P R O J E C T M A N U A L

PROJECT NAME:

SOG RENOVATIONS

PROJECT LOCATION:

DEPARTMENT OF CORRECTION
ADMINISTRATION BUILDING
245 McKEE ROAD
DOVER, DE 19904

OWNER:

State of Delaware
Department of Correction
245 McKee Road
Dover, DE 19904
302.739.5601

OWNER PROJECT NUMBER:

DOC1316-SOGRENOVS

RGA PROJECT NUMBER:

12017

ISSUED FOR:

BIDDING

ISSUED DATE:

3 DECEMBER 2012

NOT FOR BIDDING PURPOSES

R G Architects, LLC
3171 S DuPont Parkway - Odessa, DE 19730
(P) 302 . 376 . 8100 (F) 302 . 376 . 9851
w w w . r g a r c h i t e c t s . n e t

STATE OF DELAWARE - DOC
ADMIN BUILDING SOG RENOVATIONS
245 McKEE ROAD
DOVER, DE 19904

PROJECT TEAM

OWNER: State of Delaware – Department of Correction
245 Mckee Road
Dover, DE 19904
Phone: 302.739.5601

PROJECT: Administration Building SOG Renovations
245 McKee Road
Dover, DE 19904
Phone: 302.739.5601

ARCHITECT: R G Architects, LLC
3171 S. DuPont Parkway
P.O. Box 650
Odessa, DE 19730
Phone: 302/376-8100 Fax: 302/376-9851

M/E/P ENGINEER: Fayda Engineering & Energy Solutions, LLC
801 W. Newport Pike
Wilmington, DE 19804
Phone: 302/999-1060 Fax: 302/999-1053

NOT FOR BIDDING PURPOSES

1. Instructions to Bidders

2. Supplemental Instructions to Bidders

3. Documents to be Submitted with Bid

- Bid Form
- Bid Bond (State Form)

4. Contract Forms

- Standard Form of Agreement Between Owner and Contractor (AIA Document A101, 2007 Edition)
- Performance Bond and Payment Bond (State Forms)
- Supplemental Attachment for ACORD Certificate of Insurance (AIA Document G715)
- Change Order (AIA Document G701)
- Application and Certificate for Payment (AIA Documents G702 and G703)
- Certificate of Substantial Completion (AIA Document G704)
- Contractor's Affidavit of Payment of Debts and Claims (AIA Document G706)
- Contractor's Affidavit of Release of Liens (AIA Document G706A)
- Consent of Surety of Final Payment (AIA Document G707)
- Architect's Supplemental Instructions (AIA Document G710)
- Construction Change Directive (AIA Document G714)

5. Conditions of the Contract

- General Conditions of the Contract for Construction (AIA Document A201, 2007 Edition)
- Supplementary General Conditions
- General Requirements

6. Delaware Prevailing Wage Rates

7. Technical Specifications

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

00 0000 PLACE HOLDER

DIVISION 01 - GENERAL REQUIREMENTS

01 1100 Summary of Work
01 2100 Allowances
01 2300 Alternates
01 2500 Substitution Procedures
01 2600 Contract Modification Procedures
01 2900 Payment Procedures
01 3100 Project Management and Coordination
01 3100a Request for Information Form
01 3200 Construction Progress Documentation
01 3233 Photographic Documentation
01 3300 Submittal Procedures
01 3300a Submittal Cover Sheet Form
01 4000 Quality Requirements
01 4200 References
01 5000 Temporary Facilities and Controls
01 5400 Security Procedures

01 6000 Product Requirements
01 7300 Execution

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01 7329 Cutting and Patching
01 7419 Construction Waste Management and Disposal
01 7700 Closeout Procedures
01 7823 Operation and Maintenance Data
01 7839 Project Record Documents
01 7900 Demonstration and Training

DIVISION 02 - EXISTING CONDITIONS

02 4120 Selective Structure Demolition

DIVISION 03 - CONCRETE

03 3000 Cast-in-Place Concrete

DIVISION 04 - MASONRY

04 2000 Unit Masonry

DIVISION 05 - METALS

05 3100 Steel Decking
05 5000 Metal Fabrications
05 5213 Pipe and Tube Railings

DIVISION 06 - WOOD, PLASTICS AND COMPOSITES

06 1053 Miscellaneous Rough Carpentry

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

07 9200 Joint Sealers

DIVISION 08 - OPENINGS

08 1113 Hollow Metal Doors and Frames
08 3323 Overhead Coiling Doors
08 3463 Detention Doors and Frames
08 7100 Door Hardware
08 9000 Louvers and Vents

DIVISION 09 - FINISHES

09 2115 Gypsum Board Assemblies
09 5123 Acoustical Tile Ceilings
09 6723 Resinous Flooring
09 9100 Painting

DIVISION 21 – FIRE SUPPRESSION

21 0500 Common Work Results for Fire Suppression
21 1000 Water-Based Fire Suppression Systems

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DIVISION 22 - PLUMBING

22 0500 Common Work Results for Plumbing
22 0523 General-Duty Valves for Plumbing Piping
22 0700 Plumbing Insulation
22 1116 Domestic Water Piping

DIVISION 23 - HEATING, VENTILATING, AND AIR-CONDITIONING

23 0500 Common Work Results for HVAC
23 0593 Testing, Adjusting, and Balancing for HVAC
23 0700 HVAC Insulation
23 2300 Refrigerant Piping
23 3100 HVAV Ducts & Casings
23 3423 HVAC Power Ventilators
23 3713 Diffusers, Registers, and Grilles
23 8126 Small Capacity Split System Air Conditioners

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26 0499 Common Work Results for Electrical
26 0500 Basic Materials and Methods, Electrical

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INSTRUCTIONS TO BIDDERS

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5. CONSIDERATION OF BIDS

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7. PERFORMANCE BOND AND PAYMENT BOND

8. FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

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ARTICLE 1: GENERAL

1.1 DEFINITIONS

1.1.1 Whenever the following terms are used, their intent and meaning shall be interpreted as follows:

1.2 STATE: The State of Delaware.

1.3 AGENCY: Contracting State Agency as noted on cover sheet.

1.4 DESIGNATED OFFICIAL: The agent authorized to act for the Agency.

1.5 BIDDING DOCUMENTS: Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement for Bid, Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders (if any), General Conditions, Supplementary General Conditions, General Requirements, Special Provisions (if any), the Bid Form (including the Non-collusion Statement), and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, as well as the Drawings, Specifications (Project Manual) and all Addenda issued prior to execution of the Contract.

1.6 CONTRACT DOCUMENTS: The Contract Documents consist of the, Instructions to Bidders, Supplementary Instructions to Bidders (if any), General Conditions, Supplementary General Conditions, General Requirements, Special Provisions (if any), the form of agreement between the Owner and the Contractor, Drawings (if any), Specifications (Project Manual), and all addenda.

1.7 AGREEMENT: The form of the Agreement shall be AIA Document A101, Standard Form of Agreement between Owner and Contractor where the basis of payment is a STIPULATED SUM. In the case of conflict between the instructions contained therein and the General Requirements herein, these General Requirements shall prevail.

1.8 GENERAL REQUIREMENTS (or CONDITIONS): General Requirements (or conditions) are instructions pertaining to the Bidding Documents and to contracts in general. They contain, in summary, requirements of laws of the State; policies of the Agency and instructions to bidders.

1.9 SPECIAL PROVISIONS: Special Provisions are specific conditions or requirements peculiar to the bidding documents and to the contract under consideration and are supplemental to the General Requirements. Should the Special Provisions conflict with the General Requirements, the Special Provisions shall prevail.

1.10 ADDENDA: Written or graphic instruments issued by the Owner/Architect prior to the execution of the contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

1.11 BIDDER OR VENDOR: A person or entity who formally submits a Bid for the material or Work contemplated, acting directly or through a duly authorized representative who meets the requirements set forth in the Bidding Documents.

1.12 SUB-BIDDER: A person or entity who submits a Bid to a Bidder for materials or labor, or both for a portion of the Work.

1.13 BID: A complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

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1.14 BASE BID: The sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids (if any are required to be stated in the bid).

1.15 ALTERNATE BID (or ALTERNATE): An amount stated in the Bid, where applicable, to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents is accepted.

1.16 UNIT PRICE: An amount stated in the Bid, where applicable, as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

1.17 SURETY: The corporate body which is bound with and for the Contract, or which is liable, and which engages to be responsible for the Contractor's payments of all debts pertaining to and for his acceptable performance of the Work for which he has contracted.

1.18 BIDDER'S DEPOSIT: The security designated in the Bid to be furnished by the Bidder as a guaranty of good faith to enter into a contract with the Agency if the Work to be performed or the material or equipment to be furnished is awarded to him.

1.19 CONTRACT: The written agreement covering the furnishing and delivery of material or work to be performed.

1.20 CONTRACTOR: Any individual, firm or corporation with whom a contract is made by the Agency.

1.21 SUBCONTRACTOR: An individual, partnership or corporation which has a direct contract with a contractor to furnish labor and materials at the job site, or to perform construction labor and furnish material in connection with such labor at the job site.

1.22 CONTRACT BOND: The approved form of security furnished by the contractor and his surety as a guaranty of good faith on the part of the contractor to execute the work in accordance with the terms of the contract.

ARTICLE 2: BIDDER'S REPRESENTATIONS

2.1 PRE-BID MEETING

2.1.1 A pre-bid meeting for this project will be held at the time and place designated. Attendance at this meeting is a pre-requisite for submitting a Bid, unless this requirement is specifically waived elsewhere in the Bid Documents.

2.2 By submitting a Bid, the Bidder represents that:

2.2.1 The Bidder has read and understands the Bidding Documents and that the Bid is made in accordance therewith.

2.2.2 The Bidder has visited the site, become familiar with existing conditions under which the Work is to be performed, and has correlated the Bidder's his personal observations with the requirements of the proposed Contract Documents.

2.2.3 The Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception.

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2.3 JOINT VENTURE REQUIREMENTS

2.3.1 For Public Works Contracts, each Joint Venturer shall be qualified and capable to complete the Work with their own forces.

2.3.2 Included with the Bid submission, and as a requirement to bid, a copy of the executed Joint Venture Agreement shall be submitted and signed by all Joint Venturers involved.

2.3.3 All required Bid Bonds, Performance Bonds, Material and Labor Payment Bonds must be executed by both Joint Venturers and be placed in both of their names.

2.3.4 All required insurance certificates shall name both Joint Venturers.

2.3.5 Both Joint Venturers shall sign the Bid Form and shall submit a valid Delaware Business License Number with their Bid or shall state that the process of application for a Delaware Business License has been initiated.

2.3.6 Both Joint Venturers shall include their Federal E.I. Number with the Bid.

2.3.7 In the event of a mandatory Pre-bid Meeting, each Joint Venturer shall have a representative in attendance.

2.3.8 Due to exceptional circumstances and for good cause shown, one or more of these provisions may be waived at the discretion of the State.

2.4 ASSIGNMENT OF ANTITRUST CLAIMS

2.4.1 As consideration for the award and execution by the Owner of this contract, the Contractor hereby grants, conveys, sells, assigns and transfers to the State of Delaware all of its right, title and interests in and to all known or unknown causes of action it presently has or may now or hereafter acquire under the antitrust laws of the United States and the State of Delaware, relating to the particular goods or services purchased or acquired by the Owner pursuant to this contract.

ARTICLE 3: BIDDING DOCUMENTS

3.1 COPIES OF BID DOCUMENTS

3.1.1 Bidders may obtain complete sets of the Bidding Documents from the Architectural/Engineering firm designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein.

3.1.2 Bidders shall use complete sets of Bidding Documents for preparation of Bids. The issuing Agency nor the Architect assumes no responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

3.1.3 Any errors, inconsistencies or omissions discovered shall be reported to the Architect immediately.

3.1.4 The Agency and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

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3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall report any errors, inconsistencies, or ambiguities discovered to the Architect.

3.2.2 Bidders or Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request to the Architect at least seven days prior to the date for receipt of Bids. Interpretations, corrections and changes to the Bidding Documents will be made by written Addendum. Interpretations, corrections, or changes to the Bidding Documents made in any other manner shall not be binding.

3.2.3 The apparent silence of the specifications as to any detail, or the apparent omission from it of detailed description concerning any point, shall be regarded as meaning that only the best commercial practice is to prevail and only material and workmanship of the first quality are to be used. Proof of specification compliance will be the responsibility of the Bidder.

3.2.4 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all permits, labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work.

3.2.5 The Owner will bear the costs for all impact and user fees associated with the project.

3.3 SUBSTITUTIONS

3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of quality, required function, dimension, and appearance to be met by any proposed substitution. The specification of a particular manufacturer or model number is not intended to be proprietary in any way. Substitutions of products for those named will be considered, providing that the Vendor certifies that the function, quality, and performance characteristics of the material offered is equal or superior to that specified. It shall be the Bidder's responsibility to assure that the proposed substitution will not affect the intent of the design, and to make any installation modifications required to accommodate the substitution.

3.3.2 Requests for substitutions shall be made in writing to the Architect at least ten days prior to the date of the Bid Opening. Such requests shall include a complete description of the proposed substitution, drawings, performance and test data, explanation of required installation modifications due the substitution, and any other information necessary for an evaluation. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect’s decision of approval or disapproval shall be final. The Architect is to notify Owner prior to any approvals.

3.3.3 If the Architect approves a substitution prior to the receipt of Bids, such approval shall be set forth in an Addendum. Approvals made in any other manner shall not be binding.

3.3.4 The Architect shall have no obligation to consider any substitutions after the Contract award.

3.4 ADDENDA

3.4.1 Addenda will be mailed or delivered to all who are known by the Architect to have received a complete set of the Bidding Documents.

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3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

3.4.3 No Addenda will be issued later than 4 days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which extends the time or changes the location for the opening of bids.

3.4.4 Each bidder shall ascertain prior to submitting his Bid that they have received all Addenda issued, and shall acknowledge their receipt in their Bid in the appropriate space. Not acknowledging an issued Addenda could be grounds for determining a bid to be non-responsive.

ARTICLE 4: BIDDING PROCEDURES

4.1 PREPARATION OF BIDS

4.1.1 Submit the bids on the Bid Forms included with the Bidding Documents.

4.1.2 Submit the original Bid Form for each bid. Bid Forms may be removed from the project manual for this purpose.

4.1.3 Execute all blanks on the Bid Form in a non-erasable medium (typewriter or manually in ink).

4.1.4 Where so indicated by the makeup on the Bid Form, express sums in both words and figures, in case of discrepancy between the two, the written amount shall govern.

4.1.5 Interlineations, alterations or erasures must be initialed by the signer of the Bid.

4.1.6 BID ALL REQUESTED ALTERNATES AND UNIT PRICES, IF ANY. If there is no change in the Base Bid for an Alternate, enter “No Change”. The Contractor is responsible for verifying that they have received all addenda issued during the bidding period. Work required by Addenda shall automatically become part of the Contract.

4.1.7 Make no additional stipulations on the Bid Form and do not qualify the Bid in any other manner.

4.1.8 Each copy of the Bid shall include the legal name of the Bidder and a statement whether the Bidder is a sole proprietor, a partnership, a corporation, or any legal entity, and each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current Power of Attorney attached, certifying agent's authority to bind the Bidder.

4.1.9 Bidder shall complete the Non-Collusion Statement form included with the Bid Forms and include it with their Bid.

4.1.10 In the construction of all Public Works projects for the State of Delaware or any agency thereof, preference in employment of laborers, workers or mechanics shall be given to bona fide legal citizens of the State who have established citizenship by residence of at least 90 days in the State.

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4.2 BID SECURITY

4.2.1 All bids shall be accompanied by a deposit of either a good and sufficient bond to the agency for the benefit of the agency, with corporate surety authorized to do business in this State, the form of the bond and the surety to be approved by the agency, or a security of the bidder assigned to the agency, for a sum equal to at least 10% of the bid plus all add alternates, or in lieu of the bid bond a security deposit in the form of a certified check, bank treasurer's check, cashier's check, money order, or other prior approved secured deposit assigned to the State. The bid bond need not be for a specific sum, but may be stated to be for a sum equal to 10% of the bid plus all add alternates to which it relates and not to exceed a certain stated sum, if said sum is equal to at least 10% of the bid. The Bid Bond form used shall be the standard OMB form (attached).

4.2.2 The Agency has the right to retain the bid security of Bidders to whom an award is being considered until either a formal contract has been executed and bonds have been furnished or the specified time has elapsed so the Bids may be withdrawn or all Bids have been rejected.

4.2.3 In the event of any successful Bidder refusing or neglecting to execute a formal contract and bond within 20 days of the awarding of the contract, the bid bond or security deposited by the successful bidder shall be forfeited.

4.3 SUBCONTRACTOR LIST

4.3.1 As required by Delaware Code, Title 29, section 6962(d)(10)b, each Bidder shall submit with their Bid a completed List of Sub-Contractors included with the Bid Form. NAME ONLY ONE SUBCONTRACTOR FOR EACH TRADE. A Bid will be considered non-responsive unless the completed list is included.

4.3.2 Provide the Name and Address for each listed subcontractor. Addresses by City, Town or Locality, plus State, will be acceptable.

4.3.3 It is the responsibility of the Contractor to ensure that their Subcontractors are in compliance with the provisions of this law. Also, if a Contractor elects to list themselves as a Subcontractor for any category, they must specifically name themselves on the Bid Form and be able to document their capability to act as Subcontractor in that category in accordance with this law.

4.4 EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS

4.4.1 During the performance of this contract, the contractor agrees as follows:

A. The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex or national origin. The Contractor will take affirmative action to ensure the applicants are employed, and that employees are treated during employment, without regard to their race, creed, color, sex or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided by the contracting agency setting forth this nondiscrimination clause.

B. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive

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consideration for employment without regard to race, creed, color, sex or national origin."

4.5 PREVAILING WAGE REQUIREMENT

4.5.1 Wage Provisions: In accordance with Delaware Code, Title 29, Section 6960, renovation projects whose total cost shall exceed $15,000, and $100,000 for new construction, the minimum wage rates for various classes of laborers and mechanics shall be as determined by the Department of Labor, Division of Industrial Affairs of the State of Delaware.

4.5.2 The prevailing wage shall be the wage paid to a majority of employees performing similar work as reported in the Department's annual prevailing wage survey or in the absence of a majority, the average paid to all employees reported.

4.5.3 The employer shall pay all mechanics and labors employed directly upon the site of work, unconditionally and not less often than once a week and without subsequent deduction or rebate on any account, the full amounts accrued at time of payment, computed at wage rates not less than those stated in the specifications, regardless of any contractual relationship which may be alleged to exist between the employer and such laborers and mechanics.

4.5.4 The scale of the wages to be paid shall be posted by the employer in a prominent and easily accessible place at the site of the work.

4.5.5 Every contract based upon these specifications shall contain a stipulation that sworn payroll information, as required by the Department of Labor, be furnished weekly. The Department of Labor shall keep and maintain the sworn payroll information for a period of 6 months from the last day of the work week covered by the payroll.

4.6 SUBMISSION OF BIDS

4.6.1 Enclose the Bid, the Bid Security, and any other documents required to be submitted with the Bid in a sealed opaque envelope. Address the envelope to the party receiving the Bids. Identify with the project name, project number, and the Bidder's name and address. If the Bid is sent by mail, enclose the sealed envelope in a separate mailing envelope with the notation "BID ENCLOSED" on the face thereof. The State is not responsible for the opening of bids prior to bid opening date and time that are not properly marked.

4.6.2 Deposit Bids at the designated location prior to the time and date for receipt of bids indicated in the Advertisement for Bids. Bids received after the time and date for receipt of bids will be marked "LATE BID" and returned.

4.6.3 Bidder assumes full responsibility for timely delivery at location designated for receipt of bids.

4.6.4 Oral, telephonic or telegraphic bids are invalid and will not receive consideration.

4.6.5 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids, provided that they are then fully in compliance with these Instructions to Bidders.

4.7 MODIFICATION OR WITHDRAW OF BIDS

4.7.1 Prior to the closing date for receipt of Bids, a Bidder may withdraw a Bid by personal request and by showing proper identification to the Architect. A request for withdraw by letter or fax, if the Architect is notified in writing prior to receipt of fax, is acceptable. A fax directing a modification in the bid price will render the Bid informal, causing it to be ineligible for consideration of award. Telephone directives for modification of the bid price shall not be permitted and will have no bearing on the submitted proposal in any manner.

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4.7.2 Bidders submitting Bids that are late shall be notified as soon as practicable and the bid shall be returned.

4.7.3 A Bid may not be modified, withdrawn or canceled by the Bidder during a thirty (30) day period following the time and date designated for the receipt and opening of Bids, and Bidder so agrees in submitting their Bid. Bids shall be binding for 30 days after the date of the Bid opening.

ARTICLE 5: CONSIDERATION OF BIDS

5.1 OPENING/REJECTION OF BIDS

5.1.1 Unless otherwise stated, Bids received on time will be publicly opened and will be read aloud. An abstract of the Bids will be made available to Bidders.

5.1.2 The Agency shall have the right to reject any and all Bids. A Bid not accompanied by a required Bid Security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

5.1.3 If the Bids are rejected, it will be done within thirty (30) calendar day of the Bid opening.

5.2 COMPARISON OF BIDS

5.2.1 After the Bids have been opened and read, the bid prices will be compared and the result of such comparisons will be made available to the public. Comparisons of the Bids may be based on the Base Bid plus desired Alternates. The Agency shall have the right to accept Alternates in any order or combination.

5.2.2 The Agency reserves the right to waive technicalities, to reject any or all Bids, or any portion thereof, to advertise for new Bids, to proceed to do the Work otherwise, or to abandon the Work, if in the judgment of the Agency or its agent(s), it is in the best interest of the State.

5.2.3 An increase or decrease in the quantity for any item is not sufficient grounds for an increase or decrease in the Unit Price.

5.2.4 The prices quoted are to be those for which the material will be furnished F.O.B. Job Site and include all charges that may be imposed during the period of the Contract.

5.2.5 No qualifying letter or statements in or attached to the Bid, or separate discounts will be considered in determining the low Bid except as may be otherwise herein noted. Cash or separate discounts should be computed and incorporated into Unit Bid Price(s).

5.3 DISQUALIFICATION OF BIDDERS

5.3.1 An agency shall determine that each Bidder on any Public Works Contract is responsible before awarding the Contract. Factors to be considered in determining the responsibility of a Bidder include:

A. The Bidder's financial, physical, personnel or other resources including Subcontracts;

B. The Bidder's record of performance on past public or private construction projects, including, but not limited to, defaults and/or final adjudication or admission of violations of the Prevailing Wage Laws in Delaware or any other state;

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C. The Bidder's written safety plan;

D. Whether the Bidder is qualified legally to contract with the State;

E. Whether the Bidder supplied all necessary information concerning its responsibility; and,

F. Any other specific criteria for a particular procurement, which an agency may establish; provided however, that, the criteria be set forth in the Invitation to Bid and is otherwise in conformity with State and/or Federal law.

5.3.2 If an agency determines that a Bidder is nonresponsive and/or nonresponsible, the determination shall be in writing and set forth the basis for the determination. A copy of the determination shall be sent to the affected Bidder within five (5) working days of said determination.

5.3.3 In addition, any one or more of the following causes may be considered as sufficient for the disqualification of a Bidder and the rejection of their Bid or Bids.

5.3.3.1 More than one Bid for the same Contract from an individual, firm or corporation under the same or different names.

5.3.3.2 Evidence of collusion among Bidders.

5.3.3.3 Unsatisfactory performance record as evidenced by past experience.

5.3.3.4 If the Unit Prices are obviously unbalanced either in excess or below reasonable cost analysis values.

5.3.3.5 If there are any unauthorized additions, interlineation, conditional or alternate bids or irregularities of any kind which may tend to make the Bid incomplete, indefinite or ambiguous as to its meaning.

5.3.3.6 If the Bid is not accompanied by the required Bid Security and other data required by the Bidding Documents.

5.3.3.7 If any exceptions or qualifications of the Bid are noted on the Bid Form.

5.4 ACCEPTANCE OF BID AND AWARD OF CONTRACT

5.4.1 A formal Contract shall be executed with the successful Bidder within twenty (20) calendar days after the award of the Contract.

5.4.2 Per Section 6962(d)(13) a., Title 29, Delaware Code, "The contracting agency shall award any public works contract within thirty (30) days of the bid opening to the lowest responsive and responsible Bidder, unless the Agency elects to award on the basis of best value, in which case the election to award on the basis of best value shall be stated in the Invitation To Bid."

5.4.3 Each Bid on any Public Works Contract must be deemed responsive by the Agency to be considered for award. A responsive Bid shall conform in all material respects to the requirements and criteria set forth in the Contract Documents and specifications.

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5.4.4 The Agency shall have the right to accept Alternates in any order or combination, and to determine the low Bidder on the basis of the sum of the Base Bid, plus accepted Alternates.

5.4.5 The successful Bidder shall execute a formal contract, submit the required Insurance Certificate, and furnish good and sufficient bonds, unless specifically waived in the General Requirements, in accordance with the General Requirement, within twenty (20) days of official notice of contract award. Bonds shall be for the benefit of the Agency with surety in the amount of 100% of the total contract award. Said Bonds shall be conditioned upon the faithful performance of the contract. Bonds shall remain in affect for period of one year after the date of substantial completion.

5.4.6 If the successful Bidder fails to execute the required Contract and Bond, as aforesaid, within twenty (20) calendar days after the date of official Notice of the Award of the Contract, their Bid guaranty shall immediately be taken and become the property of the State for the benefit of the Agency as liquidated damages, and not as a forfeiture or as a penalty. Award will then be made to the next lowest qualified Bidder of the Work or readvertised, as the Agency may decide.

