical equipment will pass through all restricting openings, and when equipment or sections of equipment are larger than these openings, install this equipment prior to construction of enclosing walls, floors or roofs.

B. Use planking or cribbing as required to protect adjoining construction from damage.

C. Provide rigging and expert rigging personnel as required for equipment installation in difficult

locations. Rigging shall include any necessary structural investigation and temporary structural support.

1.10 CUTTING AND PATCHING

A. Provide all openings through walls, floors and ceilings, etc. required for the installation of work defined on the drawings and specifications.

B. Following installation and testing, restore floors, walls and ceilings with materials equal to the original construction and finish to match existing surfaces.

C. Cutting and patching shall be performed only by tradesmen familiar with the construction involved.

1.11 IDENTIFICATION

A. Nameplates:

1. Provide each new normal power load break switch, automatic transfer switch, starter, circuit breaker, panel, remote start-stop station, pilot light or safety switch with an engraved laminated black and white phenolic nameplate, white letters on black background. Provide similar emergency and normal/emergency equipment with an engraved laminated red and white phenolic nameplate, white letters on red background.
2. Compose the legend so as to clearly indicate the function of the equipment. Letters and numbers to be at least 3/16 inch high.
3. Locate the nameplate in a position so as to be clearly visible and secure with screws. Rivets and adhesives are not acceptable.
4. Submit proposed nameplate legend for review.

B. Stenciling:

1. Paint bright red, all exposed pull/splice boxes, conduits, duct banks and raceways containing high voltage conductors over 600 volts.
2. Provide 1 inch high stenciling, white letters on red background as follows: ″HIGH VOLTAGE **** VOLTS″
3. The stenciling shall occur 10 feet on center on each side of the raceway and on the front face of pull/splice box.

1.12 FINAL ACCEPTANCE

A. The Contractor shall perform and complete work in accordance with the Contract Documents without fault or defect of any kind. In the absence of more specific directives, the work shall:

1. Be completed in a first class manner.
2. Be placed in a thoroughly clean and unmarred condition.
3. Be checked out in a step-by-step manner to ascertain that fastenings, controls, parts, safety devices, operating devices and other required appurtenances have been provided in accordance with the Contract Documents.
4. Be free of previously condemned or rejected parts and be properly restored to an acceptable condition.
5. Be adjusted for proper operation wherever adjustments or calibrations exist in the work.

B. All systems shall be operated to demonstrate that the requirements of the Contract have been met and that the systems have been adjusted and will operate in accordance therewith.

1.13 OPERATING AND MAINTENANCE INSTRUCTIONS

See Specification 017800.

1.14 PERMITS, FEES AND CERTIFICATES OF APPROVAL

A. Not Used.

B. Contractor shall provide all power, labor and instruments required for tests and cleaning of systems.

C. Whenever tests are required, three (3) copies of the test reports shall be submitted to the Engineer.

D. Tests may be observed by the Engineer or his representative. Notify the Engineer a minimum of three weeks in advance of test dates.

1.15 COMPLIANCE WITH CODES, STANDARDS AND REGULATIONS

A. In the absence of specific instruction in the technical specifications, equipment and installation shall conform to the following applicable codes, standards and regulations, latest editions:

1. American Society for Testing and Materials (ASTM)
2. American National Standard Institute (ANSI)
3. Underwriter's Laboratories, Inc. (UL)
4. American Welding Society Code (AWSC)
5. NFPA 70, ″National Electrical Code″, latest edition
6. National Electrical Manufacturer's Association (NEMA).
7. Occupational Safety and Health Act (OSHA).
8. National Fire Protection Association (NFPA).
9. National Electrical Safety Code (NESC)
10. National Building Code (BOCA)
11. Institute of Electrical and Electronics Engineers (IEEE)
12. Illuminating Engineering Society of North American (IESNA)
13. State and Local Building, Electric, and Fire Codes and Regulations.

1.16 PAINTING

A. Cabinet trims and similar prefabricated equipment shall be factory primed and finish painted with baked enamel in color selected. This equipment shall not be painted in the field unless the factory finishes have been marred or as otherwise directed. Do not paint over UL or similar labels or mechanical/electrical nameplates.

1.17 COORDINATION OF WORK

A. Coordinate installation of conduit runs and equipment with other trades and conditions in the building and participate in all coordinated shop drawings. Variance from work shown on drawings will be subject to approval. Where interference occurs and electrical work is directed to be relocated, provide such relocation without additional cost.

B. It is the Contractor’s responsibility to coordinate with the manufacturers of all new and existing pieces of equipment the different aspects of their interfaces. All additional costs for equipment manufacturer’s redesign of interfaces caused by the Contractor’s failure to properly coordinate all aspects of the interfaces shall be borne by the Contractor.

1.18 ACCESS PANELS

A. Furnish access panels where required, to concealed pull boxes, junction boxes, or similar equipment located above dry wall board ceiling or behind walls. Installation of access panels shall be by mechanics of the pertinent trade under General Construction.

B. Access panels shall be 18" x 18" minimum, 16 gage wall or ceiling frame and a 14 gage panel door with not less than 1/8" fire proofing secured to the inside of the door. The door shall be provided with concealed hinges and cylinder lock, and prime-coated steel prepared for painting. Each door shall be capable of opening 180 degrees. Doors for wall panels shall be secured with suitable clips and counter sunk tamperproof screws.

C. Access panels shall have "label" fire rating equal to the ceiling or wall surface.

1.19 WARRANTY

A. The contractor and equipment manufacturers shall jointly guarantee all wiring and equipment to be free of defects in workmanship and material for a period of one year from the date of final acceptance, unless otherwise noted.

1.20 PROJECT RECORD DOCUMENTS

A. Maintain at job site, one copy of record documents and samples as required under the General Conditions of the Contract, including Drawings, Specifications, Addenda And Bulletins, Change Orders, Shop Drawings, Product Data and Samples, Field Orders, Field Test Records and Maintenance and Operating Manuals.

B. Provide files and racks for storage of documents. Maintain documents in a clean, dry legible condition and in good order. Do not use record documents for construction purposes. Make record documents and samples available during normal working hours for inspection.

C. Recording:

1. Label each document ″Project Record″ in neat large letters and provide final completion date.
2. Record information concurrently with construction progress.
3. Do not conceal any work until required information is recorded.

D. Record Drawings - legibly mark to record actual construction as follows:

1. A print set (blue-line or black-line) of contract drawing or shop drawing mark-ups of actual installations which vary substantially from the work as originally shown. Mark whichever drawing is most capable of showing "field" condition fully and accurately; however, where shop drawing are used for mark-up, record a cross reference at corresponding location on working drawings. Mark with red erasable pencil and, where feasible, use other colors to distinguish between variation in separate categories or work. Mark-up new information which is recognized to be of importance to Owner, but was for some reason not shown on either contract drawings or shop drawings. Give particular attention to concealed work which would be difficult to measure and record at a later date. Note related change order numbers where applicable.
2. Record Specifications and Addenda, Bulletins, Requests for Information (RFI's) and Construction Clarification Sketches (CSK's) - legibly mark each Section to record:
3. Any variations in actual work in comparison with text of specifications and modifications as issued. Give particular attention to substitutions, selection of options, and similar information work where it is concealed or cannot otherwise be readily discerned at a later date by direct observations. Note related record drawing information and product data, where applicable.
4. Changes made by Field Order or by Change Order.

E. Product Data: Maintain one copy of each product data submittal, and mark-up significant variation in actual work in comparison with submitted information.

1. Include both variations in product as delivered to site, and variations from manufacturer's instruction and recommendations for installation.
2. Give particular attention to concealed products and portions of the work which cannot otherwise be readily discerned at a later date by direct observations. Note related change orders and mark-up of record drawings and specifications.

F. Record Drawings Submittal at Project Completion: Organize record drawing sheets into

manageable sets, bind with durable paper cover sheets and print suitable titles, dates and other identification on cover of each set. Transfer marking required by previous paragraphs to set of reproducible transparencies. Submit complete set of transparencies to the Design Professional and two sets of blue-line prints.

G. Product Data Submittal at Project Completion: Submit three sets of marked-up product data submittals for record purposes that include resolution of all review notes and field revisions.

H. Record Sample Submittals: Immediately prior to date of substantial completion Design Professional (and including Owner's personnel where desired) will meet with Contractor at site, and will determine which if any of submitted samples maintained by Contractor during progress of work are to be transmitted to Owner for record purposes. Comply with Design Professionals instruction for packaging, identification marking, and delivery to Owner's sample storage space.

I. Miscellaneous Record Submittals: Refer to other sections of these specification for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the work. Immediately prior to date(s) of substantial completion, complete miscellaneous records and place in good order properly identified and bound or filed, ready for continued use and reference. Submit to Architect/Engineer for Owner's records.

J. Maintenance Manuals: Organize maintenance-and-operating manual information into three suitable sets of manageable size, and bind into individual binders properly identified and indexed (thumb-tabbed). Include: emergency instructions; spare parts listing; warranties; wiring diagrams; recommended "turn-around" cycles; inspection and cleaning procedures; recommended frequency of testing, adjustment and any other maintenance requirements; shop drawings; product data; and similarly applicable information. Bind each manual of each set in heavy duty 2-inch, vinyl-covered ring binder, and include pocket folders for folded sheet information. Mark identification on both front and spine for each binder.

END OF SECTION 26 00 50

SECTION 26 00 75 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes electrical identification materials and devices required to comply with ANSI C2, NFPA 70, OSHA standards, and authorities having jurisdiction.

1.3 SUBMITTALS

A. No submittals.

1.4 QUALITY ASSURANCE

A. Comply with ANSI C2.

B. Comply with NFPA 70.

C. Comply with ANSI A13.1 and NFPA 70 for color-coding.

D. Comply with NC SCO Electrical Guidelines, 2017.

PART 2 - PRODUCTS

2.1 RACEWAY AND CABLE LABELS

A. Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Color with ANSI A13.1, Table 3, for minimum size of letters for legend and for minimum length of color field for each raceway and cable.

C. Adhesive Labels: Preprinted, flexible, self-adhesive vinyl with legend over-laminated with a clear, weather- and chemical-resistant coating.

D. Pretensioned, Wraparound Plastic Sleeves: Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the line it identifies and arranged to stay in place by pretensioned gripping action when placed in position.

E. Colored Adhesive Tape: Self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide (0.08 mm thick by 25 to 51 mm wide).

F. Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

G. Aluminum, Wraparound Marker Bands: Bands cut from 0.014-inch- (0.4-mm-) thick aluminum sheet, with stamped or embossed legend, and fitted with slots or ears for permanently securing around wire or cable jacket or around groups of conductors.

2.2 NAMEPLATES AND SIGNS

A. Safety Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145.

B. Engraved Plastic Nameplates and Signs: Engraving stock, melamine plastic laminate, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. in. (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes.

1. Engraved legends consistent with facility standard.
2. Punched or drilled for mechanical fasteners.

C. Baked-Enamel Signs for Interior Use: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for the application. 1/4-inch (6.4-mm) grommets in corners for mounting. Nameplate material colors shall be:

1. Fire Alarm System: Bright red surface with white core
2. Telephone/Data System: Orange surface with white core
3. Sound System: Dark Blue with white core
4. Security System: Dark red (burgundy) surface with white core
5. Emergency System: Green surface with white core
6. Data Systems: Brown surface with white core
7. Paging System: White surface with black core
8. TV System: Purple surface with white core
9. 208 Volt System: Blue surface with white core
10. 480 Volt System: Black surface with white core

2.3 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking, Type 6/6 nylon cable ties.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength: 50 lb (22.3 kg) minimum.
3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
4. Color: According to color-coding.

B. Paint: Formulated for the type of surface and intended use.

1. Primer for Galvanized Metal: Single-component acrylic vehicle formulated for galvanized surfaces.
2. Primer for Concrete Masonry Units: Heavy-duty-resin block filler.
3. Primer for Concrete: Clear, alkali-resistant, binder-type sealer.
4. Enamel: Silicone-alkyd or alkyd urethane as recommended by primer manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Identification Materials and Devices: Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations with corresponding designations in the Contract Documents or with those required by codes and standards. Use consistent designations throughout Project.

C. Sequence of Work: If identification is applied to surfaces that require finish, install identification after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before applying.

F. Install painted identification according to manufacturer's written instructions and as follows:

1. Clean surfaces of dust, loose material, and oily films before painting.
2. Prime surfaces using type of primer specified for surface.
3. Apply one intermediate and one finish coat of enamel.

G. Color Banding Raceways and Exposed Cables: Band exposed and accessible raceways of the systems listed below:

1. Bands: Pretensioned, wraparound plastic sleeves; colored adhesive tape; or a combination of both. Make each color band 2 inches (51 mm) wide, completely encircling conduit, and place adjacent bands of two-color markings in contact, side by side.

2. Band Locations: At changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
3. Apply the following colors to the systems listed below:

   a. Fire Alarm System: Bright Red.
   b. Telephone/Data System: Orange
   c. Sound System: Dark Blue.
   d. Security Dark Red (Burgundy)
   e. Emergency Systems Green
   f. Data Systems Brown
   g. Paging Systems White
   h. TV Systems: Purple
   i. 208 Volt System: Blue.
   j. 480 Volt System: Black

H. Caution Labels for Indoor Boxes and Enclosures for Power and Lighting: Install pressure-sensitive, self-adhesive labels identifying system voltage with colors:

   a. 208 VAC: Blue with White background
   b. 480 VAC: Black with White background.

F. Circuit Identification Labels on Boxes, Switches, and Receptacles: Install labels externally.

1. Exposed Boxes: Pressure-sensitive, self-adhesive plastic label on cover.
2. Concealed Boxes: Plasticized card-stock tags.
3. Labeling Legend: Permanent, waterproof listing of panel and circuit number/equivalent.

J. Color-Coding of Secondary Phase Conductors: Use the following colors for service feeder, and branch-circuit phase conductors:

1. 208/120-V Conductors:

   a. Phase A: Black.
   b. Phase B: Red.
   c. Phase C: Blue.

2. Factory apply color the entire length of conductors, except the following field applied, color coding methods may be used instead of factory-coded wire for sizes larger than No. 10 AWG:

   a. Colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Use 1 inch (25-mm-) wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification markings.
   b. Colored cable ties applied in groups of three ties of specified color to each wire at each terminal or splice point starting 3 inches (76 mm) from the terminal and spaced 3 inches (76 mm) apart. Apply with a special tool or pliers, tighten to a snug fit, and cut off excess length.

L. Power Circuit Identification: Metal tags or aluminum, wraparound marker bands for cables, feeders, and power circuits in vaults, pull and junction boxes, manholes, and switchboard rooms.

1. Legend: 1/4-inch- (6.4-mm-) steel letter and number stamping or embossing with legend corresponding to indicated circuit designations.
2. Tag Fasteners: Nylon cable ties.
3. Band Fasteners: Integral ears.

M. Apply identification to conductors as follows:

1. Conductors to Be Extended in the Future: Indicate source and circuit numbers.
2. Multiple Power or Lighting Circuits in the Same Enclosure: Identify each conductor with source, voltage, circuit number, and phase. Use color-coding to identify circuits' voltage and phase.
3. Multiple Control and Communication Circuits in the Same Enclosure: Identify each conductor by its system and circuit designation. Use a consistent system of tags, color-coding, or cable marking tape.

N. Apply warning, caution, and instruction signs as follows:

1. Warnings, Cautions, and Instructions: Install to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
2. Emergency Operation: Install engraved laminated signs with white legend on red

   background with minimum 3/8-inch- (9-mm-) high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.

O. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. This includes power, lighting, communication, signal, and alarm systems, unless units are specified with their own self-explanatory identification. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high lettering on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high. Use white lettering on black field. Apply labels for each unit of the following categories of equipment using mechanical fasteners:

1. Panelboards, electrical cabinets, and enclosures.
2. Access doors and panels for concealed electrical items.
3. Disconnect switches.
4. Enclosed circuit breakers.
5. Motor starters.
6. Contactors.
7. Remote-controlled switches.
8. Control devices.

END OF SECTION 26 00 75

SECTION 26 01 20 - CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

1.3 SUBMITTALS

A. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.4 QUALITY ASSURANCE

A. Listing and Labeling: Provide wires and cables specified in this Section that are listed and labeled.

1. The Terms ″Listed″ and ″Labeled″ as defined in NDPA 70, Article 100.
2. Listing and Labeling Agency Qualifications: "Third party agencies shall be amongst those accredited by the NCBCC (North Carolina Building Code Council) to Label Electrical & Mechanical Equipment".

B. Comply with NFPA 70.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver wires and cables according to NEMA WC 26.

1.6 COORDINATION

A. Coordinate layout and installation of cables with other installations.

B. Revise locations and elevations from those indicated, as required to suit field conditions and as approved by Engineer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 CONDUCTORS AND CABLES

A. Manufacturers:

1. American Insulated Wire Corp.; a Leviton Company.
2. General Cable Corporation.
3. Rome Cable Company.

B. Refer to Part 3 "Conductor and Insulation Applications" Article for insulation type, cable construction, and ratings.

C. Conductor Material: Copper complying with NEMA WC 5 or 7; solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.

D. Conductor Insulation Types: Type THHN-THWN, XHHW and XHHW-2 complying with NEMA WC 5 or 7.

E. Multi-conductor Cable: Armored or MC cable is not permitted.

2.3 CONNECTORS AND SPLICES

A. Manufacturers:

1. AFC Cable Systems, Inc.
2. AMP Incorporated/Tyco International.
3. Hubbell/Anderson.
4. O-Z/Gedney; EGS Electrical Group LLC.
5. 3M Company; Electrical Products Division.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR AND INSULATION APPLICATIONS

A. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

B. Feeders Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.

C. Feeders Concealed in Concrete, below Slabs-on-Grade, and in Crawlspaces: Type THHN-THWN, single conductors in raceway.

D. Exposed Branch Circuits, including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

E. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway or flexible metal conduit where permitted for connections to devices not exceeding 3’ in length. .

F. Branch circuit homeruns exposed or concealed: Type THHN-THWN, single conductors in EMT or RMC.

G. Fire Alarm NAC Circuits: Type THHN-THWN, in EMT conduit. SAC: Fire Alarm installer may use standard cables that comply with NEC Article 760. Armor flex may be used for connections to equipment not exceeding 3’ in length.

H. Class 1 Control Circuits: Type THHN-THWN, in raceway.

I. Flexible metal conduit shall be used at all equipment locations subject to vibration. Length shall not exceed 6’ for power feeds and 36” for control devices.

J. MC/AC cables are not permitted except in existing walls with permission of the Engineer and NC SCO.

3.2 INSTALLATION

A. Conceal conduits in finished walls, ceilings, and floors, unless otherwise indicated.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables according to Division 260500 Section "Common Work Results."

F. Seal around cables penetrating fire-rated elements according to "Firestopping Penetration Details" on drawings.

G. Identify and color-code conductors and cables according to Division 260075 Section "Electrical Identification."

3.3 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B. Use calibrated torque tool per NEC Art 110.13(D).

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings.

1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches (300 mm) of slack.

3.4 FIELD QUALITY CONTROL

A. Testing: Perform the following field quality-control testing:

1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.
2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.

B. Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION 26 01 20

SECTION 26 01 30 - RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. Related Sections include the following:

1. Not Used
2. Division 260500 Section "Common Work Results" for supports, anchors, and identification products.
3. Division 262726 Section "Wiring Devices" for devices installed in boxes and for floor-box service fittings.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. FMC: Flexible metal conduit.

C. IMC: Intermediate metal conduit.

D. LFMC: Liquidtight flexible metal conduit.

E. RMC: Rigid Metal Conduit.

F. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

1.6 COORDINATION

A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 METAL CONDUIT AND TUBING

A. Manufacturer:

1. AFC Cable Systems, Inc.

2. Alflex Inc.
3. Anamet Electrical, Inc.; Anaconda Metal Hose.
4. Electri-Flex Co.
5. Grinnell Co. /Tyco International; Allied Tube and Conduit Div.
6. LTV Steel Tubular Products Company.
7. Manhattan/CDT/Cole-Flex.
8. O-Z Gedney; Unit of General Signal.
9. Wheatland Tube Co.

B. Rigid Steel Conduit: ANSI C80.1.

C. IMC: ANSI C80.6.

D. EMT and Fittings: ANSI C80.3.

1. Fittings: Compression type.

E. FMC: Zinc-coated steel.

F. LFMC: Flexible steel conduit with PVC jacket.

G. Fittings: NEMA FB 1; compatible with conduit and tubing materials.

2.3 METAL WIREWAYS

A. Manufacturer:

1. Hoffman.
2. Square D.

B. Material and Construction: Sheet metal sized and shaped as indicated, NEMA 1 or 3R.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70.

D. Wireway Covers: Screw cover type, Flanged and gasketed type at exterior.

E. Finish: Manufacturer's standard enamel finish.

2.4 SURFACE RACEWAYS

A. Surface Metal Raceways: Galvanized steel with snap-on covers. Finish with manufacturer's standard grey finish coat.

1. Manufacturer:
   a. Walker Systems, Inc.; Wiremold Company (The).
   b. Wiremold Company (The); Electrical Sales Division.

B. Types, sizes, and channels as indicated and required for each application, with fittings that match and mate with raceways.

2.5 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturer:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. Emerson/General Signal; Appleton Electric Company.
3. Erickson Electrical Equipment Co.
4. Hoffman.
5. Hubbell, Inc.; Killark Electric Manufacturing Co.
6. O-Z/Gedney; Unit of General Signal.

7. RACO; Division of Hubbell, Inc.
8. Robroy Industries, Inc.; Enclosure Division.
9. Scott Fetzer Com.; Adalet-PLM Division.
10. Spring City Electrical Manufacturing Co.
11. Thomas & Betts Corporation. Walker Systems, Inc.; Wiremold Company
12. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, Type FD, with gasketed cover.

D. Nonmetallic Outlet and Device Boxes: NEMA OS 2.

E. Floor Boxes: Cast metal, fully adjustable, rectangular.

F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

G. Cast-Metal Pull and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.

H. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous hinge cover and flush latch.
1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Nonmetallic Enclosures: Plastic, finished inside with radio frequency resistant paint.

I. Cabinets: NEMA 250, Type 1, galvanized steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel. Hinged door in front cover with flush latch and concealed hinge. Key latch to match panelboards. Include metal barriers to separate wiring of different systems and voltage and include accessory feet where required for freestanding equipment.

2.6 FACTORY FINISHES

A. Finish: For raceway, enclosure, or cabinet components, provide manufacturer's standard prime-coat finish ready for field painting.

B. Finish: For raceway, enclosure, or cabinet components, provide manufacturer's standard gray paint applied to factory-assembled surface raceways, enclosures, and cabinets before shipping.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors:
1. Exposed: Rigid steel or IMC.
2. Concealed: Rigid steel or IMC.
3. Underground, Single Run: RMC or RNC.
4. Underground, Grouped: RMC or RNC.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
6. Boxes and Enclosures: NEMA 250, Type 3R or 4.

B. Indoors:
1. Exposed: EMT.
2. Concealed: EMT.
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC; except use LFMC in damp or wet locations.
4. Damp or Wet Locations: Rigid steel conduit.
5. Boxes and Enclosures: NEMA 250, Type 1, except as follows:

a. Damp or Wet Locations: NEMA 250, Type 4.