5.4.7 Each bidder shall supply with its bid its taxpayer identification number (i.e., federal employer identification number or social security number) or a Delaware business license number, and should the vendor be awarded a contract, such vendor shall provide to the agency the taxpayer identification or Delaware business license numbers of such subcontractors. Such numbers shall be provided on the later of the date on which such subcontractor is required to be identified or the time the contract is executed. Prior to execution of the resulting contract, the successful Bidder shall be required to produce proof of its Delaware business license if not provided in its bid.

5.4.8 The Bid Security shall be returned to the successful Bidder upon the execution of the formal contract. The Bid Securities of unsuccessful bidders shall be returned within thirty (30) calendar days after the opening of the Bids.

ARTICLE 6: POST-BID INFORMATION

6.1 CONTRACTOR'S QUALIFICATION STATEMENT

6.1.1 Bidders to whom award of a Contract is under consideration shall, if requested by the Agency, submit a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a statement has been previously required and submitted.

6.2 BUSINESS DESIGNATION FORM

6.2.1 Successful bidder shall be required to accurately complete an Office of Management and Budget Business Designation Form for Subcontractors.

ARTICLE 7: PERFORMANCE BOND AND PAYMENT BOND

7.1 BOND REQUIREMENTS

7.1.1 The cost of furnishing the required Bonds, that are stipulated in the Bidding Documents, shall be included in the Bid.

7.1.2 If the Bidder is required by the Agency to secure a bond from other than the Bidder's usual sources, changes in cost will be adjusted as provide in the Contract Documents.

NOT FOR BIDDING PURPOSES

7.1.3 The Performance and Payment Bond forms used shall be the standard OMB forms (attached).

7.2 TIME OF DELIVERY AND FORM OF BONDS

7.2.1 The bonds shall be dated on or after the date of the Contract.

7.2.2 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix a certified and current copy of the power of attorney.

ARTICLE 8: FORM OF AGREEMENT BETWEEN AGENCY AND CONTRACTOR

8.1 Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment is a Stipulated Sum.

END OF INSTRUCTIONS TO BIDDERS

NOT FOR BIDDING PURPOSES

INSTRUCTIONS TO BIDDERS 00 21 13-12

NOT FOR BIDDING PURPOSES

1. Contract Documents

Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders, the bid form, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

Addenda are written or graphic instruments, issued by the Architect prior to the execution of the Contract, which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

A Bid is a complete and properly signed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted form the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

2. Bids

Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

In making copies of the Bidding Documents available on the above terms, the Owner and the Architect do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant permission for any other use of the Bidding Documents.

Interpretations, corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely on them.

Bids (unless directed otherwise) must be prepared upon the letterhead of the firm or individual submitting the estimate in the exact form and sequence of the Proposal Form included in these specifications.

All blanks on the bid form shall be filled in by typewriter or manually in ink.

Where so indicated by the makeup of the bid form, sums shall be expressed in both words and figures, and in case of discrepancy between the two, the amount written in words shall govern.

The signer of the Bid must initial interlineations, alterations, and erasures.

All requested Alternates shall be bid. If no change in the Base Bid is required, enter “No Change.”

NOT FOR BIDDING PURPOSES

Each copy of the Bid shall include the legal name of the Bidder and a statement that the Bidder is a sole proprietor, partnership, corporation or other legal entity. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

Include a sufficient amount in the bid to cover the cost of any and/or all work called for in Addenda or other instructions issued during the bidding period. Such work shall automatically become a part of the contract.

In the event of a tie in the bids, the Owner will decide which bidder is to be awarded the contract by any criteria the Owner chooses.

Bidders may take exception to the terms and conditions of the bid documents and specifications. Exceptions shall be considered only if they are submitted in writing within five (5) calendar days prior to the bid opening date. Exceptions that create inequity in the treatment of bidders will be rejected. Bidders risk the acceptance of their bids by the Owner, when such exceptions are submitted that are deemed not in the best interest of the project.

Bidders acknowledge and accept that the Owner's Representative may, at the Owner's option, photograph and/or videotape construction work in progress including Contractor employees.

Bidders acknowledge and accept that the Owner's Representative may, at the Owner's option, record by audiotape construction progress meetings.

3. Addenda

Addenda will be mailed, faxed, emailed, or delivered to all who have purchased or have been given a complete set of Bidding Documents. All addenda conforming to an 8-1/2" x 11" format will be sent out via fax or email only.

Copies of Addenda will be made available for inspection locally wherever Bidding Documents are on file for that purpose.

Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt on the bid form.

4. Listing Subcontractors

As required by Chapter 69, Section 6912 of the Delaware Code, the Bidder shall submit with, and as a part of its Proposal, a complete list of Subcontractors as agreed upon at the Bidder's Meeting during the bidding period. No Proposal will be considered unless the names and addresses, city and state only, are included in the Proposal where called for. The General Contractor shall list the entity providing the specified system and labor to install it. The work must be awarded to the Subcontractor listed.

No General Contractor shall list itself in any Proposal as the Subcontractor of any part of the Project unless it, in addition to being licensed as a General Contractor of the state, shall also be recognized in the trades as a Subcontractor in and for any such part or parts of such work so listed in such Proposal. NO Subcontractors listed in the Proposal shall be substituted unless the substitution is made in compliance with Section 6912 of the Delaware Code. Refer to Paragraph 10 in this Section for further clarification.

NOT FOR BIDDING PURPOSES

In order to determine the various parts, or classifications of the work for which the names of Subcontractors shall be included in the Proposal, a discussion at the prebid meeting shall be held.

5. Notice of Waiver

In submitting these bids, it is understood that the right is reserved by the Owner to reject any and/or all bids and waive informalities therein, and it is further agreed that these bids may not be withdrawn for a period of sixty (60) days from the opening thereof.

6. Delivery of Bids

All copies of the Bid, the bid security, if any, and other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name and the Bidder's name and address. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

Oral, telephonic or telegraphic Bids are invalid and will not receive consideration.

7. Consideration of Bids

Opening of Bids: The properly identified Bids received on time will be opened publicly and will be read aloud.

Rejection of Bids: The Owner shall have the right to reject any or all Bids, reject a Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or reject a bid that is in any way incomplete or irregular.

8. Bid Bond (Bid Guarantee)

Bidders shall use the State form for the Bid Bond form. The Bid Bond shall be in the sum of ten percent (10%) of the Bid.

9. Performance Bond and Labor and Material Payment Bond (Contract Bond)

Bidders shall use the State forms for the Performance Bond and Labor and Material Payment Bond. The Performance Bond and Labor and Material Payment Bond shall be in the sum of one hundred percent (100%) of the contract.

Bond Requirements: The Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising hereunder. Bonds may be secured through the Bidder's usual sources.

Cost of bonds shall be included in the Bid.

If the Owner requires that bonds be secured from other than the Bidder's usual sources, changes in cost will be adjusted as provided in the Contract Documents.

NOT FOR BIDDING PURPOSES

Time of Delivery and Form of Bonds: The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered.

Both the Labor and Material Payment Bonds shall be written in the amount of the Contract Sum.

The bonds shall be dated on or after the date of the Contract.

The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

10. Awards

It is the intent of the Owner to award the contract to the lowest responsible bidder. Accordingly, the following shall apply:

The Owner reserves the right to award the contract on the Base Bid or on the Base Bid plus any combination of Alternate Estimate as listed in the Proposal Form. The amount of each Alternate Estimate shall include any and all costs of modifications made necessary by the use of such Alternate. An amount shall be stated for each and every Unit Price and Alternate Estimate. The Owner reserves the right to reject any and/or all of the bids presented and waive informalities therein. In the event that the sums of the Base Bid plus the selected alternates of any two or more bidders' results in an identical low bid price, then the Unit Prices as listed in the Proposal may, at the option of the Owner, be used to determine the apparent low bidder.

After such a contract has been awarded, the successful bidder shall not substitute another Subcontractor for any Subcontractor whose name was set forth in the statement which accompanied its bid without the written consent of the agency awarding the contract. No agency shall consent to such substitution unless the agency is satisfied that the Subcontractor in question whose name is listed in the successful bidder's accompanying statement, (1) is unqualified to perform the work required, or (2) has failed to execute a timely reasonable subcontract, or (3) has defaulted in the performance of the part of the work covered by the subcontract, or (4) is no longer engaged in such business.

The Agreement for the Work will be written on AIA Document A101, *Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum*.

11. Plans and Specifications (For Construction Purposes)

Upon the signing of the contract, the successful bidder (Contractor) shall upon request to the Architect, be provided free of charge, **six** sets of these plans and specifications, or one set of electronic plot files (*.pdf) of the drawings to be utilized by the Contractors reproduction service of choice.

In the event that the Contractor requires plans and specifications in excess of the number produced by the Architect for bidding purposes, these additional required sets may be obtained by the Contractor at the cost of reproduction.

12. Submission of Post-Bid Information

The selected Bidder, within fifteen days following signing of the contract, shall submit a list of manufacturers it intends to use on the project.

NOT FOR BIDDING PURPOSES

13. Substitution

It is distinctly understood that were the term "or equal" is used that the Proposal shall be submitted on the commodity specified. If the Contractor wishes to submit to the Architect a commodity or commodities which it considers equal to that specified, and desires to make a substitution, it shall furnish to the Architect all necessary data, catalogs, samples, etc., in reference to same for the Architect's decision as to whether the item is considered "or equal," not later than ten days prior to the bid opening date. The information provided must clearly point out by comparison how the requested products meets or exceeds the specifications of the listed product. Submitting only catalog cuts is not enough, and will most likely result in a "rejection". If the Architect decides that such commodity or commodities meet the standard required, an Addendum shall be issued including the item under list of acceptable items.

Any request for the use of a substitute material, apparatus, etc. shall state where an installation is readily available for inspection; complete fabrication details and operating and maintenance performance.

Failure to comply with the requirements of the above paragraphs may be considered sufficient reason for rejection of the entire Proposal.

Manufacturers and/or Material Suppliers not listed in the Specifications desiring approval of their products by the Architect, as acceptable substitutions for those specified shall apply for consideration of their products through one of the Contractors bidding upon the project. The Contractor receiving the request for product approval shall forward a letter (using its letterhead) regarding the request, including any comments it may have concerning the request to the Architect for consideration. In addition, the Contractor shall attach the manufacturer's original letter of request or a copy of same, plus any literature, etc., received, to its letter, to the Architect.

14. Contract Documents

The contract documents are complementary and what is called for by any one shall be as binding as if called for by all.

The Contractor shall own all entities (products, materials, equipment and systems) identified in the Project Manual (Specifications) and drawings, regardless of whether said entities are only referenced in either the Project Manual or the drawings. Failure of the successful low bidder to identify all required quantities and locations of all project entities in the bidding period will not exempt the low bidder from the contractual responsibility for these items. In the event of a conflict between the Project Manual and the drawings, the Contractor shall own the more costly of the conflicting scenarios. The conflict once identified and reported by the Contractor, will be resolved by the Architect.

For convenience, the specifications have been separated into volumes under various headings with General Requirements listed first and the Technical Specifications following. A group of Divisions comprise the Technical Specifications. Various trades, providing materials or labor or both, whose work is closely related are grouped into these Divisions does not relieve the General Contractor from providing all labor and materials necessary to complete the work, irrespective of the Division in which such labor and material is specified.

NOT FOR BIDDING PURPOSES

15. Examination of Bidding Documents, Site, Etc.

Before submitting bids, bidders shall fully inform themselves of the nature of the work by personal examination of the site, the existing building, the drawings, and specifications and by such other means as they may consider necessary, as to matters, conditions and considerations bearing on or in any way affecting the preparation of their Proposal and the Contract. They shall not at any time after submission of the Proposal dispute or complain of such drawings or specifications and the General Conditions, nor assert that there is any misunderstanding in regard to the location, extent or nature of the work to be performed.

Each Bidder shall examine the Bidding Documents carefully and, not later than five (5) days prior to the date for receipt of bids, shall make written request to the Architect for interpretation or correction of any ambiguity, inconsistency or error therein which it may discover.

16. Access to Site

Before commencing any work of construction, the General Contractor is to consult with the Owner and Architect as to matters in connection with access to the site and the allocation of Ground Areas for the various features of hauling, storage, etc.

17. Protection and Replacement of Roadways, Curbs, Etc.

Before starting any work, the Contractor shall file with the Architect, for approval, a list of all defective areas related to the existing site, including roadways, etc. At the close of the project, the Contractor shall repair any damaged areas to the satisfaction of the Owner and Architect.

18. Repair of Grounds

Toward the completion of the job, go over the grounds, fill any ruts and repair any damage caused by hauling, the storage of materials, and other operations, and leave the whole property in as good condition as at the start of the work. Ant damage to the Owner's property shall be repaired either at the cost of the Contractor or by the Contractor.

19. Contractors Responsibilities under OSHA Requirements

It shall be the General Contractor's and its subcontractors' responsibility to meet the necessary safety requirements, established by the Federal "Occupational Safety and Health Administration" (OSHA) required and applicable while performing work on this project.

A. Project Labor/Staffing:

It shall be **MANDATORY** that the project is staffed by the Prime Contractor.

This staffing requirement shall be required until substantial completion is achieved or as directed and approved by the Architect.

B. Work Hours:

No restrictions however the owner must be notified if the times are after 8 am - 3 pm.

20. Time of Completion

Work shall be commenced by the Prime Contractor upon receipt of the State of Delaware Purchase Order and shall be substantially completed within 90 days of the start of on-site construction.

Note 1: Substantial completion is defined as the owner having "beneficial occupancy of the building." This shall be further clarified for this project as the following items are 100% complete:

NOT FOR BIDDING PURPOSES

- All new mechanical, plumbing, and electrical items shall be installed, electrified, and controlled.

Actual on site construction may begin as early as, or around, February 22, 2013 as long as it does not interfere with the facilities' operations. All work shall be 100 percent (100%) complete on or before August 31, 2013. Work not 100 percent complete by that date may be completed by the Owner's forces with the costs back charged to the Contractor.

A. Work can be completed on Saturdays and Sundays and at extended hours during the week with advanced noticed to the owner. The Owner shall not be responsible for additional costs for overtime.

B. Weather Delays ─ The project substantial completion date, shall only be adjusted due to weather conditions if there are delays above and beyond the following "Adverse Day" allowances based on a seven day work week:

1. January (12 days), February (10 days), March (5 days), April (5 days), May (4days), June (2 days), July (4 days), August (3 days) September (4 days), October (3 days), November (2 days), and December (6 days). These "Adverse Days" are based on the following reference: State of Delaware Department of Transportation's Standard: "763508 Project Control System."
2. Delays requested due to weather must relate to the critical path activity as indicated on the Contractor's Project Schedule only.
3. If work is not scheduled to occur on a day when foul weather occurs, then that day shall not be considered for a "weather delay day".
4. Delays shall only apply to project scope on the exterior work critical path affected by the adverse weather. All other interior project scope must be completed by the original Substantial Completion date.

21. Owner's Inspections

The Owner may have a full- or part-time inspector for this Work in addition to the inspections completed by the Architect.

A. The site may be videotaped daily and progress meetings may be audio taped.

B. The site shall have a daily sign-in log recording the name and trades of all personnel on the site that day.

22. Secure Storage

Secure Storage shall be the responsibility of the Contractor. The Owner shall allow the Contractor to store items on site in designated areas, or off site.

END OF INSTRUCTIONS TO BIDDERS

NOT FOR BIDDING PURPOSES

STATE OF DELAWARE - DOC
ADMIN BUILDING SOG RENOVATIONS
245 McKEE ROAD
DOVER, DE 19904
BID NO. DOC1316-SOGRENOVS
12017

BID FORM

For Bids Due: **Tuesday, January 15th, 2013 @ 2:00 p.m.**

To: **DOC Admin. Building Conf. Room**
245 McKee Rd
Dover, DE 19904

Name of Bidder: _____

Delaware Business License No.: _____ **Taxpayer ID No.:** _____

(Other License Nos.): _____

Phone No.: ( ) ____ - _____ **Fax No.: ( ) ____ - _____**

The undersigned, representing that he has read and understands the Bidding Documents and that this bid is made in accordance therewith, that he has visited the site and has familiarized himself with the local conditions under which the Work is to be performed, and that his bid is based upon the materials, systems and equipment described in the Bidding Documents without exception, hereby proposes and agrees to provide all labor, materials, plant, equipment, supplies, transport and other facilities required to execute the work described by the aforesaid documents for the lump sum itemized below:

BASE BID

$ _____

($)

ALTERNATES

Alternate prices conform to applicable project specification section. Refer to the specification section 01230 for a complete description of the following Alternates. An "ADD" or "DEDUCT" amount is indicated by the crossed-out part that does not apply.

ALTERNATE No. 1: Refer to plan 7/A11-2, column line 0.55. In lieu of constructing the metal stud, drywall, and plywood wall shown on 2/A11-2 along column line 0.55; construct chain link fencing and steel posts between columns E.8 and E.4 as specified in the revised plan from slab to underside of mezzanine. All other surrounding conditions remain as specified in other details, plans, and sections

Add/Deduct: _____

($)

ALTERNATE No. 2: ** _____

Add/Deduct: _____

($)

ALTERNATE NO. 3: . _____

Add/Deduct: _____

NOT FOR BIDDING PURPOSES

STATE OF DELAWARE - DOC
ADMIN BUILDING SOG RENOVATIONS
245 McKEE ROAD
DOVER, DE 19904
BID NO. DOC1316-SOGRENOVS
12017

BID FORM

I / We acknowledge Addendums numbered _____ and the price(s) submitted include any cost / schedule impact they may have.

This bid shall remain valid and cannot be withdrawn for _____ days from the date of opening of bids, and the undersigned shall abide by the Bid Security forfeiture provisions. Bid Security is attached to this Bid (if required).

The Owner shall have the right to reject any or all bids, and to waive any informality or irregularity in any bid received.

This bid is based upon work being accomplished by the Subcontractors named on the list attached to this bid.

Should I/We be awarded this contract, I/We pledge to achieve substantial completion of all the work within _____ calendar days of the Notice to Proceed.

The undersigned represents and warrants that he has complied and shall comply with all requirements of local, state, and national laws; that no legal requirement has been or shall be violated in making or accepting this bid, in awarding the contract to him or in the prosecution of the work required; that the bid is legal and firm; that he has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free competitive bidding.

Upon receipt of written notice of the acceptance of this Bid, the Bidder shall, within twenty (20) calendar days, execute the agreement in the required form and deliver the Contract Bonds, and Insurance Certificates, required by the Contract Documents.

I am / We are an Individual / a Partnership / a Corporation.

By _____ **Trading as** _____
(Individual's / General Partner's / Corporate Name)

_____
(State of Corporation)

Business Address: _____
_____
_____
_____

Witness: _____ **By:** _____
(Authorized Signature)

(SEAL)

_____
(Title)

Date: _____

ATTACHMENTS:
Subcontractor List
Noncollusion Statement
Bid Security
(Others as Required by Project Manuals)

NOT FOR BIDDING PURPOSES

STATE OF DELAWARE - DOC
ADMIN BUILDING SOG RENOVATIONS
245 McKEE ROAD
DOVER, DE 19904
BID NO. DOC1316-SOGRENOVS
12017

BID FORM

SUBCONTRACTOR LIST

In accordance with Title 29, Chapter 6962 (d)(10)b Delaware Code, the following sub-contractor listing must accompany the bid submittal. The name and address of the sub-contractor **must be listed for each category** where the bidder intends to use a sub-contractor to perform that category of work. In order to provide full disclosure and acceptance of the bid by the *Owner*, **it is required that bidders list themselves as being the sub-contractor for all categories where he/she is qualified and intends to perform such work**.

	Subcontractor Category	**Subcontractor for the Specified System**	**Address (City & State)**
1.			
2.			
3.			
4.			
5.			
6.			

NOT FOR BIDDING PURPOSES

STATE OF DELAWARE - DOC
ADMIN BUILDING SOG RENOVATIONS
245 McKEE ROAD
DOVER, DE 19904
BID NO. DOC1316-SOGRENOVS
12017

BID FORM

UNIT PRICES

Unit prices conform to applicable project specification section. Refer to the specification section 01270 for a complete description of the following Unit Price.

		ADD	DEDUCT
UNIT PRICE No. 1:	(BRIEF DESCRIPTION)	$	$
UNIT PRICE No. 2:	(BRIEF DESCRIPTION)	$	$
UNIT PRICE No. 3:	(BRIEF DESCRIPTION)	$	$

NOT FOR BIDDING PURPOSES

STATE OF DELAWARE - DOC
ADMIN BUILDING SOG RENOVATIONS
245 McKEE ROAD
DOVER, DE 19904
BID NO. DOC1316-SOGRENOVS
12017

BID FORM

NONCOLLUSION STATEMENT

This is to certify that the undersigned bidder has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted this date *(to the Department of Administrative Services, Division of Facilities Management)*.

All the terms and conditions of *(Project or Contract Number)* have been thoroughly examined and are understood.

NAME OF BIDDER: _____

AUTHORIZED REPRESENTATIVE (TYPED): _____

AUTHORIZED REPRESENTATIVE (SIGNATURE): _____

AUTHORIZED REPRESENTATIVE (TYPED): _____

TITLE: _____

ADDRESS OF BIDDER: _____

_____

_____

ADDRESS OF BIDDER: _____

Sworn to and Subscribed before me this _____ day of _____ 20 _____

My Commission expires _____ NOTARY PUBLIC _____

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

NOT FOR BIDDING PURPOSES

STATE OF DELAWARE
OFFICE OF MANAGEMENT AND BUDGET

BID BOND

TO ACCOMPANY PROPOSAL
(Not necessary if security is used)

KNOW ALL MEN BY THESE PRESENTS That: _____ _____ of _____ in the County of _____ _____ and State of _____ as **Principal**, and _____ _____ of _____ in the County of _____ and State of _____ as **Surety**, legally authorized to do business in the State of Delaware ("**State**"), are held and firmly unto the **State** in the sum of _____ _____ Dollars ($_____), or _____ percent not to exceed _____ _____ Dollars ($_____) of amount of bid on Contract No. _____, to be paid to the **State** for the use and benefit of _____ (***insert State agency name***) for which payment well and truly to be made, we do bind ourselves, our and each of our heirs, executors, administrators, and successors, jointly and severally for and in the whole firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bonded **Principal** who has submitted to the _____ (***insert State agency name***) a certain proposal to enter into this contract for the furnishing of certain material and/or services within the **State**, shall be awarded this Contract, and if said **Principal** shall well and truly enter into and execute this Contract as may be required by the terms of this Contract and approved by the _____ _____ (***insert State agency name***) this Contract to be entered into within twenty days after the date of official notice of the award thereof in accordance with the terms of said proposal, then this obligation shall be void or else to be and remain in full force and virtue.

Sealed with _____ seal and dated this _____day of _____ in the year of our Lord two thousand and _____ (20___).

SEALED, AND DELIVERED IN THE
Presence of

_____
Name of Bidder (Organization)

Corporate Seal

By: _____
Authorized Signature

Attest _____

_____
Title

_____
Name of Surety

Witness:_____

By: _____

_____
Title

NOT FOR BIDDING PURPOSES

DRAFT

AIA® Document A101™ – 2007

Standard Form of Agreement Between Owner and Contractor

where the basis of payment is a Stipulated Sum

AGREEMENT made as of the « » day of « » in the year « »
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

and the Contractor:
(Name, legal status, address and other information)

for the following Project:
(Name, location and detailed description)

The Architect:
(Name, legal status, address and other information)

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

AIA Document A201™–2007, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.

(Insert the date of commencement if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

If, prior to the commencement of the Work, the Owner requires time to file mortgages and other security interests, the Owner's time requirement shall be as follows:

§ 3.2 The Contract Time shall be measured from the date of commencement.

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than « » (« ») days from the date of commencement, or as follows:

(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

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Portion of Work	Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be « » ($ « »), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:
(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

« »

§ 4.3 Unit prices, if any:
(Identify and state the unit price; state quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price Per Unit ($0.00)

§ 4.4 Allowances included in the Contract Sum, if any:
(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Price

ARTICLE 5 PAYMENTS

§ 5.1 PROGRESS PAYMENTS

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

« »

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the « » day of a month, the Owner shall make payment of the certified amount to the Contractor not later than the « » day of the « » month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than « » (« ») days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

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§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of « » percent (« » %). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™–2007, General Conditions of the Contract for Construction;

.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of « » percent (« » %);

.3 Subtract the aggregate of previous payments made by the Owner; and

.4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201–2007.

§ 5.1.7 The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

.1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and
(Section 9.8.5 of AIA Document A201–2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.)

.2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201–2007.

§ 5.1.8 Reduction or limitation of retainage, if any, shall be as follows:
(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 5.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

« »

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 FINAL PAYMENT

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201–2007, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

« »

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ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 INITIAL DECISION MAKER

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

« »
« »
« »
« »

§ 6.2 BINDING DISPUTE RESOLUTION

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A201–2007, the method of binding dispute resolution shall be as follows:
(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.)

[« »] Arbitration pursuant to Section 15.4 of AIA Document A201–2007

[« »] Litigation in a court of competent jurisdiction

[« »] Other *(Specify)*

« »

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.
(Insert rate of interest agreed upon, if any.)

« » % « »

§ 8.3 The Owner's representative:
(Name, address and other information)

« »
« »
« »
« »
« »
« »

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§ 8.4 The Contractor's representative:
(Name, address and other information)

« »
« »
« »
« »
« »
« »

§ 8.5 Neither the Owner's nor the Contractor's representative shall be changed without ten days written notice to the other party.

§ 8.6 Other provisions:

« »

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A101–2007, Standard Form of Agreement Between Owner and Contractor.

§ 9.1.2 The General Conditions are AIA Document A201–2007, General Conditions of the Contract for Construction.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

§ 9.1.4 The Specifications:
(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

« »

Section	Title	Date	Pages

§ 9.1.5 The Drawings:
(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

« »

Number	Title	Date

§ 9.1.6 The Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 9.

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents:

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.1 AIA Document E201™–2007, Digital Data Protocol Exhibit, if completed by the parties, or the following:

« »

.2 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201–2007 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

« »

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201–2007.
(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201–2007.)

Type of insurance or bond	**Limit of liability or bond amount ($0.00)**

This Agreement entered into as of the day and year first written above.

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
(Printed name and title)	*(Printed name and title)*

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SUPPLEMENT TO AGREEMENT BETWEEN OWNER AND CONTRACTOR A101-2007

The following supplements modify the "Standard Form of Agreement Between Owner and Contractor," AIA Document A101-2007. Where a portion of the Standard Form of Agreement is modified or deleted by the following, the unaltered portions of the Standard Form of Agreement shall remain in effect.

ARTICLE 5: PAYMENTS

5.1 PROGRESS PAYMENTS

5.1.3 Delete paragraph 5.1.3 in its entirety and replace with the following:

"Provided that a valid Application for Payment is received by the Architect that meets all requirements of the Contract, payment shall be made by the Owner not later than 30 days after the Owner receives the valid Application for Payment."

ARTICLE 6: DISPUTE RESOLUTION

6.2 BINDING DISPUTE RESOLUTION

Check Other – and add the following sentence:

"Any remedies available in law or in equity."

ARTICLE 8: MISCELLANEOUS PROVISIONS

8.2 Insert the following:

"Payments are due 30 days after receipt of a valid Application for Payment. After that 30 day period, interest may be charged at the rate of 1% per month not to exceed 12% per annum."

8.5 Delete paragraph 8.5 in its entirety and replace with the following:

"The Contractor's representative shall not be changed without ten days written notice to the Owner."

END OF SUPPLEMENT TO AGREEMENT BETWEEN OWNER AND CONTRACTOR

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STATE OF DELAWARE
OFFICE OF MANAGEMENT AND BUDGET

PERFORMANCE BOND

Bond Number: _____

KNOW ALL PERSONS BY THESE PRESENTS, that we, _____, as principal ("**Principal**"), and _____, a _____ corporation, legally authorized to do business in the State of Delaware, as surety ("**Surety**"), are held and firmly bound unto the _____ ("**Owner**") (***insert State agency name***), in the amount of _____ ($_____), to be paid to **Owner**, for which payment well and truly to be made, we do bind ourselves, our and each and every of our heirs, executors, administrations, successors and assigns, jointly and severally, for and in the whole, firmly by these presents.

Sealed with our seals and dated this _____ day of _____, 20__.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH, that if **Principal**, who has been awarded by **Owner** that certain contract known as Contract No. _____ dated the _____ day of _____, 20__ (the "Contract"), which Contract is incorporated herein by reference, shall well and truly provide and furnish all materials, appliances and tools and perform all the work required under and pursuant to the terms and conditions of the Contract and the Contract Documents (as defined in the Contract) or any changes or modifications thereto made as therein provided, shall make good and reimburse **Owner** sufficient funds to pay the costs of completing the Contract that **Owner** may sustain by reason of any failure or default on the part of **Principal**, and shall also indemnify and save harmless **Owner** from all costs, damages and expenses arising out of or by reason of the performance of the Contract and for as long as provided by the Contract; then this obligation shall be void, otherwise to be and remain in full force and effect.

Surety, for value received, hereby stipulates and agrees, if requested to do so by **Owner**, to fully perform and complete the work to be performed under the Contract pursuant to the terms, conditions and covenants thereof, if for any cause **Principal** fails or neglects to so fully perform and complete such work.

Surety, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of **Surety** and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition or change in or to the Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any work to be performed or any monies due or to become due thereunder; and **Surety** hereby waives notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other

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transferees shall have the same effect as to **Surety** as though done or omitted to be done by or in relation to **Principal**.

Surety hereby stipulates and agrees that no modifications, omissions or additions in or to the terms of the Contract shall in any way whatsoever affect the obligation of **Surety** and its bond.

Any proceeding, legal or equitable, under this Bond may be brought in any court of competent jurisdiction in the State of Delaware. Notices to **Surety** or Contractor may be mailed or delivered to them at their respective addresses shown below.

IN WITNESS WHEREOF, **Principal** and **Surety** have hereunto set their hand and seals, and such of them as are corporations have caused their corporate seal to be hereto affixed and these presents to be signed by their duly authorized officers, the day and year first above written.

PRINCIPAL

Name: _____

Witness or Attest: Address: _____

_____ By: _____(SEAL)
Name: Name:
Title:

(Corporate Seal)

SURETY

Name: _____

Witness or Attest: Address: _____

_____ By: _____ (SEAL)
Name: Name:
Title:

(Corporate Seal)

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STATE OF DELAWARE
OFFICE OF MANAGEMENT AND BUDGET

PAYMENT BOND

Bond Number: _____

KNOW ALL PERSONS BY THESE PRESENTS, that we, _____, as principal ("**Principal**"), and _____, a _____ corporation, legally authorized to do business in the State of Delaware, as surety ("**Surety**"), are held and firmly bound unto the _____ ("**Owner**") (***insert State agency name***), in the amount of _____ ($_____), to be paid to **Owner**, for which payment well and truly to be made, we do bind ourselves, our and each and every of our heirs, executors, administrations, successors and assigns, jointly and severally, for and in the whole firmly by these presents.

Sealed with our seals and dated this _____ day of _____, 20__.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH, that if **Principal**, who has been awarded by **Owner** that certain contract known as Contract No. _____dated the _____ day of _____, 20__ (the "Contract"), which Contract is incorporated herein by reference, shall well and truly pay all and every person furnishing materials or performing labor or service in and about the performance of the work under the Contract, all and every sums of money due him, her, them or any of them, for all such materials, labor and service for which **Principal** is liable, shall make good and reimburse **Owner** sufficient funds to pay such costs in the completion of the Contract as **Owner** may sustain by reason of any failure or default on the part of **Principal**, and shall also indemnify and save harmless **Owner** from all costs, damages and expenses arising out of or by reason of the performance of the Contract and for as long as provided by the Contract; then this obligation shall be void, otherwise to be and remain in full force and effect.

Surety, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of **Surety** and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition or change in or to the Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any work to be performed or any monies due or to become due thereunder; and **Surety** hereby waives notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to **Surety** as though done or omitted to be done by or in relation to **Principal**.

Surety hereby stipulates and agrees that no modifications, omission or additions in or to the terms of the Contract shall in any way whatsoever affect the obligation of **Surety** and its bond.

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Any proceeding, legal or equitable, under this Bond may be brought in any court of competent jurisdiction in the State of Delaware. Notices to **Surety** or Contractor may be mailed or delivered to them at their respective addresses shown below.

IN WITNESS WHEREOF, **Principal** and **Surety** have hereunto set their hand and seals, and such of them as are corporations have caused their corporate seal to be hereto affixed and these presents to be signed by their duly authorized officers, the day and year first above written.

PRINCIPAL

Name: _____

Witness or Attest: Address: _____

_____ By: _____(SEAL)
Name: Name:
Title:

(Corporate Seal)

SURETY

Name: _____

Witness or Attest: Address: _____

_____ By: _____(SEAL)
Name: Name:
Title:

(Corporate Seal)

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INFORMATION ONLY

AIA® Document G701™ – 2001

Change Order

PROJECT *(Name and address)*:

CHANGE ORDER NUMBER: 001
DATE:

OWNER: ☐
ARCHITECT: ☐
CONTRACTOR: ☐
FIELD: ☐
OTHER: ☐

TO CONTRACTOR *(Name and address)*:

ARCHITECT'S PROJECT NUMBER:
CONTRACT DATE:
CONTRACT FOR:

THE CONTRACT IS CHANGED AS FOLLOWS:
(Include, where applicable, any undisputed amount attributable to previously executed Construction Change Directives)

The original Contract Sum was	$	0.00
The net change by previously authorized Change Orders	$	0.00
The Contract Sum prior to this Change Order was	$	0.00
The Contract Sum will be increased by this Change Order in the amount of	$	0.00
The new Contract Sum including this Change Order will be	$	0.00

The Contract Time will be increased by Zero (0) days.
The date of Substantial Completion as of the date of this Change Order therefore is

NOTE: This Change Order does not include changes in the Contract Sum, Contract Time or Guaranteed Maximum Price which have been authorized by Construction Change Directive until the cost and time have been agreed upon by both the Owner and Contractor, in which case a Change Order is executed to supersede the Construction Change Directive.

NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.

ARCHITECT *(Firm name)*	CONTRACTOR *(Firm name)*	OWNER *(Firm name)*
ADDRESS	ADDRESS	ADDRESS
BY *(Signature)*	BY *(Signature)*	BY *(Signature)*
(Typed name)	*(Typed name)*	*(Typed name)*
DATE	DATE	DATE

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AIA® Document G702™ – 1992

Application and Certificate for Payment

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INFORMATION ONLY

TO OWNER:	**PROJECT:**	**APPLICATION NO:** 001 **PERIOD TO:**	**Distribution to:** OWNER: ☐
		CONTRACT FOR: General Construction	ARCHITECT: ☐
FROM CONTRACTOR:	**VIA ARCHITECT:**	**CONTRACT DATE:** **PROJECT NOS:** / /	CONTRACTOR: ☐ FIELD: ☐ OTHER: ☐

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
Continuation Sheet, AIA Document G703, is attached.

1. ORIGINAL CONTRACT SUM		$ 0.00
2. Net change by Change Orders		$ 0.00
3. CONTRACT SUM TO DATE (Line 1 ± 2)		$ 0.00
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703)		$ 0.00
5. RETAINAGE:		
a. 0 % of Completed Work (Column D + E on G703)	$ 0.00	
b. 0 % of Stored Material (Column F on G703)	$ 0.00	
Total Retainage (Lines 5a + 5b or Total in Column I of G703)		$ 0.00
6. TOTAL EARNED LESS RETAINAGE (Line 4 Less Line 5 Total)		$ 0.00
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate)		$ 0.00
8. CURRENT PAYMENT DUE		$ 0.00
9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6)	$ 0.00	

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	$ 0.00	$ 0.00
Total approved this Month	$ 0.00	$ 0.00
TOTALS	$ 0.00	$ 0.00
NET CHANGES by Change Order	$ 0.00	

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: _____ Date: _____

State of:

County of:

Subscribed and sworn to before me this day of

Notary Public:

My Commission expires:

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED $ 0.00

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract

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(3581048424)
User Notes:

AIA® Document G703™ – 1992

Continuation Sheet

AIA Document G702, APPLICATION AND CERTIFICATION FOR PAYMENT,
containing Contractor's signed certification is attached.
In tabulations below, amounts are stated to the nearest dollar.
Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO: 001
APPLICATION DATE:
PERIOD TO:
ARCHITECT'S PROJECT NO:

A	B	C	D	E	F	G		H	I
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	WORK COMPLETED FROM PREVIOUS APPLICATION (D + E)	WORK COMPLETED THIS PERIOD	MATERIALS PRESENTLY STORED (NOT IN D OR E)	TOTAL COMPLETED AND STORED TO DATE (D+E+F)	% (G ÷ C)	BALANCE TO FINISH (C - G)	RETAINAGE (IF VARIABLE RATE)
	GRAND TOTAL	$ 0.00	$ 0.00	$ 0.00	$ 0.00	$ 0.00	0.00 %	$ 0.00	$ 0.00

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(2755046741)

AIA® Document G704™ – 2000

Certificate of Substantial Completion

PROJECT:
(Name and address):

PROJECT NUMBER: /
CONTRACT FOR: General Construction
CONTRACT DATE:

OWNER: ☐
ARCHITECT: ☐
CONTRACTOR: ☐
FIELD: ☐
OTHER: ☐

TO OWNER:
(Name and address):

TO CONTRACTOR:
(Name and address):

PROJECT OR PORTION OF THE PROJECT DESIGNATED FOR PARTIAL OCCUPANCY OR USE SHALL INCLUDE:

The Work performed under this Contract has been reviewed and found, to the Architect's best knowledge, information and belief, to be substantially complete. Substantial Completion is the stage in the progress of the Work when the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The date of Substantial Completion of the Project or portion designated above is the date of issuance established by this Certificate, which is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below:

Warranty **Date of Commencement**

ARCHITECT	BY	DATE OF ISSUANCE

A list of items to be completed or corrected is attached hereto. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Unless otherwise agreed to in writing, the date of commencement of warranties for items on the attached list will be the date of issuance of the final Certificate of Payment or the date of final payment.

Cost estimate of Work that is incomplete or defective: $ 0.00

The Contractor will complete or correct the Work on the list of items attached hereto within Zero (0) days from the above date of Substantial Completion.

CONTRACTOR	BY	DATE

The Owner accepts the Work or designated portion as substantially complete and will assume full possession at (time) on (date).

OWNER	BY	DATE

The responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance shall be as follows:
(Note: Owner's and Contractor's legal and insurance counsel should determine and review insurance requirements and coverage.)

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AIA® Document G706™ – 1994

Contractor's Affidavit of Payment of Debts and Claims

PROJECT: *(Name and address)*	**ARCHITECT'S PROJECT NUMBER:**	OWNER: ☐ ARCHITECT: ☐
	CONTRACT FOR: General Construction	CONTRACTOR: ☑
TO OWNER: *(Name and address)*	**CONTRACT DATED:**	SURETY: ☐ OTHER: ☐

STATE OF:
COUNTY OF:

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Consent of Surety to Final Payment. Whenever Surety is involved, Consent of Surety is required. AIA Document G707, Consent of Surety, may be used for this purpose

Indicate Attachment ☐ Yes ☒ No

The following supporting documents should be attached hereto if required by the Owner:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.
3. Contractor's Affidavit of Release of Liens (AIA Document G706A).

CONTRACTOR: *(Name and address)*

BY: _____
(Signature of authorized representative)

_____
(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:
My Commission Expires:

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User Notes: (2772897536)

AIA® Document G706A™ – 1994

Contractor's Affidavit of Release of Liens

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

CONTRACT FOR: General Construction

CONTRACT DATED:

TO OWNER: *(Name and address)*

OWNER: ☐
ARCHITECT: ☐
CONTRACTOR: ☐
SURETY: ☐
OTHER: ☐

STATE OF:
COUNTY OF:

The undersigned hereby certifies that to the best of the undersigned's knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens or encumbrances or the right to assert liens or encumbrances against any property of the Owner arising in any manner out of the performance of the Contract referenced above.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.

2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

CONTRACTOR: *(Name and address)*

BY:

(Signature of authorized representative)

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:
My Commission Expires:

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User Notes:
(701488131)

AIA® Document G707™ – 1994

Consent Of Surety to Final Payment

PROJECT: *(Name and address)*	**ARCHITECT'S PROJECT NUMBER:**	OWNER: ☐
	CONTRACT FOR: General Construction	ARCHITECT: ☐
		CONTRACTOR: ☐
TO OWNER: *(Name and address)*	**CONTRACT DATED:**	SURETY: ☐
		OTHER: ☐

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
(Insert name and address of Surety)

, SURETY,

on bond of
(Insert name and address of Contractor)

, CONTRACTOR,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety of any of its obligations to
(Insert name and address of Owner)

, OWNER,

as set forth in said Surety's bond.

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date:
(Insert in writing the month followed by the numeric date and year.)

(Surety)

(Signature of authorized representative)

Attest:
(Seal):

(Printed name and title)

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AIA® Document G710™ – 1992

Architect's Supplemental Instructions

PROJECT *(Name and address)*:

ARCHITECT'S SUPPLEMENTAL INSTRUCTION NO: 001

OWNER: ☐
ARCHITECT: ☐
CONSULTANT: ☐
CONTRACTOR: ☐
FIELD: ☐
OTHER: ☐

OWNER *(Name and address)*:

DATE OF ISSUANCE:

CONTRACT FOR: General Construction

CONTRACT DATE:

FROM ARCHITECT *(Name and address)*:

TO CONTRACTOR *(Name and address)*:

ARCHITECT'S PROJECT NUMBER:

The Work shall be carried out in accordance with the following supplemental instructions issued in accordance with the Contract Documents without change in Contract Sum or Contract Time. Proceeding with the Work in accordance with these instructions indicates your acknowledgment that there will be no change in the Contract Sum or Contract Time.

DESCRIPTION:

ATTACHMENTS:
(Here insert listing of documents that support description.)

ISSUED BY THE ARCHITECT:

_____ _____
(Signature) *(Printed name and title)*

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User Notes:
(387766375)

AIA® Document G714™ – 2001

Construction Change Directive

PROJECT: *(Name and address)*

DIRECTIVE NUMBER: 001
DATE:
CONTRACT FOR: General Construction

TO CONTRACTOR: *(Name and address)*

CONTRACT DATED:
ARCHITECT'S PROJECT NUMBER:

OWNER: ☐
ARCHITECT: ☐
CONSULTANT: ☐
CONTRACTOR: ☐
FIELD: ☐
OTHER: ☐

You are hereby directed to make the following change(s) in this Contract:
(Describe briefly any proposed changes or list any attached information in the alternative)

PROPOSED ADJUSTMENTS

1. The proposed basis of adjustment to the Contract Sum or Guaranteed Maximum Price is:
   - ☒ • Lump Sum increased of $ 0.00
   - ☐ • Unit Price of $ per
   - ☐ • As provided in Section 7.3.3 of AIA Document A201-1997
   - ☐ • As follows:

2. The Contract Time is proposed to (be adjusted). The proposed adjustment, if any, is (an increase of 0 days).

When signed by the Owner and Architect and received by the Contractor, this document becomes effective IMMEDIATELY as a Construction Change Directive (CCD), and the Contractor shall proceed with the change(s) described above.

Contractor signature indicates agreement with the proposed adjustments in Contract Sum and Contract Time set forth in this CCD.

ARCHITECT *(Firm name)*	OWNER *(Firm name)*	CONTRACTOR *(Firm name)*
ADDRESS	ADDRESS	ADDRESS
BY *(Signature)*	BY *(Signature)*	BY *(Signature)*
(Typed name)	*(Typed name)*	*(Typed name)*
DATE	DATE	DATE

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(2362828750)

AIA® Document G715™ – 1991

Supplemental Attachment for ACORD Certificate of Insurance 25-S

(This document replaces AIA Document G705, Certificate of Insurance.)

PROJECT *(Name and address)*:

INSURED

		Yes	No	N/A
A.	**General Liability**			
1.	Does the General Aggregate apply to this Project only?	☐	☐	☐
2.	Does this policy include coverage for:			
a.	Premises - Operations?	☐	☐	☐
b.	Explosion, Collapse and Underground Hazards?	☐	☐	☐
c.	Personal Injury Coverage?	☐	☐	☐
d.	Products Coverage?	☐	☐	☐
e.	Completed Operations?	☐	☐	☐
f.	Contractual Coverage for the Insured's obligations in A201?	☐	☐	☐
3.	If coverage is written on a claims-made basis, what is the:			
a.	Retroactive Date?			
b.	Extended Reporting Date?			
B.	**Worker's Compensation**			
1.	If the Insured is exempt from Worker's Compensation statutes, does the Insured carry the equivalent Voluntary Compensation coverage?	☐	☐	☐
C.	**Final Payment Information**			
1.	Is this certificate being furnished in connection with the Contractor's request for final payment in accordance with the requirements of Sections 9.10.2 and 11.1.3 of AIA Document A201, General Conditions of the Contract for Construction?	☐	☐	☐
2.	If so, and if the policy period extends beyond termination of the Contract for Construction, is Completed Operations coverage for this Project continued for the balance of the policy period?	☐	☐	☐
D.	**Termination Provisions**			
1.	Has each policy shown on the certificate and this Supplement been endorsed to provide the holder with 30 days notice of cancellation and/or expiration? List below any policies which do not contain this notice.	☐	☐	☐
E.	**Other Provisions**			

Authorized Representative

Date of Issue

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STANDARD

GENERAL CONDITIONS

OF THE

CONSTRUCTION CONTRACT

The General Conditions of this Contract are as stated in the American Institute of Architects Document AIA A201 (1997 Edition) entitled General Conditions of the Contract for Construction and is part of this project manual as if herein written in full.

Copies of the Document are available through the Owner

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STANDARD

GENERAL CONDITIONS

OF THE

CONSTRUCTION CONTRACT

The General Conditions of this Contract are as stated in the American Institute of Architects Document AIA A201 (2007 Edition) entitled General Conditions of the Contract for Construction and is part of this project manual as if herein written in full.

Copies of the Document are available through the Owner.

NOT FOR BIDDING PURPOSES

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ATTACHMENT 'A'

General Conditions A201

This attachment amends AIA Document A201-1997 General Conditions as follows:

1. The Invitation to Bid, the bid forms and noncollusion statement are expressly enumerated as contract documents pursuant to Article 1.1.1.

2. Delete Article 1.6.1 in its entirety and replace with the following:

   "All predesign studies, drawings, specifications and other documents, including those in electronic form, prepared by the Architect under this Agreement are, and shall remain, the property of the Owner whether the Project for which they are made is executed or not. Such documents may be used by the Owner to construct one or more like Projects without the approval of, or additional compensation to, the Architect. The Contractor, Subcontractors, Sub-subcontractors and Material or Equipment Suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants appropriate to and for use in the execution of their Work under the Contract Documents. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or Material and Equipment Supplier on other Projects or for additions to this Project outside the scope of Work without the specific written consent of the Owner, Architect, and Architect's consultants.

   The Architect shall not be liable for injury or damage resulting from the re-use of drawings and specifications if the Architect is not involved in the re-use Project. Prior to re-use of construction documents for a Project in which the Architect is not also involved, the Owner will remove from such documents all identification of the original Architect, including name, address and professional seal or stamp."

3. Amend Article 3.2.2 to state that any errors, inconsistencies or omissions discovered shall be reported to the Architect and Owner immediately.

4. Delete the third sentence in Article 3.2.3.

5. Delete the first sentence of Article 4.2.7 and replace with the following: "The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples for the purpose of checking for conformance with the Contract Documents."

   Delete the second sentence of Article 4.2.7 and replace with the following: "The Architect's action will be taken with such reasonable promptness as to cause no delay in the Work in the activities of the Owner, Contractor or separate Contractors, while allowing sufficient time in the Owner's professional judgment to permit adequate review."

6. Delete Article 4.3.10 in its entirety.

7. Delete Article 4.4.5 in its entirety and replace with the following: "The Architect will approve or reject Claims by written decision, which shall state the reasons therefore and shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Architect shall be subject to mediation and other remedies at law or in equity."

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8. Delete Article 4.4.6 in its entirety.

9. Delete Article 4.6.4 and substitute the following:

   "4.6.4 CONSOLIDATION OR JOINDER

   A controversy or claim arising out of or related to this Agreement, or the breach thereof, may include, by consolidation or joinder, the Architect and Surety. The objective is to permit the Owner to resolve any such controversy or claim in one arbitration proceeding by permitting consolidation or joinder of the Owner, Contract, Architect and Surety. The Owner shall include in its Agreement with the Architect a provision permitting consolidation or joinder. The Performance and Payment Bond provided by the Contractor shall include a provision binding the Surety to the arbitration award and allowing the Surety to participate in the arbitration."

10. Delete Article 5.2.3 in its entirety and replace with the following: "If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection, subject to the statutory requirements of 29 Delaware Code § 6962(d)(10)b.3,4."

11. Delete Article 6.1.4 in its entirety.

12. Add a new Article 7.1.4 to read as follows:

    "The additional cost, or credit to the Owner resulting from a change in the work shall be by mutual agreement of the Owner, Contractor and the Architect. In all cases, this cost or credit shall be based on the 'DPE' wages required and the "invoice price" of the materials/equipment needed.

    "DPE" shall be defined to mean "direct personnel expense". Direct payroll expense includes direct salary (prevailing wage rates) plus customary fringe benefits and documented statutory costs such as workman's compensation insurance, Social Security/Medicare, and unemployment insurance (a maximum multiplier of 1.27 times DPE).

    "Invoice price" of materials/equipment shall be defined to mean the actual cost of materials and/or equipment that is paid by the Contractor, (or subcontractor), to a material distributor, direct factory vendor, store, material provided, or equipment leasing entity. Rates for equipment that is leased and/or owned by the Contractor or subcontractor(s) shall not exceed those listed in the latest version of the "Means Building Construction Cost Data" publication.

    In addition to the above, the General Contractor is allowed a fifteen percent, 15%, overhead and profit for additional work performed by the General Contractor's own forces. For additional subcontractor work, the Subcontractor is allowed a fifteen percent overhead and profit on change order work above and beyond the direct costs stated previously. To this amount, the General Contractor will be allowed a mark-up not exceeding five percent, 5%, on the subcontractors work. These mark-ups shall include all costs including, but not limited to: overhead, profit, bonds, insurance, etc. There will be no other costs associated with the change order."

13. Add a new article 9.3.4 to read as follows: "Article 6516, Chapter 65, Title 29 of the Delaware Code stipulates annualized interest not to exceed 12% per annum beginning thirty (30) days after the "presentment" (as opposed to the date) of the invoice."

NOT FOR BIDDING PURPOSES

14. Add a new Article 9.5.3 to read as follows: "The Owner shall have the right to withhold from payment the funds necessary to offset these claims enumerated in paragraphs 9.5.1.1 through 9.5.1.7 above.

    The Contractor shall have the obligation to remove any liens filed against the Project or any part thereof, and shall bear all costs connected with said removal prior to the Owner being obligated to make the next monthly progress payment.

    No payment of monies nor any partial or entire use of occupancy of the Project by the Owner shall constitute an acceptance of any Work not in accordance with the Contract Documents."

15. Amend Article 9.6.1 to read as follows: "After the Architect has approved and issued a Certificate for Payment, payment shall be made by the Owner within 30 days after Owner's receipt of the Certificate for Payment."