6. Where subject to damage, use rigid steel or IMC.

C. Minimum Raceway Size: 3/4-inch trade size (DN 21)

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

E. Install nonferrous conduit or tubing for circuits operating above 60 Hz.

3.2 INSTALLATION

A. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

B. Complete raceway installation before starting conductor installation.

C. Support raceways as specified in Division 260500 Section "Common Work Results."

D. Install temporary closures to prevent foreign matter from entering raceways.

E. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above the finished slab.

F. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.

G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

1. Install concealed raceways with a minimum of bends in the shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.

H. Raceways Embedded in Slabs: Install in middle 1/3 of slab thickness where practical and leave at least 2 inches of concrete cover.

1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.

2. Space raceways laterally to prevent voids in concrete.

3. Run conduit larger than 1-inch trade size parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.

4. Change from nonmetallic tubing to rigid steel conduit, or IMC before rising above the floor.

I. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.

1. Run parallel or banked raceways together on common supports.

2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

J. Join raceways with fittings designed and approved for that purpose and make joints tight.

1. Use insulating bushings to protect conductors.

K. Terminations:

1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.

2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.

L. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

M. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where otherwise required by NFPA 70.

N. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.

O. Flexible Connections: Use maximum of 72 inches of flexible conduit for recessed and semirecessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use LFMC in damp or wet locations. Install separate ground conductor across flexible connections.

P. MC/AC cable is not permitted except in existing walls with Architect's permission.

Q. Surface Raceways: Install a separate, green, ground conductor in raceways from junction box supplying raceways to receptacle or fixture ground terminals.

R. Set floor boxes level and flush with finished floor surface.

S. Set floor boxes level. Trim after installation to fit flush with finished floor surface.

T. Install hinged-cover enclosures and cabinets plumb. Support at each corner.

3.2 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.3 CLEANING

A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes.

END OF SECTION 26 01 30

SECTION 26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Supporting devices for electrical components.
2. Cutting and patching for electrical construction.
3. Touchup painting.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.4 COORDINATION

A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.

1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.

B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.

C. Coordinate electrical service connections to existing transformer.

1. Coordinate installation and connection of exterior underground utilities and services.

D. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces. Access doors and panels are specified in Division 8 Section "Access Doors."

PART 2 - PRODUCTS

2.1 SUPPORTING DEVICES

A. Material: Cold-formed steel, with corrosion-resistant coating acceptable to authorities having jurisdiction.

B. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.

C. Slotted-Steel Channel Supports: Flange edges turned toward web, and 9/16-inch- diameter slotted holes at a maximum of 2 inches o.c., in webs.

1. Channel Thickness: Selected to suit structural loading.

D. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.

E. Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.

F. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for non-armored electrical cables in riser conduits. Plugs have number and size of conductor gripping holes as required to suit individual risers. Body constructed of malleable-iron casting with hot-dip galvanized finish.

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

H. Toggle Bolts: All steel springhead type.

2.2 TOUCHUP PAINT

A. For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.

B. Galvanized Surfaces: Zinc rich paint recommended by item manufacturer.

PART 3 - EXECUTION

3.1 ELECTRICAL EQUIPMENT INSTALLATION

A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide the maximum possible headroom.

B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

D. Right of Way: Give to raceways and piping systems installed at a required slope.

3.2 ELECTRICAL SUPPORTING DEVICE APPLICATION

A. Damp Locations and Outdoors: Hot-dip galvanized materials or nonmetallic, U-channel system components.

B. Dry Locations: Steel materials.

C. Selection of Supports: Comply with manufacturer's written instructions.

D. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four; minimum of 200-lb design load.

3.3 SUPPORT INSTALLATION

A. Install support devices to securely and permanently fasten and support electrical components.

B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.

C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.

D. Size supports for multiple raceway installations so capacity can be increased by a 25 percent minimum in the future.

E. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.

F. Install 1/4-inch- diameter or larger threaded steel hanger rods, unless otherwise indicated.

G. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.

H. Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.

I. Simultaneously install vertical conductor supports with conductors.

J. Separately support cast boxes that are threaded to raceways and used for fixture support.

Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to raceways on opposite sides of the box and support the raceway with an approved fastener not more than 24 inches from the box.

K. Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.

L. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.

M. Securely fasten electrical items and their supports to the building structure, unless otherwise indicated. Perform fastening according to the following unless other fastening methods are indicated:

1. Wood: Fasten with wood screws or screw type nails.
2. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
3. New Concrete: Concrete inserts with machine screws and bolts.
4. Existing Concrete: Expansion bolts.
5. Light Steel: Sheet metal screws.
6. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof test load.

3.4 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.

B. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

3.5 FIELD QUALITY CONTROL

A. Inspect installed components for damage and faulty work, including the following:

1. Supporting devices for electrical components.
2. Cutting and patching for electrical construction.
3. Touchup painting.

3.6 REFINISHING AND TOUCHUP PAINTING

A. Refinish and touch up paint. Paint materials and application requirements are specified in Division 9 Section "Painting."

1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.7 CLEANING AND PROTECTION

A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.

B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

C. Protect all open device boxes from painter's sprays.

END OF SECTION 26 05 00

SECTION 26 05 10 - GROUNDING AND BONDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Field Test Reports: Submit written test reports to include the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with UL 467.

PART 2 - PRODUCTS

2.1 GROUNDING CONDUCTORS

A. For insulated conductors, comply with Division 260120 Section "Conductors and Cables."

B. Material: Copper.

C. Equipment Grounding Conductors: Insulated with green-colored insulation.

D. Copper Bonding Conductors: As follows:

1. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG copper conductor, 1/4 inch in diameter.
2. Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.
3. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.2 CONNECTOR PRODUCTS

A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.

B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.

PART 3 - EXECUTION

3.1 APPLICATION

A. Use only copper conductors for both insulated and bare grounding conductors in direct contact

with earth, concrete, masonry, crushed stone and similar materials.

B. In raceways, use insulated equipment grounding conductors.

C. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.

3.2 EQUIPMENT GROUNDING CONDUCTORS

A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.

B. Install an insulated green copper equipment ground in all branch circuits and feeders.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage. Conductors shall be in EMT conduit, bond conduit at both ends with approved bonding bushings and #6.

B. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.

3.4 CONNECTIONS

A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
2. Make connections with clean, bare metal at points of contact.
3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

B. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

C. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically non-continuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.

D. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturers published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.

E. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

END OF SECTION

SECTION 26 24 16 - PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following: Distribution panelboards, and lighting and appliance branch circuit panelboards.

1.3 SUBMITTALS

A. Product Data: For each type of panelboard, overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

C. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:

D. Enclosure types and details.

E. Bus configuration, current, and voltage ratings.

F. Short-circuit current rating of panelboards and overcurrent protective devices.

G. Features, characteristics, ratings, and factory settings of individual overcurrent protective device and auxiliary components.

Field quality-control test reports including the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

4. Panelboard Schedules: On drawings for installation in panelboards.

5. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Closeout Procedures” or “Operation and Maintenance Data," include the following:

6. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
7. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories through one source from a single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NEMA PB 1.

D. Comply with NFPA 70.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions, unless otherwise indicated:

B. Ambient Temperature: Not exceeding 104 deg F.

C. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

D. Notify Owner no fewer than seven days in advance of proposed interruption of electrical service.

E. Do not proceed with interruption of electrical service without Owner's written permission.

1.6 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Keys: Six spares for each panelboard cabinet lock.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Enclosures: Flush, and surface mounted cabinets, as indicated. NEMA PB 1, Type 1. Rated for environmental conditions at installed location.

B. Outdoor Locations: NEMA 250, Type 3R.

C. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.

D. Finish: Manufacturer's standard enamel finish over corrosion resistant treatment or primer coat.

E. Directory Card: With transparent protective cover, mounted in metal frame, inside panelboard door.

F. Phase and Ground Buses:

Material: Hard-drawn copper, 98 percent conductivity.

Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box. Copper bus shall be used, OEM standard product with all associated, and appropriately sized accessories/hardware.