16. Delete Articles 10.3.3, and 10.5 in their entirety.

17. Delete Article 11.2 in its entirety.

18. Delete Article 11.3 in its entirety.

19. Delete Article 11.4 in its entirety and replace with the following: "The State will not provide Builder's All Risk Insurance for the Project. The Contractor and all Subcontractors shall provide property coverage for their tools and equipment, as necessary."

20. Delete Article 14.4.3 in its entirety and replace with the following: "In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and cost incurred by reason of such termination along with reasonable overhead."

21. Add a new Article 14.4.4 to read as follows:

    "If the continuation of this Agreement is contingent upon the appropriation of adequate state, or federal funds, this Agreement may be terminated on the date beginning on the first fiscal year for which funds are not appropriated or at the exhaustion of the appropriation. The Owner may terminate this Agreement by providing written notice to the parties of such non-appropriation. All payment obligations of the Owner will cease upon the date of termination. Notwithstanding the foregoing, the Owner agrees that it will use its best efforts to obtain approval of necessary funds to continue the Agreement by taking appropriate action to request adequate funds to continue the Agreement."

NOT FOR BIDDING PURPOSES

SUPPLEMENTARY GENERAL CONDITIONS A201-2007

The following supplements modify the "General Conditions of the Contract for Construction," AIA Document A201-2007. Where a portion of the General Conditions is modified or deleted by the Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

TABLE OF ARTICLES

1. GENERAL PROVISIONS
2. OWNER
3. CONTRACTOR
4. ADMINISTRATION OF THE CONTRACT
5. SUBCONTRACTORS
6. CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
7. CHANGES IN THE WORK
8. TIME
9. PAYMENTS AND COMPLETION
10. PROTECTION OF PERSONS AND PROPERTY
11. INSURANCE AND BONDS
12. UNCOVERING AND CORRECTION OF WORK
13. MISCELLANEOUS PROVISIONS
14. TERMINATION OR SUSPENSION OF THE CONTRACT

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ARTICLE 1: GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

Delete the last sentence in its entirety and replace with the following:

"The Contract Documents also include Advertisement for Bid, Instructions to Bidder, sample forms, the Bid Form, the Contractor's completed Bid and the Award Letter."

Add the following Paragraph:

1.1.2 In the event of conflict or discrepancies among the Contract Documents, the Documents prepared by the State of Delaware, Division of Facilities Management shall take precedence over all other documents.

1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

Add the following Paragraphs:

1.2.4 In the case of an inconsistency between the Drawings and the Specifications, or within either document not clarified by addendum, the better quality or greater quantity of work shall be provided in accordance with the Architect's interpretation.

1.2.5 The word "PROVIDE" as used in the Contract Documents shall mean "FURNISH AND INSTALL" and shall include, without limitation, all labor, materials, equipment, transportation, services and other items required to complete the Work.

1.2.6 The word "PRODUCT" as used in the Contract Documents means all materials, systems and equipment.

1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

Delete Paragraph 1.5.1 in its entirety and replace with the following:

"All pre-design studies, drawings, specifications and other documents, including those in electronic form, prepared by the Architect under this Agreement are, and shall remain, the property of the Owner whether the Project for which they are made is executed or not. Such documents may be used by the Owner to construct one or more like Projects without the approval of, or additional compensation to, the Architect. The Contractor, Subcontractors, Sub-subcontractors and Material or Equipment Suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants appropriate to and for use in the execution of their Work under the Contract Documents. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or Material and Equipment Supplier on other Projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and Architect's consultants.

NOT FOR BIDDING PURPOSES

The Architect shall not be liable for injury or damage resulting from the re-use of drawings and specifications if the Architect is not involved in the re-use Project. Prior to re-use of construction documents for a Project in which the Architect is not also involved, the Owner will remove from such documents all identification of the original Architect, including name, address and professional seal or stamp."

Delete Paragraph 1.5.2 in its entirety.

ARTICLE 2: OWNER

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

To Subparagraph 2.2.3 – Add the following sentence:

"The Contractor, at their expense shall bear the costs to accurately identify the location of all underground utilities in the area of their excavation and shall bear all cost for any repairs required, out of failure to accurately identify said utilities."

Delete Subparagraph 2.2.5 in its entirety and substitute the following:

2.2.5 The Contractor shall be furnished free of charge up to five (5) sets of the Drawings and Project Manuals. Additional sets will be furnished at the cost of reproduction, postage and handling.

ARTICLE 3: CONTRACTOR

3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

Amend Paragraph 3.2.2 to state that any errors, inconsistencies or omissions discovered shall be reported to the Architect and Owner immediately.

Delete the third sentence in Paragraph 3.2.3.

3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

Add the following Paragraphs:

3.3.2.1 The Contractor shall immediately remove from the Work, whenever requested to do so by the Owner, any person who is considered by the Owner or Architect to be incompetent or disposed to be so disorderly, or who for any reason is not satisfactory to the Owner, and that person shall not again be employed on the Work without the consent of the Owner or the Architect.

3.3.4 The Contractor must provide suitable storage facilities at the Site for the proper protection and safe storage of their materials. Consult the Owner and the Architect before storing any materials.

3.3.5 When any room is used as a shop, storeroom, office, etc., by the Contractor or Subcontractor(s) during the construction of the Work, the Contractor making use of these areas will be held responsible for any repairs, patching or cleaning arising from such use.

NOT FOR BIDDING PURPOSES

3.4 LABOR AND MATERIALS

Add the Following Paragraphs:

3.4.4 Before starting the Work, each Contractor shall carefully examine all preparatory Work that has been executed to receive their Work. Check carefully, by whatever means are required, to insure that its Work and adjacent, related Work, will finish to proper contours, planes and levels. Promptly notify the General Contractor/Construction Manager of any defects or imperfections in preparatory Work which will in any way affect satisfactory completion of its Work. Absence of such notification will be construed as an acceptance of preparatory Work and later claims of defects will not be recognized.

3.4.5 Under no circumstances shall the Contractor's Work proceed prior to preparatory Work proceed prior to preparatory Work having been completely cured, dried and/or otherwise made satisfactory to receive this Work. Responsibility for timely installation of all materials rests solely with the Contractor responsible for that Work, who shall maintain coordination at all times.

3.5 WARRANTY

Add the following Paragraphs:

3.5.1 The Contractor will guarantee all materials and workmanship against original defects, except injury from proper and usual wear when used for the purpose intended, for two years after Acceptance by the Owner, and will maintain all items in perfect condition during the period of guarantee.

3.5.2 Defects appearing during the period of guarantee will be made good by the Contractor at his expense upon demand of the Owner, it being required that all work will be in perfect condition when the period of guarantee will have elapsed.

3.5.3 In addition to the General Guarantee there are other guarantees required for certain items for different periods of time than the two years as above, and are particularly so stated in that part of the specifications referring to same. The said guarantees will commence at the same time as the General Guarantee.

3.5.4 If the Contractor fails to remedy any failure, defect or damage within a reasonable time after receipt of notice, the Owner will have the right to replace, repair, or otherwise remedy the failure, defect or damage at the Contractor's expense.

3.11 DOCUMENTS AND SAMPLES AT THE SITE

Add the following Paragraphs:

3.11.1 During the course of the Work, the Contractor shall maintain a record set of drawings on which the Contractor shall mark the actual physical location of all piping, valves, equipment, conduit, outlets, access panels, controls, actuators, including all appurtenances that will be concealed once construction is complete, etc., including all invert elevations.

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3.11.2 At the completion of the project, the Contractor shall obtain a set of reproducible drawings from the Architect, and neatly transfer all information outlined in 3.11.1 to provide a complete record of the as-built conditions.

3.11.3 The Contractor shall provide two (2) prints of the as-built conditions, along with the reproducible drawings themselves, to the Owner and one (1) set to the Architect. In addition, attach one complete set to each of the Operating and Maintenance Instructions/Manuals.

3.17 In the first sentence of the paragraph, insert "indemnify" between "shall" and "hold".

ARTICLE 4: ADMINISTRATION OF THE CONTRACT

4.2 ADMINISTRATION OF THE CONTRACT

Delete the first sentence of Paragraph 4.2.7 and replace with the following:

The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples for the purpose of checking for conformance with the Contract Documents.

Delete the second sentence of Paragraph 4.2.7 and replace with the following:

The Architect's action will be taken with such reasonable promptness as to cause no delay in the Work in the activities of the Owner, Contractor or separate Contractors, while allowing sufficient time in the Owner's professional judgment to permit adequate review.

Add the following Paragraph:

4.2.10.1 There will be no full-time project representative provided by the Owner or Architect on this project.

Add to Paragraph 4.2.13 "and in compliance with all local requirements." to the end of the sentence

ARTICLE 5: SUBCONTRACTORS

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

Delete Paragraph 5.2.3 in its entirety and replace with the following:

5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection, subject to the statutory requirements of 29 Delaware Code § 6962(d)(10)b.3 and 4.

ARTICLE 6: CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

Delete Paragraph 6.1.4 in its entirety.

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6.2 MUTUAL RESPONSIBILITY

6.2.3 In the second sentence, strike the word “shall” and insert the word “may”.

ARTICLE 7: CHANGES IN THE WORK

(SEE ARTICLE 7: CHANGES IN WORK IN THE GENERAL REQUIREMENTS)

ARTICLE 8: TIME

8.2 PROGRESS AND COMPLETION

Add the following Paragraphs:

8.2.1.1 Refer to Specification Section SUMMARY OF WORK for Contract time requirements.

8.2.4 If the Work falls behind the Progress Schedule as submitted by the Contractor, the Contractor shall employ additional labor and/or equipment necessary to bring the Work into compliance with the Progress Schedule at no additional cost to the Owner.

8.3 DELAYS AND EXTENSION OF TIME

8.3.1 Strike “arbitration” and insert “remedies at law or in equity”.

Add the following Paragraph:

8.3.2.1 The Contractor shall update the status of the suspension, delay, or interruption of the Work with each Application for Payment. (The Contractor shall report the termination of such cause immediately upon the termination thereof.) Failure to comply with this procedure shall constitute a waiver for any claim for adjustment of time or price based upon said cause.

Delete Paragraph 8.3.3 in its entirety and replace with the following:

8.3.3 Except in the case of a suspension of the Work directed by the Owner, an extension of time under the provisions of Paragraph 8.3.1 shall be the Contractor’s sole remedy in the progress of the Work and there shall be no payment or compensation to the Contractor for any expense or damage resulting from the delay.

Add the following Paragraph:

8.3.4 By permitting the Contractor to work after the expired time for completion of the project, the Owner does not waive their rights under the Contract.

ARTICLE 9: PAYMENTS AND COMPLETION

9.2 SCHEDULE OF VALUES

Add the following Paragraphs:

9.2.1 The Schedule of Values shall be submitted using AIA Document G702, Continuation Sheet to G703.

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9.2.2 The Schedule of Values is to include a line item for Project Closeout Document Submittal. The value of this item is to be no less than 1% of the initial contract amount.

9.3 APPLICATIONS FOR PAYMENT

Add the following Paragraph:

9.3.1.3 Application for Payment shall be submitted on AIA Document G702 "Application and Certificate for Payment", supported by AIA Document G703 "Continuation Sheet". Said Applications shall be fully executed and notarized.

Add the following Paragraphs:

9.3.4 Until Closeout Documents have been received and outstanding items completed the Owner will pay 95% (ninety-five percent) of the amount due the Contractor on account of progress payments.

9.3.5 The Contractor shall provide a current and updated Progress Schedule to the Architect with each Application for Payment. Failure to provide Schedule will be just cause for rejection of Application for Payment.

9.5 DECISIONS TO WITHHOLD CERTIFICATION

Add the following to 9.5.1:

.8 failure to provide a current Progress Schedule;
.9 a lien or attachment is filed;
.10 failure to comply with mandatory requirements for maintaining Record Documents.

9.6 PROGRESS PAYMENTS

Delete Paragraph 9.6.1 in its entirety and replace with the following:

9.6.1 After the Architect has approved and issued a Certificate for Payment, payment shall be made by the Owner within 30 days after Owner's receipt of the Certificate for Payment.

9.7 FAILURE OF PAYMENT

In first sentence, strike "seven" and insert "thirty (30)". Also strike "binding dispute resolution" and insert "remedies at law or in equity".

9.8 SUBSTANTIAL COMPLETION

To Subparagraph 9.8.3- Add the following sentence:

"If the Architect is required to make more than 2 inspections of the same portion of work, the Contractor shall responsible for all costs associated with subsequent inspections including but not limited to any Architect's fees."

9.8.5 In the second sentence, strike "shall" and insert "may".

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ARTICLE 10: PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

Add the following Paragraphs:

10.1.1.1.1 Each Contractor shall develop a safety program in accordance with the Occupational Safety and Health Act of 1970. A copy of said plan shall be furnished to the Owner and Architect prior to the commencement of that Contractor's Work.

10.1.2 Each Contractor shall appoint a Safety Representative. Safety Representatives shall be someone who is on site on a full time basis. If deemed necessary by the Owner or Architect, Contractor Safety meetings will be scheduled. The attendance of all Safety Representatives will be required. Minutes will be recorded of said meetings by the Contractor and will be distributed to all parties as well as posted in all job offices/trailers etc.

10.2 SAFETY OF PERSONS AND PROPERTY

Add the following Paragraph:

10.2.4.1 As required in the Hazardous Chemical Act of June 1984, all vendors supplying any material that may be defined as hazardous must provide Material Safety Data Sheets for those products. Any chemical product should be considered hazardous if it has a caution warning on the label relating to a potential physical or health hazard, if it is known to be present in the work place, and if employees may be exposed under normal conditions or in foreseeable emergency situations. Material Safety Data Sheets shall be provided directly to the Owner, along with the shipping slips that include those products.

10.3 HAZARDOUS MATERIALS

Delete Paragraph 10.3.3 in its entirety.

10.5 Delete Paragraphs 10.3.6 in its entirety.

ARTICLE 11: INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.4 Strike "the Owner" immediately following "(1)" and strike "and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations."

11.2 OWNER'S LIABILITY INSURANCE

Delete Paragraph 11.2 in its entirety.

11.3 PROPERTY INSURANCE

Delete Paragraph 11.3 in its entirety and replace with the following:

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11.3 The State will not provide Builder's All Risk Insurance for the Project. The Contractor and all Subcontractors shall provide property coverage for their tools and equipment, as necessary. Any mandatory deductible required by the Contractor's Insurance shall be the responsibility of the Contractor.

11.4 PERFORMANCE BOND AND PAYMENT BOND

Add the following sentence: "The bonds will conform to those forms approved by the Office of Management and Budget."

ARTICLE 12: UNCOVERING AND CORRECTION OF WORK

12.2.2 AFTER SUBSTANTIAL COMPLETION

Add the following Paragraph:

12.2.2.1.1 At any time during the progress of the Work, or in any case where the nature of the defects will be such that it is not expedient to have corrected, the Owner, at its option, will have the right to deduct such sum, or sums, of money from the amount of the Contract as it considers justified to adjust the difference in value between the defective work and that required under contract including any damage to the structure.

12.2.2.1 Strike "one" and insert "two".

12.2.2.2 Strike "one" and insert "two".

12.2.2.3 Strike "one" and insert "two".

12.2.5 In second sentence, strike "one" and insert "two".

ARTICLE 13: MISCELLANEOUS PROVISIONS

13.1 GOVERNING LAW

Strike "except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4."

13.6 INTEREST

Strike "the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located." Insert "30 days of presentment of the authorized Certificate of Payment at the annual rate of 12% or 1% per month.

13.7 TIME LIMITS ON CLAIMS

Strike the last sentence.

Add the following Paragraph:

13.8 CONFLICTS WITH FEDERAL STATUTES OR REGULATIONS

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13.8.1 If any provision, specifications or requirement of the Contract Documents conflict or is inconsistent with any statute, law or regulation of the government of the United State of America, the Contractor shall notify the Architect and Owner immediately upon discovery.

ARTICLE 14: TERMINATION OR SUSPENSION OF THE CONTRACT

14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

Delete Paragraph 14.4.3 in its entirety and replace with the following:

14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and cost incurred by reason of such termination along with reasonable overhead.

ARTICLE 15: CLAIMS AND DISPUTES

15.1.2 Throughout the Paragraph strike "21" and insert "45".

15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

Delete Paragraph 15.1.6 in its entirety.

15.2 INITIAL DECISION

Delete Paragraph 15.2.5 in its entirety and replace with the following:

15.2.5 The Architect will approve or reject Claims by written decision, which shall state the reasons therefore and shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Architect shall be subject to mediation and other remedies at law or in equity.

Delete Paragraph 15.2.6 and its subparagraphs in their entirety.

15.3 MEDIATION

15.3.1 Strike "binding dispute resolution" and insert "any or all remedies at law or in equity".

15.3.2 In the first sentence, delete "administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedure in effect on the date of the Agreement," Strike "binding dispute resolution" and insert "remedies at law and in equity".

15.4 ARBITRATION

Delete Paragraph 15.4 and its sub-sections in its entirety.

END OF SUPPLEMENTARY GENERAL CONDITIONS

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GENERAL REQUIREMENTS

TABLE OF ARTICLES

1. GENERAL PROVISIONS
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3. CONTRACTOR
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13. MISCELLANEOUS PROVISIONS
14. TERMINATION OR SUSPENSION OF THE CONTRACT

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ARTICLE 1: GENERAL

1.1 CONTRACT DOCUMENTS

1.1.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary and what is required by one shall be as binding as if required by all. Performance by the Contractor shall be required to an extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results.

1.1.2 Work including material purchases shall not begin until the Contractor is in receipt of a bonafide State of Delaware Purchase Order. Any work performed or material purchases prior to the issuance of the Purchase Order is done at the Contractor's own risk and cost.

1.2 EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS

1.2.1 For Public Works Projects financed in whole or in part by state appropriation the Contractor agrees that during the performance of this contract:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex or national origin. The Contractor will take positive steps to ensure that applicants are employed and that employees are treated during employment without regard to their race, creed, color, sex or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided by the contracting agency setting forth this nondiscrimination clause.

2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, sex or national origin."

ARTICLE 2: OWNER

(NO ADDITIONAL GENERAL REQUIREMENTS – SEE SUPPLEMENTARY GENERAL CONDITIONS)

ARTICLE 3: CONTRACTOR

3.1 Schedule of Values: The successful Bidder shall within twenty (20) days after receiving notice to proceed with the work, furnish to the Owner a complete schedule of values on the various items comprising the work.

3.2 Subcontracts: Upon approval of Subcontractors, the Contractor shall award their Subcontracts as soon as possible after the signing of their own contract and see that all material, their own and those of their Subcontractors, are promptly ordered so that the work will not be delayed by failure of materials to arrive on time.

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3.3 Before commencing any work or construction, the General Contractor is to consult with the Owner as to matters in connection with access to the site and the allocation of Ground Areas for the various features of hauling, storage, etc.

3.4 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions.

3.5 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

3.6 The Contractor warrants to the Owner that materials and equipment furnished will be new and of good quality, unless otherwise permitted, and that the work will be free from defects and in conformance with the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved, may be considered defective. If required by the Owner, the Contractor shall furnish evidence as to the kind and quality of materials and equipment provided.

3.7 Unless otherwise provided, the Contractor shall pay all sales, consumer, use and other similar taxes, and shall secure and pay for required permits, fees, licenses, and inspections necessary for proper execution of the Work.

3.8 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on performance of the Work. The Contractor shall promptly notify the Owner if the Drawings and Specifications are observed to be at variance therewith.

3.9 The Contractor shall be responsible to the Owner for the acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons performing portions of the Work under contract with the Contractor.

3.10 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove from and about the Project all waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials. The Contractor shall be responsible for returning all damaged areas to their original conditions.

3.11 STATE LICENSE AND TAX REQUIREMENTS

3.11.1 Each Contractor and Subcontractor shall be licensed to do business in the State of Delaware and shall pay all fees and taxes due under State laws. In conformance with Section 2503, Chapter 25, Title 30, Delaware Code, "the Contractor shall furnish the Delaware Department of Finance within ten (10) days after entering into any contract with a contractor or subcontractor not a resident of this State, a statement of total value of such contract or contracts together with the names and addresses of the contracting parties."

3.12. The Contractor shall comply with all requirements set forth in Section 6962, Chapter 69, Title 29 of the Delaware Code.

ARTICLE 4: ADMINISTRATION OF THE CONTRACT

4.1 CONTRACT SURETY

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4.1.1 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

4.1.2 All bonds will be required as follows unless specifically waived elsewhere in the Bidding Documents.

4.1.3 Contents of Performance Bonds – The bond shall be in the form approved by the Office of Management and Budget. The bond shall be conditioned upon the faithful compliance and performance by the successful bidder of each and every term and condition of the contract and the proposal, plans, specifications, and bid documents thereof. Each term and condition shall be met at the time and in the manner prescribed by the Contract, Bid documents and the specifications, including the payment in full to every person furnishing materiel or performing labor in the performance of the Contract, of all sums of money due the person for such labor and materiel. (The bond shall also contain the successful bidder's guarantee to indemnify and save harmless the State and the agency from all costs, damages and expenses growing out of or by reason of the Contract in accordance with the Contract.)

4.1.4 Invoking a Performance Bond – The agency may, when it considers that the interest of the State so require, cause judgement to be confessed upon the bond.

4.1.5 Within twenty (20) days after the date of notice of award of contract, the Bidder to whom the award is made shall furnish a Performance Bond and Labor and Material Payment Bond, each equal to the full amount of the Contract price to guarantee the faithful performance of all terms, covenants and conditions of the same. The bonds are to be issued by an acceptable Bonding Company licensed to do business in the State of Delaware and shall be issued in duplicate.

4.1.6 Performance and Payment Bonds shall be maintained in full force (warranty bond) for a period of two (2) years after the date of the Certificate for Final Payment. The Performance Bond shall guarantee the satisfactory completion of the Project and that the Contractor will make good any faults or defects in his work which may develop during the period of said guarantees as a result of improper or defective workmanship, material or apparatus, whether furnished by themselves or their Sub-Contractors. The Payment Bond shall guarantee that the Contractor shall pay in full all persons, firms or corporations who furnish labor or material or both labor and material for, or on account of, the work included herein. The bonds shall be paid for by this Contractor. The Owner shall have the right to demand that the proof parties signing the bonds are duly authorized to do so.

4.2 FAILURE TO COMPLY WITH CONTRACT

4.2.1 If any firm entering into a contract with the State, or Agency that neglects or refuses to perform or fails to comply with the terms thereof, the Agency which signed the Contract may terminate the Contract and proceed to award a new contract in accordance with this Chapter 69, Title 29 of the Delaware Code or may require the Surety on the Performance Bond to complete the Contract in accordance with the terms of the Performance Bond. Nothing herein shall preclude the Agency from pursing additional remedies as otherwise provided by law.

4.3 CONTRACT INSURANCE AND CONTRACT LIABILITY

4.3.1 In addition to the bond requirements stated in the Bid Documents, each successful Bidder shall purchase adequate insurance for the performance of the Contract and, by submission of a Bid, agrees to indemnify and save harmless and to defend all legal or equitable actions brought against the State, any Agency, officer and/or employee of the

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State, for and from all claims of liability which is or may be the result of the successful Bidder's actions during the performance of the Contract.

4.3.2 The purchase or nonpurchase of such insurance or the involvement of the successful Bidder in any legal or equitable defense of any action brought against the successful Bidder based upon work performed pursuant to the Contract will not waive any defense which the State, its agencies and their respective officers, employees and agents might otherwise have against such claims, specifically including the defense of sovereign immunity, where applicable, and by the terms of this section, the State and all agencies, officers and employees thereof shall not be financially responsible for the consequences of work performed, pursuant to said contract.

4.4 RIGHT TO AUDIT RECORDS

4.4.1 The Owner shall have the right to audit the books and records of a Contractor or any Subcontractor under any Contract or Subcontract to the extent that the books and records relate to the performance of the Contract or Subcontract.

4.4.2 Said books and records shall be maintained by the Contractor for a period of seven (7) years from the date of final payment under the Prime Contract and by the Subcontractor for a period of seven (7) years from the date of final payment under the Subcontract.

ARTICLE 5: SUBCONTRACTORS

5.1 SUBCONTRACTING REQUIREMENTS

5.1.1 All contracts for the construction, reconstruction, alteration or repair of any public building (not a road, street or highway) shall be subject to the following provisions:

1. A contract shall be awarded only to a Bidder whose Bid is accompanied by a statement containing, for each Subcontractor category, the name and address (city or town and State only – street number and P.O. Box addresses not required) of the subcontractor whose services the Bidder intends to use in performing the Work and providing the material for such Subcontractor category.

2. A Bid will not be accepted nor will an award of any Contract be made to any Bidder which, as the Prime Contractor, has listed itself as the Subcontractor for any Subcontractor unless:

   A. It has been established to the satisfaction of the awarding Agency that the Bidder has customarily performed the specialty work of such Subcontractor category by artisans regularly employed by the Bidder's firm;

   B. That the Bidder is duly licensed by the State to engage in such specialty work, if the State requires licenses; and

   C. That the Bidder is recognized in the industry as a bona fide Subcontractor or Contractor in such specialty work and Subcontractor category.

5.1.2 The decision of the awarding Agency as to whether a Bidder who list itself as the Subcontractor for a Subcontractor category shall be final and binding upon all Bidders, and no action of any nature shall lie against any awarding agency or its employees or officers because of its decision in this regard.

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5.1.3 After such a Contract has been awarded, the successful Bidder shall not substitute another Subcontractor for any Subcontractor whose name was set forth in the statement which accompanied the Bid without the written consent of the awarding Agency.