D. Conductor Connectors: Suitable for use with conductor material.

E. Main and Neutral Lugs: Mechanical type.

F. Ground Lugs and Bus Configured Terminators: Compression type

G. Service Equipment Label: UL labeled for use as service equipment for panelboards with service disconnect switches.

H. Future Devices: Mounting brackets, bus connections, and necessary appurtenances, provisions required for future installation of devices.

2.2 PANELBOARD SHORT-CIRCUIT RATING

A. Fully rated to interrupt symmetrical short-circuit current available at terminals. See panel schedules on drawings.

B. Series rated breakers may be used but relying on them for fault protection is not permitted.

C. Short circuit current shall be labeled on door.

2.3 DISTRIBUTION PANELBOARDS

A. Doors: Secured with vault type latch with tumbler lock; keyed alike.

B. Main Overcurrent Protective Devices in MDP:

C. Circuit breakers where MDP fault does not exceed 40 KAIC.

D. Current limiting breakers or fuses where fault current exceeds 40 KAIC.

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

B. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.5 OVERCURRENT PROTECTIVE DEVICES

A. Molded Case Circuit Breaker: UL 489, with interrupting capacity to meet available fault currents.

B. Thermal Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits.

C. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.

B. Molded Case Circuit Breaker, Features and Accessories: Standard frame sizes, trip ratings, and number of poles.

1. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
3. Multiple units enclosed in a single housing or factory assembled to operate as a single unit.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboards and accessories according to NEMA PB 1.1.

B. Mount top of trim not more than 78 inches above finished floor and not less than 72 inches, unless otherwise indicated. Bottom of large panelboards shall not be closer than 6” from floor.

C. Mount plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.

D. Install overcurrent protective devices.

E. Set field-adjustable switches and circuit-breaker trip ranges: (unless fault study provided)

Panelboard Feeders: LT: Maximum, ST: Minimum

Transformers: LT: Minimum, ST: Maximum

Elevators: LT: Maximum, ST: Maximum

Service MCB: LT: Mid range, LTD: Mid range, ST: Maximum, STD: Maximum, GF: 200 Amps, GFD: 0.5 Seconds

B. Install filler plates in unused spaces.

C. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

3.2 IDENTIFICATION

A. Create a directory to indicate installed circuit loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

B. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.3 CONNECTIONS

A. Ground equipment according to Division 26 Section "Grounding and Bonding."

B. Connect wiring according to Division 26 Section "Conductors and Cables."

3.4 FIELD QUALITY CONTROL

A. Prepare for acceptance tests as follows:

B. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.

C. Test continuity of each circuit.

D. Perform the following field tests and inspections and prepare test reports:

F. The panelboards shall be tested according to the manufacturer’s recommendations.

G. Balance loads, at full load conditions, to not worse than +/- 10% (20% total). Move circuits as needed.

H. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3.5 CLEANING

A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION 26 24 16

SECTION 26 27 26 - WIRING DEVICE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following: Single and duplex receptacles, including ground fault circuit interrupters.

1. Single and double pole snap switches.
2. Device wall plates.
3. Floor service outlets.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: List of legends and description of materials and process used for pre-marking wall plates.

C. Field quality control test reports.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of wiring device through one source from a single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 COORDINATION

A. Receptacles for Owner Furnished Equipment: Match plug configurations, minimum of NEMA 20 Amp.

Cord and Plug Sets: Match equipment requirements, minimum of NEMA 20 Amp.

PART 2 - PRODUCTS

2.1 RECEPTACLES

A. Straight Blade Type Receptacles: Comply with NEMA WD 1, NEMA WD 6, DSCC W-C-596G, and UL 498.

B. Straight Blade and Locking Receptacles: Heavy Duty grade, 20 Amp.

C. GFCI Receptacles: Straight blade, non-feed through type, heavy Duty grade, with integral NEMA WD 6, Configuration 5-20R duplex receptacle; complying with UL 498 and UL 943. Design units for installation in a 2-3/4-inch- deep outlet box without an adapter.

D. Receptacles shall have plug in connectors.

1. Special purpose receptacles to match NEMA designations of various manufacturers' plugs.
2. Receptacles shall be PlugTail by Pass and Seymour.

2.2 CORD AND PLUG SETS

A. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.

2. Cord: Rubber insulated, stranded copper conductors, with Type SOW- jacket; with green insulated grounding conductor and equipment rating ampacity plus a minimum of 30 percent.
3. Plug: Nylon body and integral cable clamping jaws. Match cord and receptacle type for connection.

2.3 SWITCHES

A. Single, Double Pole, or 3 Way Switches: Comply with DSCC W-C-896F and UL 20.
B. Snap Switches: Heavy Duty grade, quiet type, 20 Amp.
C. Switches shall have plug in connectors.
D. Switches shall be PlugTail by Pass and Seymour.

2.4 WALL PLATES

A. Single and combination types to match corresponding wiring devices.
B. Plate-Securing Screws: Metal with head color to match plate finish.
B. Material for Finished Spaces: Brushed Stainless Steel.
C. Material for Unfinished Spaces: Galvanized steel, with rolled edges to match box size.
D. Material for Wet Locations: Thermoplastic with spring-loaded lift-cover, and listed and labeled for use in "wet locations" and "raintight while in use".

2.5 FINISHES

A. Color:
B. Wiring Devices Connected to Normal Power System: Grey, unless otherwise indicated or required by NFPA 70.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install devices and assemblies level, plumb, and square with building lines.
B. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical, and with grounding terminal of receptacles on top. Group adjacent switches under single, multi-gang wall plates.
C. Remove wall plates and protect devices and assemblies during painting.
D. Adjust locations of floor service outlets to suit arrangement of partitions and furnishings

3.2 IDENTIFICATION

A. Comply with Division 26 Section "Electrical Identification."
B. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.3 CONNECTIONS

A. Ground equipment according to Division 26 Section "Grounding and Bonding."
B. Connect wiring according to Division 26 Section "Conductors and Cables."
C. Tighten electrical connectors and terminals according to manufacturers published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B. Use calibrated tool per NEC Art. 110.13(D).

3.4 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. After installing wiring devices and after electrical circuitry has been energized, test for proper polarity, ground continuity, and compliance with requirements.

B. Test GFCI receptacle operation with both local and remote fault simulations according to manufacturer's written instructions. Operation of the GFCI trip shall not interrupt power to any other receptacle on circuit unless otherwise noted.

C. Remove malfunctioning units, replace with new units, and retest as specified above.

END OF SECTION 26 27 26

SECTION 26 50 00 - LIGHTING CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following lighting control devices:
   1. Occupancy Sensors
   2. Photoelectric switches.
   3. Power Relays

B. Related Sections include the following:
   1. Division 26 Section "Wiring Devices" for wall-box dimmers and switches.

1.3 DEFINITIONS

A. LED: Light-emitting diode.

B. PIR: Passive Infrared.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show installation details for occupancy and light-level sensors.

C. Lighting plan showing location, orientation, and coverage area of each sensor.

D. Interconnection diagrams showing field-installed wiring.

E. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.6 COORDINATION

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
   2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 GENERAL LIGHTING CONTROL DEVICE REQUIREMENTS

A. Line-Voltage Surge Protection: An integral part of the devices for 120-V solid-state equipment. For devices without integral line-voltage surge protection, field-mounting surge protection shall comply with IEEE C62.41 and with UL 1449.

2.3 INDOOR OCCUPANCY SENSORS

A. Manufacturers:
   1. Hubbell Lighting Inc.
   2. Leviton Mfg. Company Inc.
   3. Lithonia Lighting.
   4. MYTECH Corporation.
   5. Novitas, Inc.
   6. RAB Electric Manufacturing, Inc.
   7. Sensor Switch, Inc.
   8. TORK.
   9. Unenco Electronics; a Hubbell Company.
   10. Watt Stopper.

B. General Description: Wall- or ceiling-mounting, solid-state units with an integral relay unit.
   1. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
   2. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor shall be line powered.
   3. Relay Unit: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-Vac, and for 1 hp at 120-V ac. Ceiling mounted units shall have DPDT relay contacts.
   4. Mounting: Suitable for mounting in any position on a standard outlet box.
   5. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
   6. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.
   7. Bypass Switch: Override the on function in case of sensor failure.

C. Switchplate Type: 3-wire, wall mounted to replace light switch.
   1. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes. Sensor: Sensor shall use infrared technology, shall cover up to 900 square feet with a 180 degree field of view, and shall have a user adjustable sensitivity setting.
   2. Mounting: Suitable for mounting in a standard switch box. Connect ground wire to electrical ground wire and junction box. Sensitivity adjustment and mounting hardware shall be concealed behind switchplate cover.
   3. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.
   4. Bypass Switch: Override the on function in case of sensor failure.

D. Dual-Technology Type: Ceiling mounting; detect occupancy by using a combination of PIR and ultrasonic detection methods in area of coverage. Particular technology or combination of technologies that controls on and off functions shall be selectable in the field by operating controls on unit.

1. Sensitivity Adjustment: Separate for each sensing technology.
2. Detector Sensitivity: Detect occurrences of 6-inch minimum movement of any portion of a human body that presents a target of at least 36 sq. in. and detect a person of average size and weight moving at least 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft., for offices, and 2000 sq. ft. for classrooms, conference rooms and general spaces, when mounted on a 96-inch- high ceiling.

PART 3 - EXECUTION

3.1 WIRING INSTALLATION

A. Wiring Method: Comply with Division 26 Section "Conductors and Cables." Minimum conduit size shall be 1/2 inch.

B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points.

C. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull and outlet boxes; terminal cabinets; and equipment enclosures.

3.2 Device Testing

A. For All Buildings all occupancy sensors shall be tested to verify operation and adjusted to provide proper spacial coverage, sensitivity for timely activation, and time delays to deactivate as appropriate for the application and as indicated on drawings.

B. If 25% of devices fail any tests, and are not capable of field adjustment, all devices shall be replaced with new units.

END OF SECTION 26 50 00

SECTION 26 51 00 - INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Interior lighting fixtures with lamps and ballasts
   2. Lighting fixtures mounted on exterior building surfaces.
   3. Emergency lighting units.
   4. Exit signs.

B. No Fluorescent, HID, or incandescent sources shall be used except in limited, special applications.

C. All retrofits shall be done with LED light bars unless specifically permitted otherwise by the owner.

D. All light fixtures shall be new unless reusing existing LED fixtures as permitted by the owner.

1.3 DEFINITIONS

A. LED: Light Emitting Diode

B. CRI: Color rendering index.

C. CU: Coefficient of utilization.

D. THD: Total Harmonic Distortion

E. LER: Luminaire efficiency rating, which is calculated according to NEMA LE 5. This value can be estimated from photometric data using the following formula:
   1. LER is equal to the product of total rated lamp lumens times BF times luminaire efficiency, divided by input watts.

F. RoHS: Compliant is no hazardous materials.

1.4 SUBMITTALS

A. Product Data: For each type of lighting fixture scheduled, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:
   1. Physical description of fixture, including dimensions and verification of indicated parameters.
   2. Emergency lighting unit battery and charger.
   3. All LED sources shall have minimum of 50000 hours rated life expectancy.

B. Product Certificates: For each type of power supply/driver for dimmer-controlled fixtures, signed by product manufacturer.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Sections Closeout Procedures and Operation and Maintenance Data, include the following:
   1. Catalog data for each fixture. Include the Model number, identify all options, diffuser, power supply/driver, and lamps installed in that fixture.
   2. Warranties: Not less than 1 year or by special warranties specified in this Section.

3. All OEM recommended cleaning and maintenance of fixtures and lamp sources.
4. Schedule for inspecting and recalibrating lights and associated controls.
5. Narrative of how each system is to operate and include all control set points.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. State of North Carolina Building Code/IBC 2016 Compliance: Comply with visibility and luminance requirements for exit signs.

C. IESNA Illuminating Engineering Society of North America: G-2-10 - Guide for the Application of General Illumination (“White”) Light Emitting Diode (LED) Technologies and applicable LM and TM standards.

D. NEMA - National Electrical Manufacturers Association SSL standards.

E. UL - Underwriters Laboratories, Inc.: 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products and 1598C - Light Emitting Diode (LED) Retrofit Luminaire Conversion Kits.

F. FCC – 47 CFR Part 15 – Radio Frequency Devices

1.6 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire suppression system, and partition assemblies.

1.7 WARRANTY

A. Special Warranty for Exit Signs: Manufacturer's standard form in which manufacturer of exit sign agrees to repair or replace components that fail in materials or workmanship within specified warranty period.

B. Warranty Period: Five years from date of Final Acceptance. Full warranty shall apply to entire unit for first three years.

C. Special Warranty for LED light bars and drivers: Manufacturer's standard form in which manufacturer agrees to repair or replace any that fail in materials or workmanship within specified warranty period.

D. Warranty Period for light drivers and LED bars: Five years from date of Final Acceptance.

PART 2 - PRODUCTS

2.1 FIXTURES AND COMPONENTS, GENERAL

A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.

B. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.

C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit re-lamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during re-lamping and when secured in operating position.

D. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.

4. Laminated Silver Metallized Film: 90 percent.

E. Plastic Diffusers, Covers, and Globes:

1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
2. Lens Thickness: At least 0.125 inch minimum unless different thickness is scheduled. UV stabilized.
3. Glass: Annealed crystal glass, unless otherwise indicated.

F. Drivers shall be integral to fixture. Remote mounting will only be permitted where environmental or space constraints require and by permission of the owner.

G. All fixtures shall be U.L. or other suitable, approved listing agency and bear appropriate label.

2.2 LED

A. Units shall be in accordance with NFPA, UL, as shown on drawings, and as specified.

B. Units shall be modular and allow for separate replacement of LEDs and drivers.

C. LEDs and drivers shall be serviceable from the front or accessible underside of fixture.

D. Units shall include surge protection to withstand line surges, noise and interference.

E. Units shall be dimmable with a 0-10 volt, 3 wire dimming driver and shall be tested-certified by OEM unless otherwise lised on drawings.

F. Units shall not exhibit any audible hum or flicker of source.

G. Minimum CRI of 80.

H. Color temperature of 3500°K unless otherwise listed on drawings.

I. Lumen maintenance rating of L70 minimum, 50000 hours.

J. Minimum 5 years OEM warranty on LEDs and drivers.

K. Tested to IES LM-79 and LM-80 standards.

L. Drivers:

1. Power factor greater than 0.9.
2. Universal operating voltage at 120 and 277 VAC.
3. Minimum 2.5-KV surge protection integral with drivers.
4. Minimum efficiency of 90%.
5. Less than 20% THD.
6. Minimum 5 years warranty.
7. RoHS compliant
8. Dimmable on 0-10VDC control source at minimum of 10% without flicker.

2.3 EXIT SIGNS

A. General: Comply with UL 924; for sign colors and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Signs: Lamps: Light emitting diodes, 70,000 hours minimum of rated lamp life.

C. Provide 90 minute battery backup utilizing 10 year Lithium battery.

2.4 EMERGENCY LIGHT UNITS

A. General: Comply with UL 924; provide per schedule on drawings.

B. Provide 90 minute battery backup utilizing 10 year Lithium battery.

2.5 FIXTURE SUPPORT COMPONENTS

A. Comply with 260500 Common Work Results for channel and angle iron supports and nonmetallic channel and angle supports.

B. Single Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture. Fixtures exceeding 10# shall have safety chains.

C. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc coated, 12 gage.

D. Rod Hangers: 3/16-inch- minimum diameter, cadmium plated, threaded steel rod.

E. Aircraft Cable Support: Use cable, anchorages, and intermediate supports recommended by fixture manufacturer. Fixtures shall have minimum of (2) supports.