5.1.4 No Agency shall consent to any substitution of Subcontractors unless the Agency is satisfied that the Subcontractor whose name is on the Bidders accompanying statement:

A. Is unqualified to perform the work required;

B. Has failed to execute a timely reasonable Subcontract;

C. Has defaulted in the performance on the portion of the work covered by the Subcontract; or

D. Is no longer engaged in such business.

5.2 PENALTY FOR SUBSTITUTION OF SUBCONTRACTORS

5.2.1 Should the Contractor fail to utilize any or all of the Subcontractors in the Contractor's Bid statement in the performance of the Work on the public bidding, the Contractor shall be penalized in the amount of (project specific amount*). The Agency may determine to deduct payments of the penalty from the Contractor or have the amount paid directly to the Agency. Any penalty amount assessed against the Contractor may be remitted or refunded, in whole or in part, by the Agency awarding the Contract, only if it is established to the satisfaction of the Agency that the Subcontractor in question has defaulted or is no longer engaged in such business. No claim for the remission or refund of any penalty shall be granted unless an application is filed within one year after the liability of the successful Bidder accrues. All penalty amounts assessed and not refunded or remitted to the contractor shall be reverted to the State.

*one (1) percent of contract amount not to exceed $10,000

5.3 ASBESTOS ABATEMENT

5.3.1 The selection of any Contractor to perform asbestos abatement for State-funded projects shall be approved by the Office of Management and Budget, Division of Facilities Management pursuant to Chapter 78 of Title 16.

5.4 STANDARDS OF CONSTRUCTION FOR THE PROTECTION OF THE PHYSICALLY HANDICAPPED

5.4.1 All Contracts shall conform with the standard established by the Delaware Architectural Accessibility Board unless otherwise exempted by the Board.

5.5 CONTRACT PERFORMANCE

5.5.1 Any firm entering into a Public Works Contract that neglects or refuses to perform or fails to comply with its terms, the Agency may terminate the Contract and proceed to award a new Contract or may require the Surety on the Performance Bond to complete the Contract in accordance with the terms of the Performance Bond.

ARTICLE 6: CONSTRUCTION BY OWNER OR SEPARATE CONTRACTORS

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6.1 The Owner reserves the right to simultaneously perform other construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other Projects at the same site.

6.2 The Contractor shall afford the Owner and other Contractors reasonable opportunity for access and storage of materials and equipment, and for the performance of their activities, and shall connect and coordinate their activities with other forces as required by the Contract Documents.

ARTICLE 7: CHANGES IN THE WORK

7.1 The Owner, without invalidating the Contract, may order changes in the Work consisting of Additions, Deletions, Modifications or Substitutions, with the Contract Sum and Contract completion date being adjusted accordingly. Such changes in the Work shall be authorized by written Change Order signed by the Professional, as the duly authorized agent, the Contractor and the Owner.

7.2 The Contract Sum and Contract Completion Date shall be adjusted only by a fully executed Change Order.

7.3 The additional cost, or credit to the Owner resulting from a change in the Work shall be by mutual agreement of the Owner, Contractor and the Architect. In all cases, this cost or credit shall be based on the 'DPE' wages required and the "invoice price" of the materials/equipment needed.

7.3.1 "DPE" shall be defined to mean "direct personnel expense". Direct payroll expense includes direct salary plus customary fringe benefits (prevailing wage rates) and documented statutory costs such as workman's compensation insurance, Social Security/Medicare, and unemployment insurance (a maximum multiplier of 1.35 times DPE).

7.3.2 "Invoice price" of materials/equipment shall be defined to mean the actual cost of materials and/or equipment that is paid by the Contractor, (or subcontractor), to a material distributor, direct factory vendor, store, material provider, or equipment leasing entity. Rates for equipment that is leased and/or owned by the Contractor or subcontractor(s) shall not exceed those listed in the latest version of the "Means Building Construction Cost Data" publication.

7.3.3 In addition to the above, the General Contractor is allowed a fifteen percent (15%) markup for overhead and profit for additional work performed by the General Contractor's own forces. For additional subcontractor work, the Subcontractor is allowed a fifteen (15) percent overhead and profit on change order work above and beyond the direct costs stated previously. To this amount, the General Contractor will be allowed a mark-up not exceeding seven and one half percent (7.5%) on the subcontractors work. These mark-ups shall include all costs including, but not limited to: overhead, profit, bonds, insurance, supervision, etc. No markup is permitted on the wor of the subcontractors subcontractor. No additional costs shall be allowed for changes related to the Contractor's onsite superintendent/staff, or project manager, unless a change in the work changes the project duration and is identified by the CPM schedule. There will be no other costs associated with the change order.

ARTICLE 8: TIME

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8.1 Time limits, if any, are as stated in the Project Manual. By executing the Agreement, the Contractor confirms that the stipulated limits are reasonable, and that the Work will be completed within the anticipated time frame.

8.2 If progress of the Work is delayed at any time by changes ordered by the Owner, by labor disputes, fire, unusual delay in deliveries, abnormal adverse weather conditions, unavoidable casualties or other causes beyond the Contractor's control, the Contract Time shall be extended for such reasonable time as the Owner may determine.

8.3 Any extension of time beyond the date fixed for completion of the construction and acceptance of any part of the Work called for by the Contract, or the occupancy of the building by the Owner, in whole or in part, previous to the completion shall not be deemed a waiver by the Owner of his right to annul or terminate the Contract for abandonment or delay in the matter provided for, nor relieve the Contractor of full responsibility.

8.4 SUSPENSION AND DEBARMENT

8.4.1 Per Section 6962(d)(14), Title 29, Delaware Code, “Any Contractor who fails to perform a public works contract or complete a public works project within the time schedule established by the Agency in the Invitation To Bid, may be subject to Suspension or Debarment for one or more of the following reasons: a) failure to supply the adequate labor supply ratio for the project; b) inadequate financial resources; or, c) poor performance on the Project.”

8.4.2 “Upon such failure for any of the above stated reasons, the Agency that contracted for the public works project may petition the Director of the Office of Management and Budget for Suspension or Debarment of the Contractor. The Agency shall send a copy of the petition to the Contractor within three (3) working days of filing with the Director. If the Director concludes that the petition has merit, the Director shall schedule and hold a hearing to determine whether to suspend the Contractor, debar the Contractor or deny the petition. The Agency shall have the burden of proving, by a preponderance of the evidence, that the Contractor failed to perform or complete the public works project within the time schedule established by the Agency and failed to do so for one or more of the following reasons: a) failure to supply the adequate labor supply ratio for the project; b) inadequate financial resources; or, c) poor performance on the project. Upon a finding in favor of the Agency, the Director may suspend a Contractor from Bidding on any project funded, in whole or in part, with public funds for up to 1 year for a first offense, up to 3 years for a second offense and permanently debar the Contractor for a third offense. The Director shall issue a written decision and shall send a copy to the Contractor and the Agency. Such decision may be appealed to the Superior Court within thirty (30) days for a review on the record.”

8.5 RETAINAGE

8.5.1 Per Section 6962(d)(5) a.3, Title 29, Delaware Code: The Agency may at the beginning of each public works project establish a time schedule for the completion of the project. If the project is delayed beyond the completion date due to the Contractor’s failure to meet their responsibilities, the Agency may forfeit, at its discretion, all or part of the Contractor’s retainage.

8.5.2 This forfeiture of retainage also applies to the timely completion of the punchlist. A punchlist will only be prepared upon the mutual agreement of the Owner, Architect and Contractor. Once the punchlist is prepared, all three parties will by mutual agreement, establish a schedule for its completion. Should completion of the punchlist be delayed beyond the established date due to the Contractor’s failure to meet their responsibilities,

NOT FOR BIDDING PURPOSES

the Agency may hold permanently, at its discretion, all or part of the Contractor's retainage.

ARTICLE 9: PAYMENTS AND COMPLETION

9.1 APPLICATION FOR PAYMENT

9.1.1 Applications for payment shall be made upon AIA Document G702. There will be a five percent (5%) retainage on all Contractor's monthly invoices until completion of the project. This retainage may become payable upon receipt of all required closeout documentation, provided all other requirements of the Contract Documents have been met.

9.1.2 A date will be fixed for the taking of the monthly account of work done. Upon receipt of Contractor's itemized application for payment, such application will be audited, modified, if found necessary, and approved for the amount. Statement shall be submitted to the Owner.

9.1.3 Section 6516, Title 29 of the Delaware Code annualized interest is not to exceed 12% per annum beginning thirty (30) days after the "presentment" (as opposed to the date) of the invoice.

9.2 PARTIAL PAYMENTS

9.2.1 Any public works Contract executed by any Agency may provide for partial payments at the option of the Owner with respect to materials placed along or upon the sites or stored at secured locations, which are suitable for use in the performance of the contract.

9.2.2 When approved by the agency, partial payment may include the values of tested and acceptable materials of a nonperishable or noncontaminative nature which have been produced or furnished for incorporation as a permanent part of the work yet to be completed, provided acceptable provisions have been made for storage.

9.2.2.1 Any allowance made for materials on hand will not exceed the delivered cost of the materials as verified by invoices furnished by the Contractor, nor will it exceed the contract bid price for the material complete in place.

9.2.3 If requested by the Agency, receipted bills from all Contractors, Subcontractors, and material, men, etc., for the previous payment must accompany each application for payment. Following such a request, no payment will be made until these receipted bills have been received by the Owner.

9.3 SUBSTANTIAL COMPLETION

9.3.1 When the building has been made suitable for occupancy, but still requires small items of miscellaneous work, the Owner will determine the date when the project has been substantially completed.

9.3.2 If, after the Work has been substantially completed, full completion thereof is materially delayed through no fault of the Contractor, and without terminating the Contract, the Owner may make payment of the balance due for the portion of the Work fully completed and

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accepted. Such payment shall be made under the terms and conditions governing final payment that it shall not constitute a waiver of claims.

9.3.3 On projects where commissioning is included, the commissioning work as defined in the specifications must be complete prior to the issuance of substantial completion.

9.4 FINAL PAYMENT

9.4.1 Final payment, including the five percent (5%) retainage if determined appropriate, shall be made within thirty (30) days after the Work is fully completed and the Contract fully performed and provided that the Contractor has submitted the following closeout documentation (in addition to any other documentation required elsewhere in the Contract Documents):

9.4.1.1 Evidence satisfactory to the Owner that all payrolls, material bills, and other indebtedness connected with the work have been paid,

9.4.1.2 An acceptable RELEASE OF LIENS,

9.4.1.3 Copies of all applicable warranties,

9.4.1.4 As-built drawings,

9.4.1.5 Operations and Maintenance Manuals,

9.4.1.6 Instruction Manuals,

9.4.1.7 Consent of Surety to final payment.

9.4.1.8 The Owner reserves the right to retain payments, or parts thereof, for its protection until the foregoing conditions have been complied with, defective work corrected and all unsatisfactory conditions remedied.

ARTICLE 10: PROTECTION OF PERSONS AND PROPERTY

10.1 The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall take all reasonable precautions to prevent damage, injury or loss to: workers, persons nearby who may be affected, the Work, materials and equipment to be incorporated, and existing property at the site or adjacent thereto. The Contractor shall give notices and comply with applicable laws ordinances, rules regulations, and lawful orders of public authorities bearing on the safety of persons and property and their protection from injury, damage, or loss. The Contractor shall promptly remedy damage and loss to property at the site caused in whole or in part by the Contractor, a Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable.

10.2 The Contractor shall notify the Owner in the event any existing hazardous material such as lead, PCBs, asbestos, etc. is encountered on the project. The Owner will arrange with a qualified specialist for the identification, testing, removal, handling and protection against exposure or environmental pollution, to comply with applicable regulation laws and ordinances. The Contractor and Architect will not be required to participate in or to perform

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this operation. Upon completion of this work, the Owner will notify the Contractor and Architect in writing the area has been cleared and approved by the authorities in order for the work to proceed. The Contractor shall attach documentation from the authorities of said approval.

10.3 As required in the Hazardous Chemical Information Act of June 1984, all vendors supplying any materials that may be defined as hazardous, must provide Material Safety Data Sheets for those products. Any chemical product should be considered hazardous if it has a warning caution on the label relating to a potential physical or health hazard, if it is known to be present in the work place, and if employees may be exposed under normal conditions or in any foreseeable emergency situation. Material Safety Data Sheets must be provided directly to the Owner along with the shipping slips that include those products.

10.4 The Contractor shall certify to the Owner that materials incorporated into the Work are free of all asbestos. This certification may be in the form of Material Safety Data Sheet (MSDS) provided by the product manufacturer for the materials used in construction, as specified or as provided by the Contractor.

ARTICLE 11: INSURANCE AND BONDS

11.1 The Contractor shall carry all insurance required by law, such as Unemployment Insurance, etc. The Contractor shall carry such insurance coverage as they desire on their own property such as a field office, storage sheds or other structures erected upon the project site that belong to them and for their own use. The Subcontractors involved with this project shall carry whatever insurance protection they consider necessary to cover the loss of any of their personal property, etc.

11.2 Upon being awarded the Contract, the Contractor shall obtain a minimum of two (2) copies of all required insurance certificates called for herein, and submit one (1) copy of each certificate, to the Owner, within 20 days of contract award.

11.3 Bodily Injury Liability and Property Damage Liability Insurance shall, in addition to the coverage included herein, include coverage for injury to or destruction of any property arising out of the collapse of or structural injury to any building or structure due to demolition work and evidence of these coverages shall be filed with and approved by the Owner.

11.4 The Contractor's Property Damage Liability Insurance shall, in addition to the coverage noted herein, include coverage on all real and personal property in their care, custody and control damaged in any way by the Contractor or their Subcontractors during the entire construction period on this project.

11.5 Builders Risk (including Standard Extended Coverage Insurance) on the existing building during the entire construction period, shall not be provided by the Contractor under this contract. The Owner shall insure the existing building and all of its contents and all this new alteration work under this contract during entire construction period for the full insurable value of the entire work at the site. Note, however, that the Contractor and their Subcontractors shall be responsible for insuring building materials (installed and stored) and their tools and equipment whenever in use on the project, against fire damage, theft, vandalism, etc.

11.6 Certificates of the insurance company or companies stating the amount and type of coverage, terms of policies, etc., shall be furnished to the Owner, within 20 days of contract award.

11.7 The Contractor shall, at their own expense, (in addition to the above) carry the following forms of insurance:

NOT FOR BIDDING PURPOSES

11.7.1 Contractor's Contractual Liability Insurance

Minimum coverage to be:

Bodily Injury	$ 500,000	for each person
	$1,000,000	for each occurrence
	$1,000,000	aggregate
Property Damage	$ 500,000	for each occurrence
	$1,000,000	aggregate

11.7.2 Contractor's Protective Liability Insurance

Minimum coverage to be:

Bodily Injury	$ 500,000	for each person
	$1,000,000	for each occurrence
	$1,000,000	aggregate
Property Damage	$ 500,000	for each occurrence
	$500,000	aggregate

11.7.3 Automobile Liability Insurance

Minimum coverage to be:

Bodily Injury	$1,000,000	for each person
	$1,000,000	for each occurrence
Property Damage	$ 500,000	per accident

11.7.4 Prime Contractor's and Subcontractors' policies shall include contingent and contractual liability coverage in the same minimum amounts as 11.7.1 above.

11.7.5 Workmen's Compensation (including Employer's Liability):

11.7.5.1 Minimum Limit on employer's liability to be as required by law.

11.7.5.2 Minimum Limit for all employees working at one site.

11.7.6 Certificates of Insurance must be filed with the Owner guaranteeing fifteen (15) days prior notice of cancellation, non-renewal, or any change in coverages and limits of liability shown as included on certificates.

11.7.7 Social Security Liability

NOT FOR BIDDING PURPOSES

11.7.7.1 With respect to all persons at any time employed by or on the payroll of the Contractor or performing any work for or on their behalf, or in connection with or arising out of the Contractor's business, the Contractor shall accept full and exclusive liability for the payment of any and all contributions or taxes or unemployment insurance, or old age retirement benefits, pensions or annuities now or hereafter imposed by the Government of the United States and the State or political subdivision thereof, whether the same be measured by wages, salaries or other remuneration paid to such persons or otherwise.

11.7.7.2 Upon request, the Contractor shall furnish Owner such information on payrolls or employment records as may be necessary to enable it to fully comply with the law imposing the aforesaid contributions or taxes.

11.7.7.3 If the Owner is required by law to and does pay any and/or all of the aforesaid contributions or taxes, the Contractor shall forthwith reimburse the Owner for the entire amount so paid by the Owner.

ARTICLE 12: UNCOVERING AND CORRECTION OF WORK

12.1 The Contractor shall promptly correct Work rejected by the Owner or failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed, and shall correct any Work found to be not in accordance with the requirements of the Contract Documents within a period of two years from the date of Substantial Completion, or by terms of an applicable special warranty required by the Contract Documents. The provisions of this Article apply to work done by Subcontractors as well as to Work done by direct employees of the Contractor.

12.2 At any time during the progress of the work, or in any case where the nature of the defects shall be such that it is not expedient to have them corrected, the Owner, at their option, shall have the right to deduct such sum, or sums, of money from the amount of the contract as they consider justified to adjust the difference in value between the defective work and that required under contract including any damage to the structure.

ARTICLE 13: MISCELLANEOUS PROVISIONS

13.1 CUTTING AND PATCHING

13.1.1 The Contractor shall be responsible for all cutting and patching. The Contractor shall coordinate the work of the various trades involved.

13.2 DIMENSIONS

13.2.1 All dimensions shown shall be verified by the Contractor by actual measurements at the project site. Any discrepancies between the drawings and specifications and the existing conditions shall be referred to the Owner for adjustment before any work affected thereby has been performed.

13.3 LABORATORY TESTS

13.3.1 Any specified laboratory tests of material and finished articles to be incorporated in the work shall be made by bureaus, laboratories or agencies approved by the Owner and reports of such tests shall be submitted to the Owner. The cost of the testing shall be paid for by the Contractor.

13.3.2 The Contractor shall furnish all sample materials required for these tests and shall deliver same without charge to the testing laboratory or other designated agency when and where directed by the Owner.

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13.4 ARCHAEOLOGICAL EVIDENCE

13.4.1 Whenever, in the course of construction, any archaeological evidence is encountered on the surface or below the surface of the ground, the Contractor shall notify the authorities of the Delaware Archaeological Board and suspend work in the immediate area for a reasonable time to permit those authorities, or persons designated by them, to examine the area and ensure the proper removal of the archaeological evidence for suitable preservation in the State Museum.

13.5 GLASS REPLACEMENT AND CLEANING

13.5.1 The General Contractor shall replace without expense to the Owner all glass broken during the construction of the project. If job conditions warrant, at completion of the job the General Contractor shall have all glass cleaned and polished.

13.6 WARRANTY

13.6.1 For a period of two (2) years from the date of substantial completion, as evidenced by the date of final acceptance of the work, the contractor warrants that work performed under this contract conforms to the contract requirements and is free of any defect of equipment, material or workmanship performed by the contractor or any of his subcontractors or suppliers. However, manufacturer's warranties and guarantees, if for a period longer than two (2) years, shall take precedence over the above warranties. The contractor shall remedy, at his own expense, any such failure to conform or any such defect. The protection of this warranty shall be included in the Contractor's Performance Bond.

ARTICLE 14: TERMINATION OF CONTRACT

14.1 If the Contractor defaults or persistently fails or neglects to carry out the Work in accordance with the Contract Documents or fails to perform a provision of the Contract, the Owner, after seven days written notice to the Contractor, may make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor. Alternatively, at the Owner's option, and the Owner may terminate the Contract and take possession of the site and of all materials, equipment, tools, and machinery thereon owned by the Contractor and may finish the Work by whatever method the Owner may deem expedient. If the costs of finishing the Work exceed any unpaid compensation due the Contractor, the Contractor shall pay the difference to the Owner.

14.2 "If the continuation of this Agreement is contingent upon the appropriation of adequate state, or federal funds, this Agreement may be terminated on the date beginning on the first fiscal year for which funds are not appropriated or at the exhaustion of the appropriation. The Owner may terminate this Agreement by providing written notice to the parties of such non-appropriation. All payment obligations of the Owner will cease upon the date of termination. Notwithstanding the foregoing, the Owner agrees that it will use its best efforts to obtain approval of necessary funds to continue the Agreement by taking appropriate action to request adequate funds to continue the Agreement."

END OF GENERAL REQUIREMENTS

NOT FOR BIDDING PURPOSES

STATE OF DELAWARE
DEPARTMENT OF LABOR
DIVISION OF INDUSTRIAL AFFAIRS
OFFICE OF LABOR LAW ENFORCEMENT
PHONE: (302) 451-3423

Mailing Address:
225 CORPORATE BOULEVARD
SUITE 104
NEWARK, DE 19702

Located at:
225 CORPORATE BOULEVARD
SUITE 104
NEWARK, DE 19702

PREVAILING WAGES FOR **BUILDING CONSTRUCTION** EFFECTIVE MARCH 15, 2012

CLASSIFICATION	NEW CASTLE	KENT	SUSSEX
ASBESTOS WORKERS	23.22	29.83	39.20
BOILERMAKERS	65.47	33.22	48.83
BRICKLAYERS	45.63	45.63	45.63
CARPENTERS	49.06	49.06	39.22
CEMENT FINISHERS	40.38	29.11	21.20
ELECTRICAL LINE WORKERS	43.49	37.29	28.44
ELECTRICIANS	59.10	59.10	59.10
ELEVATOR CONSTRUCTORS	73.14	40.93	30.55
GLAZIERS	62.60	62.60	54.20
INSULATORS	50.38	50.38	50.38
IRON WORKERS	58.70	58.70	58.70
LABORERS	37.20	37.20	37.20
MILLWRIGHTS	60.85	60.85	47.42
PAINTERS	40.62	40.62	40.62
PILEDRIVERS	66.42	37.64	30.45
PLASTERERS	21.61	21.61	17.50
PLUMBERS/PIPEFITTERS/STEAMFITTERS	57.95	43.24	46.28
POWER EQUIPMENT OPERATORS	55.81	55.81	24.13
ROOFERS-COMPOSITION	21.01	20.71	17.02
ROOFERS-SHINGLE/SLATE/TILE	17.59	17.50	16.45
SHEET METAL WORKERS	64.39	62.18	62.18
SOFT FLOOR LAYERS	44.92	44.92	44.92
SPRINKLER FITTERS	50.65	50.65	50.65
TERRAZZO/MARBLE/TILE FNRS	50.50	50.50	45.45
TERRAZZO/MARBLE/TILE STRS	57.98	57.98	52.63
TRUCK DRIVERS	22.49	23.89	20.03

CERTIFIED: 8/6/12 BY: _____
ADMINISTRATOR, OFFICE OF LABOR LAW ENFORCEMENT

NOTE: THESE RATES ARE PROMULGATED AND ENFORCED PURSUANT TO THE PREVAILING WAGE REGULATIONS ADOPTED BY THE DEPARTMENT OF LABOR ON APRIL 3, 1992.

CLASSIFICATIONS OF WORKERS ARE DETERMINED BY THE DEPARTMENT OF LABOR. FOR ASSISTANCE IN CLASSIFYING WORKERS, OR FOR A COPY OF THE REGULATIONS OR CLASSIFICATIONS, PHONE (302) 451-3423.

NON-REGISTERED APPRENTICES MUST BE PAID THE MECHANIC'S RATE.

PROJECT: DE Dept. of Corrections Administrative Building - SOG Renovations, Kent County

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Location: Delaware Depart of Correction Administration Building, 245 McKee Rd., Dover, DE 19904**.**

B. Owner: Delaware Depart of Correction Administration Building, 245 McKee Rd., Dover, DE 19904.

C. Architect Identification: The Contract Documents, dated December 3, 2012, were prepared for the Project by R G Architects, LLC, 3171 South DuPont Parkway, Odessa, Delaware 19730, 302-376-8100.

D. The Work generally consists of, but is not limited to:

1. Office renovations
2. Storage area renovations
3. Replacement of overhead roll-up doors
4. Construction of a wood framed mezzanine and stairs
5. Ammunition vault construction
6. Installation of precast concrete stairs and loading dock ramp.

1.3 CONTRACT

A. Project will be constructed under a general construction contract however the contract will be awarded to the Prime Contractor.

1.4 USE OF PREMISES

A. General: Contractor shall have full use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

1.5 WORK UNDER OTHER CONTRACTS

A. Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.

1.6 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 23-division format and CSI/CSC's "MasterFormat" numbering system.

NOT FOR BIDDING PURPOSES

1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.

B. 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. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred, as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

a. 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 1100

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Requests for substitution must be made ten days prior to bid. This specification section applies to extra-ordinary conditions that could not be requested during the bidding period.

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for handling requests for substitutions made after award of the Contract, but no later than 60 days after commencement of the Work.

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

1. Division 1 specifies the applicability of industry standards to products specified.
2. Division 1 specifies requirements for submitting the Contractor's Construction Schedule and the Submittal Schedule.
3. Division 1 specifies requirements governing the Contractor's selection of products and product options.

1.3 DEFINITIONS

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

B. Substitutions: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are considered to be requests for substitutions. The following are not considered to be requests for substitutions:

1. Substitutions requested during the bidding period, and accepted by Addendum prior to award of the Contract, are included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
2. Revisions to the Contract Documents requested by the Owner or Architect.
3. Specified options of products and construction methods included in the Contract Documents.
4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

A. Substitution Request Submittal: The Architect will consider requests for substitution if received within 60 days after commencement of the Work (Item 1.1, A. above). Requests received more than 60 days after commencement of the Work may be considered or rejected at the discretion of the Architect.

1. Submit three copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for change-order proposals. The

NOT FOR BIDDING PURPOSES

Contractor is solely responsible for obtaining the required forms to submit before the stated time period expires.