F. Fixtures, long than 8' (nominal) shall have (3) supports or more as required by row length.

2.6 FINISHES

A. Fixtures: Brushed Aluminum, galvanized or stainless steel, unless otherwise indicated.

1. Metallic Finish: Corrosion resistant.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.

1. Support for Fixtures in or on Grid Type Suspended Ceilings: Install two independent ceiling support system wires for each grid mounted fixture. Locate not more than 6 inches from fixture corners. Wires shall be yellow or marked with yellow tag.
2. Clips: Fasten fixtures to ceiling grid members with clips that are UL listed for the application.
3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.
4. Support wires shall be installed vertical, +/-15%, to structural ceiling.
5. Wires shall be 'tensioned' to support some but not all of fixtures' weight.

B. Suspended Fixture Support: As follows:

1. Stem Mounted, Single Unit Fixtures: Suspend with twin stem hangers.
2. Continuous Rows 8 or 12' sections: As indicated on Drawings, suspend from cable; or use tubing or stem for wiring at one point and tubing or stem for suspension for each unit length of fixture chassis, including two at each end or row.
3. Install per fixture manufacturer's recommendation.

C. Adjust aimable fixtures, such as track heads, with owner's representative.

D. Each fixture shall be bonded with green ground wire back to power source.

E. Each fixture shall have local disconnecting means on or in unit.

F. Fixtures shall have all external 'stickers' removed, lenses cleaner, and all bugs debris removed at commissioning.

G. Recessed connections (in ceilings or walls) shall be with FMC or LFMC (if Wet Location). Pendant mounted units shall have OEM furnished cord, color to match fixture finish.

3.2 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturers published torque tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.3 EXIT AND EMERGENCY LIGHTING, SEALED BEAM LAMPS

A. Generally, set beams to focus 30-45° down from horizontal and at egress way about 15-30° into egress path from wall. Intent is to cover the egress pathway.

B. Demonstrate operation and do final focusing with owner's representative upon completion of work. Units must operate for 90 minutes.

3.4 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Verify normal operation of each fixture after installation including dimming.

C. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation.

D. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

E. Corroded Fixtures: During warranty period, replace fixtures that show any signs of corrosion.

END OF SECTION 26 51 00

SECTION 28 31 05 - FIRE ALARM MODIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes modifications to existing fire alarm systems.

B. Modifications are minor, essentially maintaining existing devices.

C. Changes or additions to FACP or circuits are not required.

1.3 DEFINITIONS

A. FACU: Fire alarm control unit (panel).

B. NICET: National Institute for Certification in Engineering Technologies.

C. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

1.4 SYSTEM DESCRIPTION

A. Non-coded, addressable system; multiplexed signal transmission dedicated to fire alarm service only.

B. Class A, sensor alarm circuit (SAC), Class B notification circuit (NAC).

1.5 PERFORMANCE REQUIREMENTS

A. Comply with NFPA 72.

B. Fire alarm signal initiation shall be by one or more of the following devices:

C. Smoke detectors.

D. Heat detectors.

C. Fire alarm signal shall initiate the following actions:

1. Alarm notification appliances shall operate continuously.
2. Identify alarm at the FACU and remote annunciators.
3. De-energize electromagnetic door holders.
4. Transmit an alarm signal to the remote alarm receiving station.
5. Switch heating, ventilating, and air- conditioning equipment controls to fire alarm mode.
6. Record events in the system memory.

1.6 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Shop Drawings shall be prepared by persons with the following qualifications:

2. Trained and certified by manufacturer in fire alarm system design.

3. Fire alarm certified by NICET, minimum Level III.

4. Retain existing service organization existing system.

5. System Operation Description: Detailed description for this Project, including method of operation and supervision of each type of circuit and sequence of operations for manually

and automatically initiated system inputs and outputs. Manufacturer's standard descriptions for generic systems are not acceptable.

6. Device Address List: Coordinate with final system programming.
7. System riser diagram with device addresses, conduit sizes, and cable and wire types and sizes.
8. Wiring Diagrams: Power, signal, and control wiring. Include diagrams for equipment and for system with all terminals and interconnections identified. Show wiring color code.
9. Battery Sizing Calculations: Batteries are existing; verify adequacy for revised devise counts and addition of one door holder.
10. Floor Plans: Indicate final device locations showing address of each addressable device.
11. Show size and route of cable and conduits.

C. Qualification Data: For Installer.

D. Field quality control test reports.

Operation and Maintenance Data: For fire alarm system to include in emergency, operation, and maintenance manuals. Comply with NFPA 72 Appendix A recommendations for Owner's manual. Include abbreviated operating instructions for mounting at the FACU.

Not Used

Documentation:

Approval and Acceptance: Provide the "Record of Completion" form according to NFPA 72 to Owner, Designer, and authorities having jurisdiction.

Record of Completion Documents: Provide the "Permanent Records" according to NFPA 72 to Owner, Designer, and authorities having jurisdiction. Format of the written sequence of operation shall be the optional input/output matrix.

a. Existing documentation to be updated for all changes.

Hard copies on paper to Owner, Designer, and authorities having jurisdiction.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Personnel certified by NICET as Fire Alarm Level III.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.8 PROJECT CONDITIONS

A. Interruption of Existing Fire Alarm Service: Do not interrupt fire alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:

B. Notify Owner no fewer than seven days in advance of proposed interruption of fire alarm service exceeding 8 hours.

C. Do not proceed with interruption of fire alarm service without Owner's written permission.

D. Provide a continuous Fire Watch while equipment is not functioning.

B. Owner shall designate Construction Manager who will be responsible for maintaining balance of Building Fire Alarm System during construction.

1.9 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Smoke Detectors: 1 unit of each type.

2. Detector Bases: 1 unit of each type.

PART 2 - PRODUCTS

2.1 FIRE ALARM CONTROL UNIT (FACU)

A. General Description: Use existing panel (Edwards EST).

B. All devices shall be listed/compatible with existing system.

2.2 SYSTEM SMOKE DETECTORS

A. General Description: All addressable smoke detectors shall be analog type with automatic drift compensation features to automatically compensate for detector sensitivity changes due to ambient conditions and detector contamination. UL 268 listed, operating at 24-V dc, nominal.

Integral Addressable Module: Arranged to communicate detector status (normal, alarm, for trouble) to the FACP.

Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. The fixed base shall have integral terminals for connection of building wiring.

Detectors shall have built-in tamper-resistant locking device to secure the head to the base. Activate locking device after Final Acceptance of system.

Self Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.

Integral Visual Indicating Light: LED type. Indicating detector has operated and power on status.

Remote Control: Unless otherwise indicated, detectors shall be analog addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.

Photoelectric Smoke Detectors:

Sensor: LED or infrared light source with matching silicon cell receiver.

Verify detector sensitivity below with manufacturers selected.

Detector Sensitivity: Between 2.5 and 3.5 percent/foot smoke obscuration when tested according to UL 268A.

C Ionization Smoke Detector:

1. Sensor: Responsive to both visible and invisible products of combustion. Self compensating for changes in environmental conditions.
2. Detector Sensitivity: Between 0.5 and 1.7 percent/foot smoke obscuration when tested according to UL 268A.

2.3 ADDRESSABLE INTERFACE DEVICE

Description: Microelectronic monitor module listed for use in providing a system address for listed alarm initiating devices for wired applications with normally open contacts.

B. Integral Relay: Capable of providing a direct signal to the elevator controller to initiate elevator recall and to a circuit breaker shunt trip for power shutdown.

C. Communications Protocol: The DACT shall be fully compatible with the Owner's receiving equipment.

2.4 NOTIFICATION APPLIANCES

Description: Equipped for mounting as indicated and with screw terminals for system connections.

Combination Devices: Factory integrated audible and visible devices in a single -mounting assembly.

Horns: Electric vibrating polarized type, 24-V dc; with provision for

housing the operating mechanism behind a grille. Horns shall produce a sound pressure level of 90 dBA, measured 10 feet from the horn.

Visible Alarm Devices: Xenon strobe lights listed under UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- high letters on the lens.

Strobe Leads: Factory connected to screw terminals.

Candela levels as shown on drawings, adjustable from 15 – 110 candela.

2.5 WIRE AND CABLE

A. Wire and cable for fire alarm systems shall be UL listed and labeled as complying with NFPA 70, Article 760.

B. Signaling Line Circuits: Unless otherwise indicated, Type FPL/FPLR/FPLP fire alarm cable, AWG 18 minimum, low-capacitance, twisted shielded copper pair. Size circuits as recommended by fire alarm system manufacturer. Acceptable cables include Atlas 228-18-1-1STP, Belden YQ28541 or BSCCS1802s19, or West Penn D975, D991 (AWG 16), or D995 (AWG 14); or equal cable having capacitance of 30 pf/ft maximum between conductors. The cable jacket color shall be red, with red (+) and black (-) conductor insulation.

1.Unshielded cable, otherwise equal to the above, shall be permitted where the manufacturer's written installation instructions unequivocally require, or state a preference for, the use of unshielded cable.

2.For underground raceway, Type TC or PLTC (PE insulated) cable shall be used.

3.For plenums use 2 hour rated cable assemblies.

4.Non-Power Limited Circuits: Solid copper conductors with 600-V rated, 75°C, color coded THHN/THWN insulation; AWG 16 minimum for 24 V-dc, AWG 12 minimum for 120V. Color code as follows:

5.Alarm notification appliance circuits: Blue (+) / Black (-).

6.Separate 24 V-dc operating power (for system equipment): Yellow (+)/Brown (-)

7.Door control circuits (magnet power): Orange.

8.For plenums use 2 hour rated cable assemblies.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Smoke Detector Location:

1. As shown on drawings within 12" of ceiling.

B. Device Location Indicating Lights: Locate in public space near the device they monitor.

C. When programming the system, activate the automatic drift compensation feature for all smoke detectors. Set smoke detector sensitivities to normal/medium, unless directed otherwise by the Designer.

3.2 WIRING INSTALLATION

A. Install wiring according to the following:

B. NECA 1.

C. TIA/EIA 568-A.

D. Wiring Method: Install cabling and wiring in metal raceway according to Specification 260130 "Raceways and Boxes."

E. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable

F. Wiring Method:

G. Cables and raceways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.

H. Signaling Line Circuits: Power limited fire alarm wiring shall not be installed in the same cable or raceway as signaling line circuits.

I. Wiring within Enclosures: Separate power limited and non-power limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, joined, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure type terminal blocks, or plug connectors.

B. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

C. For addressable loop controller (signaling line) circuits, T-taps shall not be permitted.

D. There shall be no splices in system wiring except at device terminals, or on terminal blocks in cabinets. “Wire nuts” and crimp splices shall not be permitted. Permanent wire

E. Markers shall be used to identify all connections in the FACU and other equipment, and in terminal cabinets.

F. Color Coding: Color code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm circuit wiring and a different color code for supervisory circuits. Color code audible alarm indicating circuits differently from alarm initiating circuits. Use different colors for visible alarm indicating devices. Paint fire alarm system junction boxes and covers red prior to installing cabling or wiring. In finished areas, boxes and covers shall be painted to match the surrounding finish color.

G. For signaling line circuit cable, connect cable shield drain wires at each device on the loop to maintain continuity, taped to insulate from ground, and terminated at the FACU.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals according to Division 26 Section "General Electrical Requirements."

B. Install instructions frame in a location visible from the FACU.

C. Identify individual detectors with a unique number as follows, in sequence and starting at the FACU: Addressable Loop # - Device #. Permanently mount the nameplate on each detector’s base. Record each number on the as-built drawings.

D. Label each isolation module, and record location on the as-built drawings.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory authorized service representative to inspect, test and adjust field assembled components and equipment installation, including connections. Report results in writing.

B. All new devices shall be 100% tested and existing devices on the 2nd Floor shall be 10% tested in accordance with the North Carolina State Building Code and NFPA 72.

C. Perform the following field tests and inspections and prepare test reports:

1. Perform each electrical test and visual and mechanical inspection listed in NFPA 72. Certify compliance with test parameters. All tests shall be conducted under the direct supervision of a NICET technician certified under the Fire Alarm Systems program at Level III.
2. Visual Inspection: Conduct a visual inspection before any testing. Use as-built drawings and system documentation for the inspection. Identify improperly located, damaged, or nonfunctional equipment, and correct before beginning tests.
3. Testing: Follow procedure and record results complying with requirements in NFPA 72.
    a. Detectors that are outside their marked sensitivity range shall be replaced.
4. Test and Inspection Records: Prepare according to NFPA 72, including demonstration of sequences of operation by using the matrix style form in Appendix A in NFPA 72.
5. Prepare a complete System Status and Programming Report, to include the following:
    6. Program settings for each alarm initiating device.
    7. Current sensitivity for each smoke detector.
    8. System operational matrix, based on 100% testing of all site-specific software functions for the system.

9. After completion of the system acceptance test, submit the following documentation to the Designer and NC SCO:
    10. Written verification that the system acceptance test was performed, and that the system has no deficiencies.
    11. NFPA 72 “Record of Completion” form, completed and signed by the Contractor.
    12. The System Status and Programming Report, generated after the system acceptance testing.
    13. Written request for a final system acceptance review by the Designer, Fire Marshall, and the Owner’s representative. The fire alarm system must operate properly for at least two days prior to this request.

14. Final Acceptance Review: The Contractor and Installer shall accompany the Designer, NC SCO and the Owner’s representative on a final acceptance review of the completed system. The Contractor shall furnish two-way radios, ladders, smoke candles, and other materials needed to test the system. The Installer shall test the system as directed by the Owner’s Representative and Designer.

15. Contractor shall schedule all inspections with NC SCO inspector with 1 week’s notice. All inspections will be done during weekdays and normal working hours.

3.5 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project outside normal occupancy hours for this purpose.

B. Semiannual Test and Inspection: Six months after date of Substantial Completion, test the fire alarm system complying with the testing and visual inspection requirements in NFPA 72.

Perform tests and inspections listed for monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

C. Annual Test and Inspection: One year after date of Substantial Completion, test the fire alarm system complying with the testing and visual inspection requirements in NFPA 72.

D. Perform tests and inspections listed for monthly, quarterly, semiannual, and annual periods. Use forms developed for initial tests and inspections.

3.6 DOCUMENTATION AND TRAINING

1.01.1 Engage a factory authorized service representative to train Owner's designated personnel as specified below:

1. Train Owner's personnel on procedures and schedules for operating, troubleshooting, servicing, adjusting, and maintaining system equipment. Provide a minimum of 2 hours of training.

2. Training Aid: Use the approved final version of the operation and maintenance manual as a training aid.

3. Schedule training with Owner, with at least seven days' advance written notice.

4. Operation and Maintenance Manual: Provide to the Designer, for transmittal to the Owner, two copies of the system Operation and Maintenance manual. The manual shall be bound in a three-ring binder, and shall contain the following information:

5. As-built system wiring diagram showing all loop numbers, device addresses, and wiring terminal numbers.

6. Manufacturer’s detailed maintenance requirements.

7. Not Used

8. Battery calculations, reflecting as-built conditions.

9. Complete site-specific programming data for the system shall be stored on electronic media and archived by the system manufacturer or authorized distributor. A compact disk (CD) copy of this data shall be submitted to the Designer for transmittal to the Owner on the day of system Final Acceptance.

10. The system manufacturer or authorized distributor shall maintain software version (VER) records on the system installed. If a new VER is released during the warranty period, the Owner’s system software shall be upgraded at no cost to the Owner. For the entire life of the installed system, upgraded VER for correcting operating problems shall be provided to the Owner at no cost to the Owner.

11. Basic operating instructions shall be framed and permanently mounted at the FACU. In addition, a copy of the NFPA 72 “Record of Completion” shall be kept in a print pocket inside the FACU. At the Owner’s discretion, the “Record of Completion” may be kept at an alternate location and an engraved label provided on the FACU to indicate the location.

END OF SECTION 28 31 05