2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
    a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors that will be necessary to accommodate the proposed substitution.
    b. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
    c. Product Data, including Drawings and descriptions of products and fabrication and installation procedures.
    d. Samples, where applicable or requested.
    e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
    f. Cost information, including a proposal of the net change, if any in the Contract Sum.
    g. The Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.
    h. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.
4. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. The Architect will notify the Contractor of acceptance or rejection of the substitution within two weeks of receipt of the request, or one week of receipt of additional information or documentation, whichever is later.
    a. Use the product specified if the Architect cannot make a decision on the use of a proposed substitute within the time allocated.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Conditions: The Architect will receive and consider the Contractor's request for substitution when the following conditions are satisfied, as determined by the Architect. If the following conditions are not satisfied, the Architect will return the requests without action except to record noncompliance with these requirements.

1. Revisions to the Contract Documents are not required.
2. Proposed changes are in keeping with the general intent of the Contract Documents.
3. The request is timely, fully documented, and properly submitted.
4. The specified product or method of construction cannot be provided within the Contract Time. The Architect will not consider the request if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.

NOT FOR BIDDING PURPOSES

5. The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. The Owner's additional responsibilities may include compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner, and similar considerations.
6. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
7. The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where the Contractor certifies that the substitution will overcome the incompatibility.
8. The specified product or method of construction cannot be coordinated with other materials and where the Contractor certifies that the proposed substitution can be coordinated.

B. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01631

NOT FOR BIDDING PURPOSES

SECTION 012100 - ALLOWANCES

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 governing allowances.

1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

B. Types of allowances include the following:

1. Lump-sum allowances.
2. Unit-cost allowances.
3. Quantity allowances.
4. Contingency allowances.
5. Testing and inspecting allowances.

C. Related Requirements:

1. Division 01 Section "Unit Prices" for procedures for using unit prices.
2. Division 01 Section "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.
3. Divisions 02 through 33 Sections for items of Work covered by allowances.

1.3 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

NOT FOR BIDDING PURPOSES

1.4 ACTION SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.5 INFORMATIONAL SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.6 COORDINATION

A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.7 LUMP-SUM ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include **taxes,** freight**,** and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.8 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. 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.

NOT FOR BIDDING PURPOSES

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.

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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

A. Allowance No. 1: Lump-Sum Allowance: Include an allowance equal to $7,500.00 for the installation of the security system components and wiring as shown on the drawings. All raceways, back boxes and appurtenances, as indicated in specification section 28 0500 shall be included in the base bid.

1. This allowance includes material cost, receiving, handling, and installation, and Contractor overhead and profit.

B. Allowance No. 2: Lump-Sum Allowance: Include an allowance equal to $10,000.00 for the installation of telecommunication system devices, components, wiring and fiber optic cabling. All raceways, back boxes and appurtenances, as indicated in specification section 28 0500 shall be included in the base bid.

NOT FOR BIDDING PURPOSES

1. This allowance includes material cost, receiving, handling, and installation, and Contractor overhead and profit.

END OF SECTION 012100

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

NOT FOR BIDDING PURPOSES

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Refer to plan 7/A11-2, column line 0.55. In lieu of constructing the metal stud, drywall, and plywood wall shown on 2/A11-2 along column line 0.55; construct chain link fencing and steel posts between columns E.8 and E.4 as specified in the revised plan from slab to underside of mezzanine. All other surrounding conditions remain as specified in other details, plans, and sections.

B. Alternate No. 2: N/A

END OF SECTION 01230

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Sections include the following:

1. Division 1, Section “Unit Prices” for administrative requirements for using unit prices.
2. Division 1, 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, on AIA Document G710, “Architect’s Supplemental Instructions”.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect 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 by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
2. Within 10 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 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 unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to the Architect.

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.

NOT FOR BIDDING PURPOSES

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 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.
5. Comply with requirements in Division 1 Section "Product Requirements" 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 purchases amount only where indicated as part of the allowance.
2. If requested, prepare explanation and documentation to substitute distribution of overhead costs and other margins claimed.
3. Submit substantiation of a change in scope of work, if any, claimed in Changes 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.

1.6 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the 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.

NOT FOR BIDDING PURPOSES

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01250

NOT FOR BIDDING PURPOSES

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 specifies administrative and procedural requirements for handling and processing Contract modifications.

B. Related Sections include the following:

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, on AIA Document G710, "Architect's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: **Architect** 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 by **Architect** are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
2. Within **time specified in Proposal Request** 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.

NOT FOR BIDDING PURPOSES

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 unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to **Architect**.

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 Division 01 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

C. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, **Architect** will issue a Change Order for signatures of Owner and Contractor on **AIA Document G701**.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: **Architect** may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the 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.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

NOT FOR BIDDING PURPOSES

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

NOT FOR BIDDING PURPOSES

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 specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Sections include the following:

1. **[Division 01 Section "Allowances" for procedural requirements governing handling and processing of allowances]**.
2. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
3. Division 01 Section "Unit Prices" for administrative requirements governing use of unit prices.
4. Division 01 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.3 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.[**Cost-loaded CPM Schedule may serve to satisfy requirements for the Schedule of Values.**]

1. Correlate 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. Submittals Schedule.
c. 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.
3. Subschedules: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.

NOT FOR BIDDING PURPOSES

B. Format and Content: Use the 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. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate. **Include separate line items under required principal subcontracts for operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training in the amount of 5 percent of the Contract Sum.**
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. 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. If specified, include evidence of insurance or bonded warehousing.

6. 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.
7. 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.

8. 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.

NOT FOR BIDDING PURPOSES

1.4 APPLICATIONS FOR PAYMENT

A. Each Application for Payment 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: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment Application Forms: Use **AIA Document G702 and AIA Document G703 Continuation Sheets** 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.

E. Transmittal: Submit **3** signed and notarized original copies of each Application for Payment to **Architect** by a method ensuring receipt **within 24 hours**. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
2. **Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.**

F. 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. Products list.
5. Schedule of unit prices.
6. Submittals Schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. List of Contractor's principal consultants.
9. Copies of building permits.

NOT FOR BIDDING PURPOSES

10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
11. Initial progress report.
12. Report of preconstruction conference.
13. Certificates of insurance and insurance policies.
14. Performance and payment bonds.
15. Data needed to acquire Owner's insurance.
16. Initial settlement survey and damage report if required.

G. Application for Payment at Substantial Completion: After issuing 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 Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

H. 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

NOT FOR BIDDING PURPOSES

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 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. Requests for Interpretation (RFIs).

B. Each contractor shall participate in coordination requirements.

C. Related Sections include the following:

1. Division 01 Section "Multiple Contract Summary" for a description of the division of Work among separate contracts and responsibility for coordination activities not in this Section.
2. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
3. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
4. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 COORDINATION

A. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with 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.

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2. Coordinate installation of different components with other contractors to ensure maximum 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.

1.4 SUBMITTALS

A. Coordination Drawings: HVAC Contractor shall prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities. Each trade shall place their own work on the coordination drawings.

1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or 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 Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

1.5 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. Include special personnel required for coordination of operations with other contractors.

1.6 PROJECT MEETINGS

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

B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner**,** and Architect, but no later than **15** days after execution of the Agreement. Hold the conference at Project site or another

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convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner, **Construction Manager,** Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Tentative construction schedule.
    b. **[Phasing]**.
    c. Critical work sequencing and long-lead items.
    d. Designation of key personnel and their duties.
    e. Procedures for processing field decisions and Change Orders.
    f. Procedures for RFIs.
    g. Procedures for testing and inspecting.
    h. Procedures for processing Applications for Payment.
    i. Distribution of the Contract Documents.
    j. Submittal procedures.
    k. **[LEED requirements]**.
    l. Preparation of Record Documents.
    m. Use of the premises[**and existing building**].
    n. Work restrictions.
    o. Owner's occupancy requirements.
    p. Responsibility for temporary facilities and controls.
    q. Construction waste management and recycling.
    r. Parking availability.
    s. Office, work, and storage areas.
    t. Equipment deliveries and priorities.
    u. First aid.
    v. Security.
    w. Progress cleaning.
    x. Working hours.

3. 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.

D. Progress Meetings: Conduct progress meetings at biweekly intervals.

NOT FOR BIDDING PURPOSES

1. Attendees: In addition to representatives of Owner**, General Contractor,** 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 conference 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) Quality and work standards.
        7) Status of correction of deficient items.
        8) Field observations.
        9) Request for Interpretations (RFIs).
        10) Status of proposal requests.

3. Minutes: Architect will record and distribute to Contractor the meeting minutes.

E. Coordination Meetings: Conduct Project coordination meetings at weekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: 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 conference shall be familiar with Project and authorized to conclude matters relating to the Work.

NOT FOR BIDDING PURPOSES

2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.7 REQUESTS FOR INTERPRETATION (RFIs)

A. Procedure: Upon discovery of the need for interpretation of the Contract Documents, prepare and submit an RFI form provided at the end of this Section. Oral RFIs will not be accepted.

1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
2. RFIs shall only be submitted to seek clarification or interpretation of ambiguities, conflicts, discrepancies, errors, inconsistencies, or omissions in the Contract Documents.
3. RFIs shall not take the place of Contractor figuring out information available in the Contract Documents.
4. Each RFI shall be limited to a single issue or very closely related issue.
5. Coordinate and promptly submit
6. RFIs to avoid delays in Contractor's work and work of subcontractors.
7. Reviews/responses to RFIs shall not constitute an approval or direction related to Contractor's construction means, methods, procedures, sequences, or techniques.
8. Reviews/Responses to RFIs shall not constitute an approval or direction related to construction site safety.

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 solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
10. Contractor's signature.
11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.

NOT FOR BIDDING PURPOSES

a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.

C. RFIs Form: Use the form at the end of this Section or a software-generated form with substantially the same content as indicated above.

1. Identify each page of attachment with the RFI number and sequential page number.

D. Architect's Action: Architect will review each RFI, determine response required, and return it within **seven** working days. RFIs received 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 substitutions.
b. Requests for adjustments in the Contract Time or the Contract Sum.
c. Requests for approval of submittals.
d. Request for information already indicated on the Contract Documents.
e. Requests for interpretation of Architect's actions on submittals.
f. Incomplete RFIs or RFIs with numerous errors.

2. RFI response may include a request for additional information, in which case Architect's time for response will start again.
3. RFI response 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 Division 01 Section "Contract Modification Procedures."
4. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within **10** calendar days of receipt of the RFI response.

E. 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.

F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log monthly to the Architect.

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.

NOT FOR BIDDING PURPOSES

8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 3100

NOT FOR BIDDING PURPOSES

Advancement of Construction Technology

REQUEST FOR INTERPRETATION LOG

Project:_____ A/E Project Number:_____

Owner:_____ Contractor:_____

R.F.I. NO.	DATE REC'D	BRIEF DESCRIPTION OF INFORMATION REQUESTED	DATE OF RESPONSE	R.F.P. NO.

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REQUEST FOR INTERPRETATION

Project: _____ R.F.I. Number:

_____ From: _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

Specification Section: Paragraph: Drawing Reference: Detail:

Request:

Signed by: Date:

Response:

☐ Attachments

Response From: To: Date Rec'd: Date Ret'd:

Signed by: Date:

Copies: ☐ Owner ☐ Consultants ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ File

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99 Canal Center Plaza, Suite 300 Alexandria, VA 22314

Page of

July 1994
CSI Form 13.2A

NOT FOR BIDDING PURPOSES

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. Preliminary Construction Schedule.
2. Contractor's Construction Schedule.
3. Submittals Schedule.
4. Daily construction reports.
5. Material location reports.
6. Field condition reports.
7. Special reports.

B. Related Sections include the following:

1. Division 01 Section "Multiple Contract Summary" for preparing a combined Contractor's Construction Schedule.
2. Division 01 Section "Payment Procedures" for submitting the Schedule of Values.
3. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
4. Division 01 Section "Photographic Documentation" for submitting construction photographs.
5. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
6. 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.

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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. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

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

F. 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.

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

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

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

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

K. 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 **ONE** copies of schedule. Arrange the following information in a tabular format:

1. Scheduled date for first submittal.

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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.

C. Preliminary Construction Schedule: Submit **two** opaque copies.

1. Approval of cost-loaded preliminary construction schedule will not constitute approval of Schedule of Values for cost-loaded activities.

D. Contractor's Construction Schedule: Submit three opaque copies of initial schedule, large enough to show entire schedule for entire construction period.

1. Submit an electronic copy of schedule, using software indicated, on CD-R, and labeled to comply with requirements for submittals. Include type of schedule (Initial or Updated) and date on label.

E. CPM Reports: Concurrent with CPM schedule, submit **three** copies of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
3. Total Float Report: List of all activities sorted in ascending order of total float.

1.5 QUALITY ASSURANCE

A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request.

B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:

1. Review software limitations and content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Review delivery dates for Owner-furnished products.
4. Review schedule for work of Owner's separate contracts.
5. Review time required for review of submittals and resubmittals.

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6. Review requirements for tests and inspections by independent testing and inspecting agencies.
7. Review time required for completion and startup procedures.
8. Review and finalize list of construction activities to be included in schedule.
9. Review submittal requirements and procedures.
10. Review procedures for updating schedule.

1.6 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.

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 **bar-chart schedule.** Include submittals required during the first 60 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.

a. At Contractor's option, show submittals on the Preliminary Construction Schedule, instead of tabulating them separately.

3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

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2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

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

B. Time Frame: Extend schedule from date established for **the Notice of Award** to date of **Substantial** Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than **20** days, unless specifically allowed by Architect.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
4. Startup and Testing Time: Include not less than <**Insert number**> days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.

D. 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 under More Than One Contract: Include a separate activity for each contract.
3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
6. Work Restrictions: Show the effect of the following items on the schedule:

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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.

7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

a. Subcontract awards.
b. Submittals.
c. Purchases.
d. Mockups.
e. Fabrication.
f. Sample testing.
g. Deliveries.
h. Installation.
i. Tests and inspections.
j. Adjusting.
k. Curing.
l. Startup and placement into final use and operation.

8. Area Separations: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

a. Structural completion.
b. Permanent space enclosure.
c. Completion of mechanical installation.
d. Completion of electrical installation.
e. Substantial Completion.

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

F. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.

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1. Refer to Division 01 Section "Payment Procedures" for cost reporting and payment procedures.
2. Contractor shall assign cost to construction activities on the CPM schedule. Costs shall not be assigned to submittal activities unless specified otherwise but may, with Architect's approval, be assigned to fabrication and delivery activities. Costs shall be under required principal subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
3. Each activity cost shall reflect an accurate value subject to approval by Architect.
4. Total cost assigned to activities shall equal the total Contract Sum.

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

H. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.

2.3 PRELIMINARY CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within **seven** days of date established for **commencement of the Work**.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first **60** days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within **30** days of date established for **the Notice of Award**. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of Project.

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

2.5 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

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

B. Material Location Reports: At **monthly** intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.

C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation [**on CSI Form 13.2A**]. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.6 SPECIAL REPORTS

A. General: Submit special reports directly to Owner 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.

NOT FOR BIDDING PURPOSES

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.

1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.

B. Contractor's Construction Schedule Updating: At **bi-weekly** 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.

END OF SECTION 013200

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 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. Preliminary Construction Schedule.
2. Contractor's Construction Schedule.
3. Submittals Schedule.
4. Daily construction reports.
5. Material location reports.
6. Field condition reports.
7. Construction photographs.

B. Related Sections include the following:

1. Division 1 Section "Payment Procedures" for submitting the Schedule of Values.
2. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
3. Division 1 Section "Submittal Procedures" for submitting schedules and reports.
4. Division 1 Section "Closeout Procedures" for submitting photographic negatives as Project Record Documents at Project closeout.

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 is an activity that must be completed before a given activity can be started.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

C. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration and contains no float.

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

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

NOT FOR BIDDING PURPOSES

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

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.

1.4 SUBMITTALS

A. Qualification Data: For firms and persons specified in "Quality Assurance" Article and in-house scheduling personnel to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

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.

C. Contractor's Construction Schedule: Submit three printed copies of initial schedule, one a reproducible print and one a blue- or black-line print, large enough to show entire schedule for entire construction period.

D. CPM Reports: Concurrent with CPM schedule, submit three printed copies of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
3. Total Float Report: List of all activities sorted in ascending order of total float.

E. Construction Photographs: Submit two prints of each photographic view including two aerial views within seven days of taking photographs.

1. Format: 4-by-6-inch (101-by-152-mm) smooth-surface matte prints on single-weight commercial-grade stock.

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2. Identification: On back of each print, provide an applied label or rubber-stamped impression with the following information:

   a. Name of Project.
   b. Name and address of photographer.
   c. Name of Architect.
   d. Name of Contractor.
   e. Date photograph was taken.
   f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

3. Negatives: Submit a complete set of photographic negatives in protective envelopes as a Project Record Document. Identify date photographs were taken.

F. Daily Construction Reports: Submit one copy at weekly intervals.

G. Material Location Reports: Submit one copy at weekly intervals.

H. Field Condition Reports: Submit one copy at weekly intervals.

1.5 QUALITY ASSURANCE

A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting.

1.6 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.

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. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

NOT FOR BIDDING PURPOSES

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

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

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

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
2. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
3. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.

D. Constraints:

1. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

a. Subcontract awards.
b. Submittals.
c. Purchases.
d. Mockups.
e. Fabrication.
f. Sample testing.
g. Deliveries.
h. Installation.
i. Tests and inspections.
j. Adjusting.
k. Curing.
l. Startup and placement into final use and operation.

F. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.

NOT FOR BIDDING PURPOSES

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. CPM Schedule: Prepare Contractor's Construction Schedule using a CPM network analysis diagram.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 15 days after date established for the Notice to Proceed..
2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
3. Use "one workday" as the unit of time.

B. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

a. Preparation and processing of submittals.
b. Purchase of materials.
c. Delivery.
d. Fabrication.
e. Installation.

2. Processing: Process data to produce output data or a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
3. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

2.4 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. High and low temperatures and general weather conditions.
5. Accidents.
6. Meetings and significant decisions.
7. Unusual events (refer to special reports).
8. Stoppages, delays, shortages, and losses.
9. Meter readings and similar recordings.
10. Emergency procedures.
11. Orders and requests of authorities having jurisdiction.
12. Change Orders received and implemented.
13. Construction Change Directives received.

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14. Services connected and disconnected.
15. Equipment or system tests and startups.
16. Partial Completions and occupancies.
17. Substantial Completions authorized.

B. Material Location Reports: At monthly intervals, prepare a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.

C. 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.

PART 3 - EXECUTION (not used)

END OF SECTION 01320

NOT FOR BIDDING PURPOSES

NOT FOR BIDDING PURPOSES

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 the following:

1. Preconstruction photographs.
2. Periodic construction photographs.
3. Final Completion construction photographs.
4. Time-lapse sequence construction videotapes.

B. Related Sections include the following:

1. Division 01 Section "Unit Prices" for procedures for unit prices for extra photographs.
2. Division 01 Section "Submittal Procedures" for submitting photographic documentation.
3. Division 01 Section "Closeout Procedures" for submitting **digital media** as Project Record Documents at Project closeout.
4. Division 01 Section "Demonstration and Training" for submitting videotapes of demonstration of equipment and training of Owner's personnel.
5. Division 02 Section "Structure Demolition" for photographic documentation before building demolition operations commence.
6. Division 02 Section "Selective Structure Demolition" for photographic documentation before selective demolition operations commence.

1.3 SUBMITTALS

A. Qualification Data: For photographer.

B. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each **photograph**. Indicate elevation or story of construction. Include same label information as corresponding **set of photographs**.

C. Construction Photographs: Submit **two** prints of each photographic view within **seven** days of taking photographs.

1. Format: 8-by-10-inch smooth-surface matte prints on single-weight commercial-grade photographic paper, **enclosed back to back in clear plastic sleeves that are** punched for standard 3-ring binder.
2. Identification: On back of each print, provide an applied label or rubber-stamped impression with the following information:

    a. Name of Project.
    b. Name and address of photographer.
    c. Name of Architect **and Construction Manager**.
    d. Name of Contractor.
    e. Date photograph was taken if not date stamped by camera.
    f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
    g. Unique sequential identifier.
3. Digital Images: Submit a complete set of digital image electronic files **with each submittal of prints as a Project Record Document** on CD-ROM. Files should be FULL size, high resolution, images (not reduced down). Identify electronic media with date photographs were taken. Submit images that have same aspect ratio as the sensor, uncropped.

1.4 QUALITY ASSURANCE

A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.

1.5 COORDINATION

A. Auxiliary Services: Cooperate with photographer and provide auxiliary services requested, including access to Project site and use of temporary facilities, including temporary lighting required to produce clear, well-lit photographs without obscuring shadows.

1.6 USAGE RIGHTS

A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

1.7 EXTRA PRINTS

A. Extra Prints: If requested by Architect **or Construction Manger**, photographer shall prepare extra prints of photographs. Photographer shall distribute these prints directly to designated parties who will pay the costs for extra prints.

NOT FOR BIDDING PURPOSES

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in uncompressed TIFF format, produced by a digital camera with minimum sensor size of 10.0 megapixels, and at an image resolution of not less than **1600 by 1200** pixels.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

A. Photographer: Engage a qualified commercial photographer to take construction photographs.

B. 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.

C. 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 filename for each image.
2. Field Office Images: Maintain one set of images on CD-ROM in the field office at Project site, available at all times for reference. Identify images same as for those submitted to Architect **and Construction Manager**.

D. Preconstruction Photographs: Before **commencement of excavation,** take **color , digital** photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by **Architect or Construction Manager**.

1. Flag **construction limits** before taking construction photographs.
2. Take thirty-two photographs to show existing conditions adjacent to property before starting the Work.
3. Take thirty-two photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

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E. Periodic Construction Photographs: Take up to 32 **color, digital** photographs **monthly, coinciding 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.

F. **Architect**-Directed Construction Photographs: From time to time, **Architect** will instruct photographer about number and frequency of **color, digital** 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.

G. Time-Lapse Sequence Construction Photographs: Take **five color, digital** photographs as indicated, to show status of construction and progress since last photographs were taken.

1. Frequency: Take photographs **monthly, coinciding** with the cutoff date associated with each Application for Payment.
2. Vantage Points: Following suggestions by **Architect** and Contractor, photographer to select vantage points. During each of the following construction phases, take not less than **two** of the required shots from same vantage point each time to create a time-lapse sequence as follows:

    a. Commencement of the Work, through completion of subgrade construction.
    b. Above-grade structural framing.
    c. Exterior building enclosure.
    d. Interior Work, through date of Substantial Completion.

H. Final Completion Construction Photographs: Take up to 24 color photographs after date of Substantial Completion for submission as Project Record Documents. **Architect** will direct photographer for desired vantage points.

1. Do not include date stamp.

END OF SECTION 013233

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SECTION 013300 - 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. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Sections include the following:

1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
3. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
4. Division 01 Section "Photographic Documentation" for submitting **construction photographs**.
5. Division 01 Section "Quality Requirements" for submitting test and inspection reports **and for mockup requirements**.
6. Division 01 Section "Closeout Procedures" for submitting warranties.
7. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
8. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
9. Division 01 Section "Demonstration and Training" for submitting videotapes of demonstration of equipment and training of Owner's personnel.
10. Divisions 02 through 49 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect's responsive action.

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B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. General:

1. Contractor shall submit electronic version of each individual submittal to the Architect in a printable PDF format. Format of PDF sheet should be of the same size as the hard copy submittal.

    a. Submittals that are larger than 11x17 shall be submitted via one hard copy in addition to the electronic version.
    b. Door hardware submittals shall be submitted with one hard copy in addition to the electronic version.

2. Contractor will be provided access to the Architect's secured project hosting site via a personalized password protected account. This site utilizes a web browser interface that requires internet access, and an individual email account.
3. Contractor shall be required to complete the Architect's Electronic Project Data Request Form.
4. Contractor will receive the necessary and applicable documentation for the purpose of providing submittals with the project hosting site when the account information is verified and configured by the Architect.
5. Architect will return submittals electronically in PDF format.
6. Contractor shall furnish one hard copy of each individual approved submittal as part of the final Operations and Maintenance Manuals.

B. Finish Submittals: Items requiring color, pattern, and similar selections shall be of sufficient size and quantity to clearly illustrate full range of color, texture, and pattern for Architects approval. Submit samples for selection of finishes within 60 days after Award of Contract, or earlier if requested at the Preconstruction Conference. Allow 60 days for Architects review of each submittal.

C. 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.

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D. 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.

E. 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 **15** 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 **15** 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 **21** days for initial review of each submittal.

5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow **15** days for review of each submittal. Submittal will be returned to **Architect,** before being returned to Contractor.

F. Identification: Submittal Cover Sheet shall be completed and attached to each individual hard and electronic submittals. Include Contractor’s stamp with completed information. Submittals without a cover sheet will not be reviewed and will be returned to the Contractor.

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

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.

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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 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.

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.

1.5 CONTRACTOR'S USE OF ARCHITECT'S CAD FILES

A. General: At Contractor's written request, access to copies of Architect's CAD files will only be provided to Prime Contractors solely for the Contractor's use in connection with the Project. Access to these files will be via a web based project site hosted by the Architect, which is subject to the terms and conditions identified in the Architect's "Electronic Project Data Request Form". This form will be provided to all successful Prime Contractors after the award of contract. The files that will be made available and the format in which they will be made available is identified in the form.

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 project hosting site specifically established for Project.

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

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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 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. Printed performance curves.
    h. Operational range diagrams.
    i. Mill reports.
    j. Standard product operation and maintenance manuals.
    k. Compliance with specified referenced standards.
    l. Testing by recognized testing agency.
    m. Application of testing agency labels and seals.
    n. Notation of coordination requirements.

4. Submit Product Data before or concurrent with Samples.

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**, unless use of Architect's CAD Drawings are otherwise permitted**.

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.

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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 40 inches.

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 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 three 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.

5. 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 **two** Sample sets; remainder will be returned. **Mark up and retain one returned Sample set as a Project Record Sample.**

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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.

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.

K. LEED Submittals: Comply with requirements specified in Division 01 Section "Sustainable Design Requirements."

L. Material Safety Data Sheets (MSDSs) for LEED Certification: Submit information necessary to show compliance with LEED certification requirements, which will be the limit of the Architect's review.

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

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2.2 INFORMATIONAL SUBMITTALS

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

1. 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.
2. 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

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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:

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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. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

V. Construction **Photographs**: Comply with requirements specified in Division 01 Section “Photographic Documentation."

W. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect**, except as required in "Action Submittals" Article**.

1. Architect will not review submittals that include MSDSs and will return or discard 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.

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B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit 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 CONSTRUCTION MANAGERS OR GENERAL 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.

3.2 ARCHITECT'S ACTION

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

B. Action Submittals: Architect will review submittal, make marks to indicate corrections or modifications, if required, and return it. Architect will stamp submittal with an action stamp and will mark stamp appropriately to indicate action taken as indicated on the Submittal Cover Sheet.

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 013300

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Date: _____ **Submission No.**_____ **No. of Copies**_____

TO: **FROM:**

R G Architects, LLC
PO Box 650
3171 South DuPont Parkway
Odessa, DE 19730

Project Name and No.: _____

Prime Contractor Name/Contract Number: _____

Subcontractor Name/Contract Number: _____

Product Specification Section Name/Number: _____

Drawing Number/Name: _____

Manufacturer: _____ **Supplier:** _____

NOTE: Use a separate Submittal Cover Sheet for each submittal Drawing or Catalog Cut.

Contractor/Subcontractor Comments: _____

_____

_____

_____

Architect's Comments: _____

_____

_____

_____

Contractor's Stamp:

Construction Manager's Stamp:

A/E Stamp:

☐ APPROVED
Indicates submittal in design professional's opinion conforms to information given and design concept expressed in contract documents.

☐ APPROVED AS NOTED
Same as above after submittal has been modified as noted by design professional. Resubmittal is not required and Contractor may proceed in accordance with submittal as modified.

☐ NOT APPROVED
Indicates submittal in design professional's opinion does not conform with information given and design concept expressed in contract documents or that submittal does not meet procedural requirements of contract documents. Additional information may be provided by design professional.

R G ARCHITECT, LLC

Date: _____ By: _____

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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 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 Sections include the following:

1. Division 01 Section "Allowances" for testing and inspecting allowances.
2. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
3. Division 01 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
4. 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

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and completed construction comply with requirements. Services do not include contract enforcement activities performed by **Construction Manager**.

C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. **Approved mockups establish the standard by which the Work will be judged.**

D. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.

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

F. 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 industry standards.

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

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

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

J. 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. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

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

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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 uncertainties and 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 SUBMITTALS

A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Description of test and inspection.
3. Identification of applicable standards.
4. Identification of test and inspection methods.
5. Number of tests and inspections required.
6. Time schedule or time span for tests and inspections.
7. Entity responsible for performing tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

C. Reports: Prepare and submit certified written reports that 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.

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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.

D. 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. 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.

C. 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.

D. 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.

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 to those indicated for this Project in material, design, and extent.

F. Specialists: Certain sections of the Specifications 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. Requirement for specialists shall not supersede building codes and regulations governing the Work.

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 548; and with additional qualifications specified in

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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 the Architect**, through Construction Manager**, 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.

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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 Sections in Divisions 02 through 49.

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. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
3. 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**, and the Contract Sum will be adjusted by Change Order**.

B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, 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.

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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 Division 01 Section "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. Testing Agency Responsibilities: Cooperate with Architect**, Construction Manager,** and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect**, Construction Manager,** and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

F. 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.

G. 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.

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

H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within **30** days of date established for **commencement of the Work**.

1. Distribution: Distribute schedule to Owner, Architect, **Construction Manager,** 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: Owner will engage a qualified **testing agency** to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect, **Construction Manager,** 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**, through Construction Manager,** 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 ACCEPTABLE TESTING AGENCIES

A. <Insert list of firms acceptable to perform designated tests and inspections.>

3.2 TEST AND INSPECTION LOG

A. Prepare a record of tests and inspections. Include the following:

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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 modifications as they occur. Provide access to test and inspection log for Architect's **and Construction Manager's** reference during normal working hours.

3.3 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. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
2. Comply with the Contract Document requirements for Division 01 Section "Cutting and Patching."

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 014000

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SECTION 014200 - 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.

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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.

D. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the organizations responsible for 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.

AA	Aluminum Association, Inc. (The)	(703) 358-2960
	www.aluminum.org	
AAADM	American Association of Automatic Door Manufacturers	(216) 241-7333
	www.aaadm.com	
AABC	Associated Air Balance Council	(202) 737-0202
	www.aabchq.com	
AAMA	American Architectural Manufacturers Association	(847) 303-5664
	www.aamanet.org	
AASHTO	American Association of State Highway and Transportation Officials	(202) 624-5800
	www.transportation.org	
AATCC	American Association of Textile Chemists and Colorists	(919) 549-8141
	www.aatcc.org	
ABAA	Air Barrier Association of America	(866) 956-5888
	www.airbarrier.org	

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ABMA	American Bearing Manufacturers Association	(202) 367-1155
	www.abma-dc.org	
ACI	American Concrete Institute	(248) 848-3700
	www.concrete.org	
ACPA	American Concrete Pipe Association	(972) 506-7216
	www.concrete-pipe.org	
AEIC	Association of Edison Illuminating Companies, Inc. (The)	(205) 257-2530
	www.aeic.org	
AF&PA	American Forest & Paper Association	(800) 878-8878
	www.afandpa.org	(202) 463-2700
AGA	American Gas Association	(202) 824-7000
	www.aga.org	
AGC	Associated General Contractors of America (The)	(703) 548-3118
	www.agc.org	
AHA	American Hardboard Association	
	(Now part of CPA)	
AHAM	Association of Home Appliance Manufacturers	(202) 872-5955
	www.aham.org	
AI	Asphalt Institute	(859) 288-4960
	www.asphaltinstitute.org	
AIA	American Institute of Architects (The)	(800) 242-3837
	www.aia.org	(202) 626-7300
AISC	American Institute of Steel Construction	(800) 644-2400
	www.aisc.org	(312) 670-2400
AISI	American Iron and Steel Institute	(202) 452-7100
	www.steel.org	
AITC	American Institute of Timber Construction	(303) 792-9559
	www.aitc-glulam.org	
ALCA	Associated Landscape Contractors of America	
	(Now PLANET - Professional Landcare Network)	

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ALSC	American Lumber Standard Committee, Incorporated	(301) 972-1700
	www.alsc.org	
AMCA	Air Movement and Control Association International, Inc.	(847) 394-0150
	www.amca.org	
ANSI	American National Standards Institute	(202) 293-8020
	www.ansi.org	
AOSA	Association of Official Seed Analysts, Inc.	(405) 780-7372
	www.aosaseed.com	
APA	Architectural Precast Association	(239) 454-6989
	www.archprecast.org	
APA	APA - The Engineered Wood Association	(253) 565-6600
	www.apawood.org	
APA EWS	APA - The Engineered Wood Association; Engineered Wood Systems	
	(See APA - The Engineered Wood Association)	
API	American Petroleum Institute	(202) 682-8000
	www.api.org	
ARI	Air-Conditioning & Refrigeration Institute	(703) 524-8800
	www.ari.org	
ARMA	Asphalt Roofing Manufacturers Association	(202) 207-0917
	www.asphaltroofing.org	
ASCE	American Society of Civil Engineers	(800) 548-2723
	www.asce.org	(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	(800) 527-4723
	www.ashrae.org	(404) 636-8400
ASME	ASME International	(800) 843-2763
	(American Society of Mechanical Engineers International)	(973) 882-1170
	www.asme.org	

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ASSE	American Society of Sanitary Engineering	(440) 835-3040
	www.asse-plumbing.org	
ASTM	ASTM International	(610) 832-9500
	(American Society for Testing and Materials International)	
	www.astm.org	
AWCI	Association of the Wall and Ceiling Industry	(703) 534-8300
	www.awci.org	
AWCMA	American Window Covering Manufacturers Association	
	(Now WCMA)	
AWI	Architectural Woodwork Institute	(571) 323-3636
	www.awinet.org	
AWPA	American Wood Protection Association	(205) 733-4077
	(Formerly: American Wood Preservers' Association)	
	www.awpa.com	
AWS	American Welding Society	(800) 443-9353
	www.aws.org	(305) 443-9353
AWWA	American Water Works Association	(800) 926-7337
	www.awwa.org	(303) 794-7711
BHMA	Builders Hardware Manufacturers Association	(212) 297-2122
	www.buildershardware.com	
BIA	Brick Industry Association (The)	(703) 620-0010
	www.bia.org	
BICSI	BICSI, Inc.	(800) 242-7405
	www.bicsi.org	(813) 979-1991
BIFMA	BIFMA International	(616) 285-3963
	(Business and Institutional Furniture Manufacturer's Association International)	
	www.bifma.com	
BISSC	Baking Industry Sanitation Standards Committee	(866) 342-4772
	www.bissc.org	
BWF	Badminton World Federation	6-03-9283 7155

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	(Formerly: IBF - International Badminton Federation)	
	www.internationalbadminton.org	
CCC	Carpet Cushion Council	(610) 527-3880
	www.carpetcushion.org	
CDA	Copper Development Association	(800) 232-3282
	www.copper.org	(212) 251-7200
CEA	Canadian Electricity Association	(613) 230-9263
	www.canelect.ca	
CEA	Consumer Electronics Association	(866) 858-1555
	www.ce.org	(703) 907-7600
CFFA	Chemical Fabrics & Film Association, Inc.	(216) 241-7333
	www.chemicalfabricsandfilm.com	
CGA	Compressed Gas Association	(703) 788-2700
	www.cganet.com	
CIMA	Cellulose Insulation Manufacturers Association	(888) 881-2462
	www.cellulose.org	(937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association	(630) 584-1919
	www.cisca.org	
CISPI	Cast Iron Soil Pipe Institute	(423) 892-0137
	www.cispi.org	
CLFMI	Chain Link Fence Manufacturers Institute	(301) 596-2583
	www.chainlinkinfo.org	
CRRC	Cool Roof Rating Council	(866) 465-2523
	www.coolroofs.org	(510) 485-7175
CPA	Composite Panel Association	(301) 670-0604
	www.pbmdf.com	
CPPA	Corrugated Polyethylene Pipe Association	(800) 510-2772
	www.cppa-info.org	(202) 462-9607
CRI	Carpet and Rug Institute (The)	(800) 882-8846
	www.carpet-rug.com	(706) 278-3176

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CRSI	Concrete Reinforcing Steel Institute	(847) 517-1200
	www.crsi.org	
CSA	Canadian Standards Association	(800) 463-6727
		(416) 747-4000
CSA	CSA International	(866) 797-4272
	(Formerly: IAS - International Approval Services)	(416) 747-4000
	www.csa-international.org	
CSI	Cast Stone Institute	(717) 272-3744
	www.caststone.org	
CSI	Construction Specifications Institute (The)	(800) 689-2900
	www.csinet.org	(703) 684-0300
CSSB	Cedar Shake & Shingle Bureau	(604) 820-7700
	www.cedarbureau.org	
CTI	Cooling Technology Institute	(281) 583-4087
	(Formerly: Cooling Tower Institute)	
	www.cti.org	
DHI	Door and Hardware Institute	(703) 222-2010
	www.dhi.org	
EIA	Electronic Industries Alliance	(703) 907-7500
	www.eia.org	
EIMA	EIFS Industry Members Association	(800) 294-3462
	www.eima.com	(770) 968-7945
EJCDC	Engineers Joint Contract Documents Committee	(703) 295-5000
	www.ejdc.org	
EJMA	Expansion Joint Manufacturers Association, Inc.	(914) 332-0040
	www.ejma.org	
ESD	ESD Association	(315) 339-6937
	(Electrostatic Discharge Association)	
	www.esda.org	
ETL SEMCO	Intertek ETL SEMCO	(800) 967-5352
	(Formerly: ITS - Intertek Testing Service NA)	
	www.intertek.com	

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FIBA	Federation Internationale de Basketball	41 22 545 00 00
	(The International Basketball Federation)	
	www.fiba.com	
FIVB	Federation Internationale de Volleyball	41 21 345 35 35
	(The International Volleyball Federation)	
	www.fivb.ch	
FM Approvals	FM Approvals LLC	(781) 762-4300
	www.fmglobal.com	
FM Global	FM Global	(401) 275-3000
	(Formerly: FMG - FM Global)	
	www.fmglobal.com	
FMRC	Factory Mutual Research	
	(Now FM Global)	
FRSA	Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.	(407) 671-3772
	www.floridaroof.com	
FSA	Fluid Sealing Association	(610) 971-4850
	www.fluidsealing.com	
FSC	Forest Stewardship Council	49 228 367 66 0
	www.fsc.org	
GA	Gypsum Association	(202) 289-5440
	www.gypsum.org	
GANA	Glass Association of North America	(785) 271-0208
	www.glasswebsite.com	
GRI	(Part of GSI)	
GS	Green Seal	(202) 872-6400
	www.greenseal.org	
GSI	Geosynthetic Institute	(610) 522-8440
	www.geosynthetic-institute.org	
HI	Hydraulic Institute	(973) 267-9700
	www.pumps.org	

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HI	Hydronics Institute	(908) 464-8200
	www.gamanet.org	
HMMA	Hollow Metal Manufacturers Association	
	(Part of NAAMM)	
HPVA	Hardwood Plywood & Veneer Association	(703) 435-2900
	www.hpva.org	
HPW	H. P. White Laboratory, Inc.	(410) 838-6550
	www.hpwhite.com	
IAS	International Approval Services	
	(Now CSA International)	
IBF	International Badminton Federation	
	(Now BWF)	
ICEA	Insulated Cable Engineers Association, Inc.	(770) 830-0369
	www.icea.net	
ICRI	International Concrete Repair Institute, Inc.	(847) 827-0830
	www.icri.org	
IEC	International Electrotechnical Commission	41 22 919 02 11
	www.iec.ch	
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The)	(212) 419-7900
	www.ieee.org	
IESNA	Illuminating Engineering Society of North America	(212) 248-5000
	www.iesna.org	
IEST	Institute of Environmental Sciences and Technology	(847) 255-1561
	www.iest.org	
IGCC	Insulating Glass Certification Council	(315) 646-2234
	www.igcc.org	
IGMA	Insulating Glass Manufacturers Alliance	(613) 233-1510
	www.igmaonline.org	
ILI	Indiana Limestone Institute of America, Inc.	(812) 275-4426
	www.iliai.com	

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ISO	International Organization for Standardization	41 22 749 01 11
	www.iso.ch	
	Available from ANSI	(202) 293-8020
	www.ansi.org	
ISSFA	International Solid Surface Fabricators Association	(877) 464-7732
	www.issfa.net	(702) 567-8150
ITS	Intertek Testing Service NA	
	(Now ETL SEMCO)	
ITU	International Telecommunication Union	41 22 730 51 11
	www.itu.int/home	
KCMA	Kitchen Cabinet Manufacturers Association	(703) 264-1690
	www.kcma.org	
LMA	Laminating Materials Association	
	(Now part of CPA)	
LPI	Lightning Protection Institute	(800) 488-6864
	www.lightning.org	
MBMA	Metal Building Manufacturers Association	(216) 241-7333
	www.mbma.com	
MFMA	Maple Flooring Manufacturers Association, Inc.	(888) 480-9138
	www.maplefloor.org	
MFMA	Metal Framing Manufacturers Association, Inc.	(312) 644-6610
	www.metalframingmfg.org	
MH	Material Handling	
	(Now MHIA)	
MHIA	Material Handling Industry of America	(800) 345-1815
	www.mhia.org	(704) 676-1190
MIA	Marble Institute of America	(440) 250-9222
	www.marble-institute.com	
MPI	Master Painters Institute	(888) 674-8937
	www.paintinfo.com	(604) 298-7578

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MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc.	(703) 281-6613
	www.mss-hq.com	
NAAMM	National Association of Architectural Metal Manufacturers	(630) 942-6591
	www.naamm.org	
NACE	NACE International	(800) 797-6623
	(National Association of Corrosion Engineers International)	(281) 228-6200
	www.nace.org	
NADCA	National Air Duct Cleaners Association	(202) 737-2926
	www.nadca.com	
NAGWS	National Association for Girls and Women in Sport	(800) 213-7193, ext. 453
	www.aahperd.org/nagws/	
NAIMA	North American Insulation Manufacturers Association	(703) 684-0084
	www.naima.org	
NBGQA	National Building Granite Quarries Association, Inc.	(800) 557-2848
	www.nbgqa.com	
NCAA	National Collegiate Athletic Association (The)	(317) 917-6222
	www.ncaa.org	
NCMA	National Concrete Masonry Association	(703) 713-1900
	www.ncma.org	
NCPI	National Clay Pipe Institute	(262) 248-9094
	www.ncpi.org	
NCTA	National Cable & Telecommunications Association	(202) 775-2300
	www.ncta.com	
NEBB	National Environmental Balancing Bureau	(301) 977-3698
	www.nebb.org	
NECA	National Electrical Contractors Association	(301) 657-3110
	www.necanet.org	
NeLMA	Northeastern Lumber Manufacturers' Association	(207) 829-6901
	www.nelma.org	

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NEMA	National Electrical Manufacturers Association	(703) 841-3200
	www.nema.org	
NETA	InterNational Electrical Testing Association	(888) 300-6382
	www.netaworld.org	(269) 488-6382
NFHS	National Federation of State High School Associations	(317) 972-6900
	www.nfhs.org	
NFPA	NFPA	(800) 344-3555
	(National Fire Protection Association)	(617) 770-3000
	www.nfpa.org	
NFRC	National Fenestration Rating Council	(301) 589-1776
	www.nfrc.org	
NGA	National Glass Association	(866) 342-5642
	www.glass.org	(703) 442-4890
NHLA	National Hardwood Lumber Association	(800) 933-0318
	www.natlhardwood.org	(901) 377-1818
NLGA	National Lumber Grades Authority	(604) 524-2393
	www.nlga.org	
NOFMA	NOFMA: The Wood Flooring Manufacturers Association	(901) 526-5016
	(Formerly: National Oak Flooring Manufacturers Association)	
	www.nofma.com	
NOMMA	National Ornamental & Miscellaneous Metals Association	(888) 516-8585
	www.nomma.org	
NRCA	National Roofing Contractors Association	(800) 323-9545
	www.nrca.net	(847) 299-9070
NRMCA	National Ready Mixed Concrete Association	(888) 846-7622
	www.nrmca.org	(301) 587-1400
NSF	NSF International	(800) 673-6275
	(National Sanitation Foundation International)	(734) 769-8010
	www.nsf.org	
NSSGA	National Stone, Sand & Gravel Association	(800) 342-1415

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	www.nssga.org	(703) 525-8788
NTMA	National Terrazzo & Mosaic Association, Inc. (The)	(800) 323-9736
	www.ntma.com	(540) 751-0930
NTRMA	National Tile Roofing Manufacturers Association	
	(Now TRI)	
NWWDA	National Wood Window and Door Association	
	(Now WDMA)	
OPL	Omega Point Laboratories, Inc.	
	(Now ITS)	
PCI	Precast/Prestressed Concrete Institute	(312) 786-0300
	www.pci.org	
PDCA	Painting & Decorating Contractors of America	(800) 332-7322
	www.pdca.com	(314) 514-7322
PDI	Plumbing & Drainage Institute	(800) 589-8956
	www.pdionline.org	(978) 557-0720
PGI	PVC Geomembrane Institute	(217) 333-3929
	http://pgi-tp.ce.uiuc.edu	
PLANET	Professional Landcare Network	(800) 395-2522
	(Formerly: ACLA - Associated Landscape Contractors of America)	(703) 736-9666
	www.landcarenetwork.org	
PTI	Post-Tensioning Institute	(602) 870-7540
	www.post-tensioning.org	
RCSC	Research Council on Structural Connections	
	www.boltcouncil.org	
RFCI	Resilient Floor Covering Institute	(301) 340-8580
	www.rfci.com	
RIS	Redwood Inspection Service	(888) 225-7339
	www.redwoodinspection.com	(415) 382-0662
SAE	SAE International	(877) 606-7323
	www.sae.org	(724) 776-4841

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SDI	Steel Deck Institute	(847) 458-4647
	www.sdi.org	
SDI	Steel Door Institute	(440) 899-0010
	www.steeldoor.org	
SEFA	Scientific Equipment and Furniture Association	(877) 294-5424
	www.sefalabs.com	(516) 294-5424
SEI/ASCE	Structural Engineering Institute/American Society of Civil Engineers	
	(See ASCE)	
SGCC	Safety Glazing Certification Council	(315) 646-2234
	www.sgcc.org	
SIA	Security Industry Association	(866) 817-8888
	www.siaonline.org	(703) 683-2075
SIGMA	Sealed Insulating Glass Manufacturers Association	
	(Now IGMA)	
SJI	Steel Joist Institute	(843) 626-1995
	www.steeljoist.org	
SMA	Screen Manufacturers Association	(561) 533-0991
	www.smacentral.org	
SMACNA	Sheet Metal and Air Conditioning Contractors'	(703) 803-2980
	National Association	
	www.smacna.org	
SMPTE	Society of Motion Picture and Television Engineers	(914) 761-1100
	www.smpte.org	
SPFA	Spray Polyurethane Foam Alliance	(800) 523-6154
	(Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division)	
	www.sprayfoam.org	
SPIB	Southern Pine Inspection Bureau (The)	(850) 434-2611
	www.spib.org	
SPRI	Single Ply Roofing Industry	(781) 647-7026

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	www.spri.org	
SSINA	Specialty Steel Industry of North America	(800) 982-0355
	www.ssina.com	(202) 342-8630
SSPC	SSPC: The Society for Protective Coatings	(877) 281-7772
	www.sspc.org	(412) 281-2331
STI	Steel Tank Institute	(847) 438-8265
	www.steeltank.com	
SWI	Steel Window Institute	(216) 241-7333
	www.steelwindows.com	
SWRI	Sealant, Waterproofing, & Restoration Institute	(816) 472-7974
	www.swrionline.org	
TCA	Tile Council of America, Inc.	
	(Now TCNA)	
TCNA	Tile Council of North America, Inc.	(864) 646-8453
	www.tileusa.com	
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance	(703) 907-7700
	www.tiaonline.org	
TMS	The Masonry Society	(303) 939-9700
	www.masonrysociety.org	
TPI	Truss Plate Institute, Inc.	(703) 683-1010
	www.tpinst.org	
TPI	Turfgrass Producers International	(800) 405-8873
	www.turfgrasssod.org	(847) 649-5555
TRI	Tile Roofing Institute	(312) 670-4177
	www.tileroofing.org	
UL	Underwriters Laboratories Inc.	(877) 854-3577
	www.ul.com	(847) 272-8800
UNI	Uni-Bell PVC Pipe Association	(972) 243-3902
	www.uni-bell.org	

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USAV	USA Volleyball	(888) 786-5539
	www.usavolleyball.org	(719) 228-6800
USGBC	U.S. Green Building Council	(800) 795-1747
	www.usgbc.org	
USITT	United States Institute for Theatre Technology, Inc.	(800) 938-7488
	www.usitt.org	(315) 463-6463
WASTEC	Waste Equipment Technology Association	(800) 424-2869
	www.wastec.org	(202) 244-4700
WCLIB	West Coast Lumber Inspection Bureau	(800) 283-1486
	www.wclib.org	(503) 639-0651
WCMA	Window Covering Manufacturers Association	(212) 297-2122
	www.wcmanet.org	
WCSC	Window Covering Safety Council	(800) 506-4636
	(Formerly: WCMA - Window Covering Manufacturers Association)	(212) 297-2109
	www.windowcoverings.org	
WDMA	Window & Door Manufacturers Association	(800) 223-2301
	(Formerly: NWWDA - National Wood Window and Door Association)	(847) 299-5200
	www.wdma.com	
WI	Woodwork Institute (Formerly: WIC - Woodwork Institute of California)	(916) 372-9943
	www.wicnet.org	
WIC	Woodwork Institute of California	
	(Now WI)	
WMMPA	Wood Moulding & Millwork Producers Association	(800) 550-7889
	www.wmmpa.com	(530) 661-9591
WSRCA	Western States Roofing Contractors Association	(800) 725-0333
	www.wsrca.com	(650) 570-5441
WWPA	Western Wood Products Association	(503) 224-3930
	www.wwpa.org	

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E. 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, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543
UBC	Uniform Building Code (See ICC)	

F. 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.

CE	Army Corps of Engineers www.usace.army.mil	(202) 761-0011
CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-7923
DOC	Department of Commerce www.commerce.gov	(202) 482-2000
DOD	Department of Defense http://.dodssp.daps.dla.mil	(215) 697-6257
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
FCC	Federal Communications Commission www.fcc.gov	(888) 225-5322

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FDA	Food and Drug Administration www.fda.gov	(888) 463-6332
GSA	General Services Administration www.gsa.gov	(800) 488-3111
HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112
LBL	Lawrence Berkeley National Laboratory www.lbl.gov	(510) 486-4000
NCHRP	National Cooperative Highway Research Program (See TRB)	
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
PBS	Public Buildings Service (See GSA)	
PHS	Office of Public Health and Science www.osophs.dhhs.gov/ophs	(202) 690-7694
RUS	Rural Utilities Service (See USDA)	(202) 720-9540
SD	State Department www.state.gov	(202) 647-4000
TRB	Transportation Research Board http://gulliver.trb.org	(202) 334-2934
USDA	Department of Agriculture www.usda.gov	(202) 720-2791
USPS	Postal Service www.usps.com	(202) 268-2000

G. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of

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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.

ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from U.S. Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
CFR	Code of Federal Regulations Available from Government Printing Office www.gpoaccess.gov/cfr/index.html	(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 Available from Defense Standardization Program www.dps.dla.mil Available from General Services Administration www.gsa.gov Available from National Institute of Building Sciences www.wbdg.org/ccb	(215) 697-2664 (202) 619-8925 (202) 289-7800
FTMS	Federal Test Method Standard (See FS)	
MIL	(See MILSPEC)	
MIL-STD	(See MILSPEC)	
MILSPEC	Military Specification and Standards Available from Department of Defense Single Stock Point	(215) 697-2664

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http://dodssp.daps.dla.mil

UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080

H. 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 Home Furnishings and Thermal Insulation www.dca.ca.gov/bhfti	(800) 952-5210 (916) 574-2041
CCR	California Code of Regulations www.calregs.com	(916) 323-6815
CPUC	California Public Utilities Commission www.cpuc.ca.gov	(415) 703-2782
TFS	Texas Forest Service Forest Resource Development http://txforestservice.tamu.edu	(979) 458-6650

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

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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 requirements for
1. Temporary utilities, support facilities, and security and protection facilities.
2. Project Signage

B. Related Sections include the following:
1. Division 01 Section "Summary" for limitations on utility interruptions and other work restrictions.
2. Division 01 Section "Multiple Contract Summary" for division of responsibilities for temporary facilities and controls.
3. Division 01 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
4. Division 01 Section "Execution" for progress cleaning requirements.
5. Divisions 02 through 49 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.
6. Division 32 Section "Dewatering" for disposal of ground water at Project site.
7. Division 31 Section "Termite Control" for pest control.
8. Division 31 Section "Asphalt Paving" for construction and maintenance of asphalt paving for temporary roads and paved areas.
9. Division 32 Section "Concrete Paving" for construction and maintenance of cement concrete pavement for temporary roads and paved areas.

1.3 DEFINITIONS

A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. 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. Sewer Service: Pay sewer service use charges for sewer usage by all entities for construction operations.

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C. Water Service: Pay water service use charges for water used by all entities for construction operations.

D. Electric Power Service: Pay electric power service use charges for electricity used by all entities for construction operations.

E. Sewer, Water, and Electric Power Service: Use charges are specified in Division 01 Section "Multiple Contract Summary."

F. Water Service: 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.

G. Electric Power Service: 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.

1.5 SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.6 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.

1.7 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Installer of each permanent service shall 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.

1.8 RESPONSIBILITIES FOR HEATING AND VENTILATION

A. During Period of Temporary Enclosure: When the building, or major unit thereof, has been sufficiently temporarily enclosed, the General Contractor shall provide, operate and maintain temporary heat and adequate ventilation provisions, including cost of installation, fuel, operation, maintenance, and removal of equipment.

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PART 2 - PRODUCTS

2.1 MATERIALS

A. Pavement: Comply with Division 32 Section "Asphalt Paving."

B. Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts**, with 1-5/8-inch- OD top rails, with galvanized barbed-wire top strand**.

C. Portable Chain-Link Fencing: Minimum 2-inch, 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide **galvanized steel** bases for supporting posts.

D. Gypsum Board: Minimum 1/2-inch thick by 48 inches wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 1396.

E. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

F. Paint: Comply with requirements in Division 09 painting Sections.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Common-Use Field Office: Of sufficient size to accommodate needs of construction personnel. Keep office clean and orderly. Furnish and equip offices as follows:
1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
2. Conference room of sufficient size to accommodate meetings of **16** individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- square tack board.
3. Drinking water and private toilet.
4. Coffee machine and supplies.
5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
6. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
1. Store combustible materials apart from building.

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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 testing agency acceptable to authorities having jurisdiction, and marked for intended use.
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.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.
1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
1. Connect temporary sewers to **municipal system** as directed by authorities having jurisdiction.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

D. Water Service: Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
1. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.

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E. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
   1. Toilets: Use of Owner's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

F. Heating **and Cooling**: Provide temporary heating **and cooling** required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

G. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

H. Electric Power Service: Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.

I. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
   1. Install electric power service **underground**, unless otherwise indicated.
   2. Connect temporary service to Owner's existing power source, as directed by Owner.

J. 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.
   2. Install lighting for Project identification sign.

K. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install 2 telephone line(s) for each field office.
   1. Provide additional telephone lines for the following:
      a. Provide a dedicated telephone line for each facsimile machine and computer in each field office.
      b. Provide **one** telephone line(s) for Owner's use.
   2. At each telephone, post a list of important telephone numbers.
      a. Police and fire departments.
      b. Ambulance service.
      c. Contractor's home office.
      d. Architect's office.
      e. Engineers' offices.
      f. Owner's office.
      g. Principal subcontractors' field and home offices.
   3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

L. Electronic Communication Service: Provide temporary electronic communication service, including electronic mail, in common-use facilities.

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1. Provide **DSL line** in primary field office.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:
   1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with NFPA 241.
   2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas **as indicated within construction limits o**n Drawings.
   1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

C. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas in same location as permanent roads and paved areas. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
   1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
   2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 31 Section "Earth Moving."
   3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
   4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Division 32 Section "Asphalt Paving."

D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
   1. Protect existing site improvements to remain including curbs, pavement, and utilities.
   2. Maintain access for fire-fighting equipment and access to fire hydrants.

E. Parking: **Provide temporary OR Use designated areas of Owner's existing** parking areas for construction personnel.

F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
   1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
   2. Remove snow and ice as required to minimize accumulations.

G. Project Identification and Temporary Signs: Provide Project identification and other signs. Install signs where indicated to inform public and individuals seeking entrance to Project. Unauthorized signs are not permitted.
   1. Provide temporary, directional signs for construction personnel and visitors.
   2. Maintain and touchup signs so they are legible at all times.

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H. Waste Disposal Facilities: Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal."

I. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution" for progress cleaning requirements.

J. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
   1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

K. Temporary Elevator Use: Refer to Division 14 Sections for temporary use of new elevators.

L. Existing Elevator Use: Use of Owner's existing elevators will be permitted, as long as elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
   1. Do not load elevators beyond their rated weight capacity.
   2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.

M. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

N. Existing Stair Usage: Use of Owner's existing stairs will be permitted, as long as stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
   1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If, despite such protection, stairs become damaged, restore damaged areas so no evidence remains of correction work.

O. Temporary Use of Permanent Stairs: Cover finished, permanent stairs with protective covering of plywood or similar material so finishes will be undamaged at time of acceptance.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that 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 Division 01 Section "Summary."

B. Temporary Erosion and Sedimentation Control: Comply with requirements specified in Division 31 Section "Site Clearing."

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C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
   1. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Stormwater Control: Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

E. Tree and Plant Protection: Comply with requirements specified in Division 01 Section "Temporary Tree and Plant Protection."

F. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

G. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Obtain extended warranty for Owner. Perform control operations lawfully, using environmentally safe materials.

H. Site Enclosure Fence: **Before construction operations begin**, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
   1. Extent of Fence: [As required to enclose entire Project site or portion determined sufficient to accommodate construction operations] [As indicated on Drawings].
   2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. **Provide Owner with one set of keys.**

I. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

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

K. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
   1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.

L. 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 gypsum wallboard with joints taped on occupied side, and fire-retardant plywood on construction operations side.
   2. Construct dustproof partitions with 2 layers of 3-mil polyethylene sheet on each side. Cover floor with 2 layers of 3-mil polyethylene sheet, extending sheets 18 inches up the

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sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant plywood.

a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.

3. Insulate partitions to provide noise protection to occupied areas.
4. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
5. Protect air-handling equipment.
6. Weather strip openings.
7. Provide walk-off mats at each entrance through temporary partition.

M. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

1. Prohibit smoking in [hazardous fire-exposure] [construction] areas.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 PROJECT SIGN

A. Project Identification and Temporary Signs: Prepare Project identification and other signs in sizes indicated. Install signs where indicated to inform public and persons seeking entrance to Project. Do not permit installation of unauthorized signs. Allow for a minimum 8’-0” x 8’-0” sign with cutouts.

1. Engage an experienced sign painter to apply graphics for Project identification signs. Comply with details indicated in drawing and color rendering to be provided by Architect.

2. Prepare temporary signs to provide directional information to construction personnel and visitors.

3. Construct signs of exterior-type Grade B-B high-density concrete form overlay plywood in sizes and thicknesses indicated. Support on posts or framing of preservative-treated wood or steel.

4. Paint sign panel and applied graphics with exterior-grade alkyd gloss enamel over exterior primer.

3.6 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.

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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. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.

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

E. 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. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
   3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 015000

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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 selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

B. Related Sections include the following:

1. Division 01 Section "Alternates" for products selected under an alternate.
2. Division 01 Section "References" for applicable industry standards for products specified.
3. Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.
4. Divisions 02 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

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

C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis-of-design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.4 SUBMITTALS

A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.

1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
2. Form: Tabulate information for each product under the following column headings:

a. Specification Section number and title.
b. Generic name used in the Contract Documents.
c. Proprietary name, model number, and similar designations.
d. Manufacturer's name and address.
e. Supplier's name and address.
f. Installer's name and address.
g. Projected delivery date or time span of delivery period.
h. Identification of items that require early submittal approval for scheduled delivery date.

3. Initial Submittal: Within 30 days after date of commencement of the Work, submit 6 copies of initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.
4. Architect's Action: Architect will respond in writing to Contractor within 15 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.

B. 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 facsimile of form provided at end of Section.

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2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

   a. Statement indicating why specified material or product cannot be provided.
   b. Coordination information, including a list of changes or modifications 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. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
   d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
   e. Samples, where applicable or requested.
   f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
   g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
   h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
   i. 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 lack of availability or delays in delivery.
   j. Cost information, including a proposal of change, if any, in the Contract Sum.
   k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents 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.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

   a. Form of Acceptance: Change Order.
   b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

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C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

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7. Protect stored products from damage and liquids from freezing.
8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
3. Refer to Divisions 02 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.

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3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
7. Or Equal or Comparable Product: Where products are specified by name and accompanied by the term "or equal" or "comparable product" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
8. Basis-of-Design Product: Where Specifications name a product and/or include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches

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Architect's sample. Architect's decision will be final on whether a proposed product matches.

a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.

10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.

a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

A. Timing: Architect will consider requests for substitution if received within 30 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Architect.

B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
2. Requested substitution does not require extensive revisions to the Contract Documents.
3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
4. Substitution request is fully documented and properly submitted.
5. Requested substitution will not adversely affect Contractor's Construction Schedule.
6. Requested substitution has received necessary approvals of authorities having jurisdiction.
7. Requested substitution is compatible with other portions of the Work.

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8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.
10. 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.

2.3 COMPARABLE PRODUCTS

A. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require extensive revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

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Advancement of Construction Technology

SUBSTITUTION REQUEST
(After the Bidding Phase)

Project: _____ Substitution Request Number: _____
_____ From: _____
To: _____ Date: _____
_____ A/E Project Number: _____
Re: _____ Contact For: _____

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____
Drawing Number and Title: _____ Details Numbered: _____

Proposed Substitution: _____
Manufacturer: _____
Address: _____
Phone: _____ Fax: _____
Trade Name: _____ Model No.: _____
Installer: _____ Phone: _____ Fax: _____
Address: _____

History: ☐ New Product ☐ 2-5 years old ☐ 5-10 years old ☐ More than 10 years old

Differences between proposed substitution and specified product: _____
_____

☐ Point-by-point comparative data attached - REQUIRED BY A/E

Reason for not providing specified item: _____
_____

Similar Installation:
Project: _____
Address: _____
Architect: _____ Phone No.: _____
Owner: _____ Phone No.: _____
Date Installed: _____

Proposed substitutions affects other parts of Work.
☐ No ☐ Yes; explain _____

Cost Savings to Owner for accepting substitution: _____ ($ _____).
Proposed Substitution changes Contract Time:
☐ No ☐ Yes (Add) (Deduct) _____ days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐

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SUBSTITUTION REQUEST (Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

Attachments: _____

_____

A/E's Review and Action

☐ Substitution approved – Make submittals in accordance with Specification Section 01330.
☐ Substitution approved as noted – Make submittals in accordance with Specification Section 01330.
☐ Substitution rejected – Use specified materials.
☐ Substitution Request received too late – Use specified materials

Signed by: _____ Date: _____

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ _____

_____

_____

_____

_____

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CSI Form 13.1A

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 general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. General installation of products.
4. Coordination of Owner-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.
8. Correction of the Work.

B. Related Sections include the following:

1. Division 01 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
2. Division 01 Section "Submittal Procedures" for submitting surveys.
3. Division 01 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
4. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 SUBMITTALS

A. Qualification Data: For professional engineer.

B. Certificates: Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.

C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

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D. Certified Surveys: Submit two copies signed by professional engineer.

E. Final Property Survey: Submit [**10**] <**Insert number**> copies showing the Work performed and record survey data.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

1. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, verify the location and points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

C. Acceptance of Conditions: 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. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

a. Description of the Work.
b. List of detrimental conditions, including substrates.
c. List of unacceptable installation tolerances.
d. Recommended corrections.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

NOT FOR BIDDING PURPOSES

3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to **Owner** that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. 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.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a Request for Information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

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. General: Engage a professional engineer to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
3. Inform installers of lines and levels to which they must comply.
4. Check the location, level and plumb, of every major element as the Work progresses.
5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.

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6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

D. 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.

E. 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 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of **two** permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

NOT FOR BIDDING PURPOSES

E. Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by professional engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 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 **8 feet** in spaces without a suspended ceiling.

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. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. 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.

G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

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.

NOT FOR BIDDING PURPOSES

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.

H. 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.

I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction forces.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.

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 forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

A. General: **Each Contractor** shall clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. 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 materials more than 7 days during normal weather or 3 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.

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.

NOT FOR BIDDING PURPOSES

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: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

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 operating components for proper operation without binding. Adjust equipment for proper operation.

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: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements."

NOT FOR BIDDING PURPOSES

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 Division 01 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 017300

NOT FOR BIDDING PURPOSES

SECTION 017329 - CUTTING AND PATCHING

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 procedural requirements for cutting and patching.

B. Related Sections include the following:

1. Division 01 Section "Selective Structure Demolition" for demolition of selected portions of the building.
2. Divisions 2 through 49 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
3. Division 07 Section "Penetration Firestopping" for patching fire-rated construction.

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 surfaces to original conditions after installation of other Work.

1.4 SUBMITTALS

A. Cutting and Patching Proposal: Submit a proposal describing procedures at least **10** days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
3. Products: List products to be used and firms or entities that will perform the Work.
4. Dates: Indicate when cutting and patching will be performed.

NOT FOR BIDDING PURPOSES

5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.
6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
7. **Architect's** Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.5 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. **Operating elements include the following:**

1. Primary operational systems and equipment.
2. Air or smoke barriers.
3. Fire-suppression systems.
4. Mechanical systems piping and ducts.
5. Control systems.
6. Communication systems.
7. Conveying systems.
8. Electrical wiring systems.
9. Detention or electronic security systems.

C. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces 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.

D. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

NOT FOR BIDDING PURPOSES

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. 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.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

NOT FOR BIDDING PURPOSES

D. 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.

3.3 PERFORMANCE

A. 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. 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 as small as possible, neatly to 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. **Concrete and Masonry**: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
5. 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.
6. Proceed with patching after construction operations requiring cutting are complete.

C. 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 possible. Provide materials and comply with installation requirements specified in other Sections.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate 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 eliminate evidence of patching and refinishing.

NOT FOR BIDDING PURPOSES

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, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 017329

NOT FOR BIDDING PURPOSES

CONSTRUCTION WASTE MANAGEMENT

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes: Administrative and procedural requirements for construction waste management activities.

1.2 DEFINITIONS

A. Construction, Demolition, and Land clearing (CDL) Waste: Includes all non-hazardous solid wastes resulting from construction, remodeling, alterations, repair, demolition and land clearing. Includes material that is recycled, reused, salvaged or disposed as garbage.

B. Salvage: Recovery of materials for on-site reuse, sale or donation to a third party.

C. Reuse: Making use of a material without altering its form. Materials can be reused on-site or reused on other projects off-site. Examples include, but are not limited to the following: Crushing or grinding of concrete for use as sub-base material. Chipping of land clearing debris for use as mulch.

D. Recycling: The process of sorting, cleaning, treating, and reconstituting materials for the purpose of using the material in the manufacture of a new product.

E. Source-Separated CDL Recycling: The process of separating recyclable materials in separate containers as they are generated on the job-site. The separated materials are hauled directly to a recycling facility or transfer station.

F. Co-mingled CDL Recycling: The process of collecting mixed recyclable materials in one container on-site. The container is taken to a material recovery facility where materials are separated for recycling.

G. Approved Recycling Facility: Any of the following:

1. A facility that can legally accept CDL waste materials for the purpose of processing the materials into an altered form for the manufacture of a new product.

2. Material Recovery Facility: A general term used to describe a waste-sorting facility. Mechanical, hand-separation, or a combination of both procedures, are used to recover recyclable materials.

1.3 SUBMITTALS

A. Contractor shall develop a Waste Management Plan: Submit 3 copies of plan within 14 days of date established for the **Notice to Proceed**.

B. Contractor shall provide Waste Management Report: Concurrent with each Application for Payment, submit **3** copies of report.

NOT FOR BIDDING PURPOSES

1.4 PERFORMANCE REQUIREMENTS

A. General: Divert a minimum of **75%** CDL waste, by weight, from the landfill by one, or a combination of the following activities:

1. Salvage
2. Reuse
3. Source-Separated CDL Recycling
4. Co-mingled CDL Recycling

B. CDL waste materials that can be salvaged, reused or recycled include, but are not limited to, the following:

1. Acoustical ceiling tiles
2. Asphalt
3. Asphalt shingles
4. Cardboard packaging
5. Carpet and carpet pad
6. Concrete
7. Drywall
8. Fluorescent lights and ballasts
9. Land clearing debris (vegetation, stumpage, dirt)
10. Metals
11. Paint (through hazardous waste outlets)
12. Wood
13. Plastic film (sheeting, shrink wrap, packaging)
14. Window glass
15. Wood
16. Field office waste, including office paper, aluminum cans, glass, plastic, and office cardboard.

1.4 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of projects with similar requirements, that employs a LEED Accredited Professional, certified by the USGBC as waste management coordinator.

B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

C. Regulatory Requirements: Conduct construction waste management activities in accordance with hauling and disposal regulations of all authorities having jurisdiction and all other applicable laws and ordinances.

D. Preconstruction Conference: Schedule and conduct meeting at Project site prior to construction activities.

1. Attendees: Inform the following individuals, whose presence is required, of date and time of meeting.

a. Owner
b. Architect
c. Contractor's superintendent
d. Major subcontractors
e. Waste Management Coordinator
f. Other concerned parties

NOT FOR BIDDING PURPOSES

2. Agenda Items: Review methods and procedures related to waste management including, but not limited to, the following:

    a. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
    b. Review requirements for documenting quantities of each type of waste and its disposition.
    c. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
    d. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
    e. Review waste management requirements for each trade.

3. Minutes: Record discussion. Distribute meeting minutes to all participants.
   Note: If there is a Project Architect, they will perform this role.

1.5 WASTE MANAGEMENT PLAN – Contactor shall develop and document the following:

A. Develop a plan to meet the requirements listed in this section at a minimum. Plan shall consist of waste identification, waste reduction plan and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight throughout the plan.

B. Indicate anticipated types and quantities of demolition, site-cleaning and construction waste generated by the project. List all assumptions made for the quantities estimates.

C. List each type of waste and whether it will be salvaged, recycled, or disposed of in an landfill. The plan should included the following information:

1. Types and estimated quantities, by weight, of CDL waste expected to be generated during demolition and construction.

2. Proposed methods for CDL waste salvage, reuse, recycling and disposal during demolition including, but not limited to, one or more of the following:

    a. Contracting with a deconstruction specialist to salvage materials generated,
    b. Selective salvage as part of demolition contractor's work,
    c. Reuse of materials on-site or sale or donation to a third party.

3. Proposed methods for salvage, reuse, recycling and disposal during construction including, but not limited to, one or more of the following:

    a. Requiring subcontractors to take their CDL waste to a recycling facility;
    b. Contracting with a recycling hauler to haul recyclable CDL waste to an approved recycling or material recovery facility;
    c. Processing and reusing materials on-site;
    d. Self-hauling to a recycling or material recovery facility.

4. Name of recycling or material recovery facility receiving the CDL wastes.

5. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on project site where materials separation will be located.

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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 salvaged materials.
5. Revenue from recycled materials.
6. Savings in hauling and tipping fees by donating materials.
7. Savings in hauling and tipping fees that are avoided.
8. Handling and transportation costs. Including cost of collection containers for each type of waste.
9. Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 CONSTRUCTION WASTE MANAGEMENT, GENERAL

A. Provide containers for CDL waste that is to be recycled clearly labeled as such with a list of acceptable and unacceptable materials. The list of acceptable materials must be the same as the materials recycled at the receiving material recovery facility or recycling processor.

B. The collection containers for recyclable CDL waste must contain no more than 10% non-recyclable material, by volume.

C. Provide containers for CDL waste that is disposed in a landfill clearly labeled as such.

D. Use detailed material estimates to reduce risk of unplanned and potentially wasteful cuts.

E. To the greatest extent possible, include in material purchasing agreements a waste reduction provision requesting that materials and equipment be delivered in packaging made of recyclable material, that they reduce the amount of packaging, that packaging be taken back for reuse or recycling, and to take back all unused product. Insure that subcontractors require the same provisions in their purchase agreements.

F. Conduct regular visual inspections of dumpsters and recycling bins to remove contaminants.

3.2 SOURCE SEPARATION

A. General: Contractor shall separate recyclable materials from CDL waste to the maximum extent possible.

Separate recyclable materials by type.

1. Provide containers, clearly labeled, by type of separated materials or provide other storage method for managing recyclable materials until they are removed from Project site.
2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water and to minimize pest attraction. Cover to prevent windblown dust.\

NOT FOR BIDDING PURPOSES

3. Stockpile materials away from demolition area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from weather.

3.3 CO-MINGLED RECYCLING

A. General: Do not put CDL waste that will be disposed in a landfill into a co-mingled CDL waste recycling container.

REMOVAL OF CONSTRUCTION WASTE MATERIALS

A. Remove CDL waste materials from project site on a regular basis. Do not allow CDL waste to accumulate on-site.

B. Transport CDL waste materials off Owner's property and legally dispose of them.

C. Burning of CDL waste is not permitted.

END OF SECTION

NOT FOR BIDDING PURPOSES

WASTE MANAGEMENT PROGRESS REPORT				
	DISPOSED IN MUNICIPAL SOLID WASTE LANDFILL	**DIVERTED FROM LANDFILL BY RECYCLING, SALVAGE OR REUSE**		
MATERIAL CATEGORY		Recycled	Salvaged	Reused
1. Acoustical Ceiling Tiles				
2. Asphalt				
3. Asphalt Shingles				
4. Cardboard Packaging				
5. Carpet and Carpet Pad				
6. Concrete				
7. Drywall				
8. Fluorescent Lights and Ballasts				
9. Land Clearing Debris (vegetation, stumpage, dirt)				
10. Metals				
11. Paint (through hazardous waste outlets)				
12. Wood				
13. Plastic Film (sheeting, shrink wrap, packaging)				
14. Window Glass				
15. Field Office Waste (office paper, aluminum cans, glass, plastic, and coffee cardboard)				
16. Other (insert description)				
17. Other (insert description)				
Total (In Weight)		(TOTAL OF ALL ABOVE VALUES – IN WEIGHT)		
		Percentage of Waste Diverted	(TOTAL WASTE DIVIDED BY TOTAL DIVERTED)	

NOT FOR BIDDING PURPOSES

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 "Photographic Documentation" for submitting Final Completion construction photographs and negatives.
3. Division 01 Section "Execution" for progress cleaning of Project site.
4. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
5. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
6. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
7. Divisions 02 through 49 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, 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.

NOT FOR BIDDING PURPOSES

4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. 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.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion 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: Reinspection will occur during final inspection.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of 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 Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The 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 and warranty.

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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.
2. **Inspections by the Architect, requested by the Contractor after the second punch list inspection, shall be at the cost of the Contractor. Costs shall be on a time and material basis and back charged to the Contractor's contract with the Owner.**

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of 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, starting with exterior areas first and proceeding from lowest floor to highest floor.
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. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

NOT FOR BIDDING PURPOSES

C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-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.

D. 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: Provide 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 portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

NOT FOR BIDDING PURPOSES

b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
k. Remove labels that are not permanent.
l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

    1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

m. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
n. Replace parts subject to unusual operating conditions.
o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
q. Clean ducts, blowers, and coils if units were operated without filters during construction.
r. 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.
s. Leave Project clean and ready for occupancy.

NOT FOR BIDDING PURPOSES

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.

D. 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.

END OF SECTION 017700

NOT FOR BIDDING PURPOSES

SECTION 017823 - OPERATION AND MAINTENANCE DATA

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 preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Maintenance manuals for the care and maintenance of **products, materials, and finishes systems and equipment**.

B. Related Sections include the following:
1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Division 01 Section "Closeout Procedures" for submitting operation and maintenance manuals.
3. Division 01 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
4. Divisions 02 through 49 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

A. Initial Submittal: Submit 1 draft copies of each manual at least **15** days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Architect will return **one copy** of draft and mark whether general scope and content of manual are acceptable.

NOT FOR BIDDING PURPOSES

B. Final Submittal: Submit three **copies** of each manual in final form at least **15** days before final inspection. Architect will return copy with comments or approve within **15** days after final inspection.

1.5 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.

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3. Manual contents.

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name, address, and telephone number of Contractor.
6. Name and address of Architect.
7. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

   a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
   b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

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a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

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1. System, subsystem, and equipment descriptions.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

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B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

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1. Standard printed maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training videotape, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

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B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.

1. Do not use original Project Record Documents as part of operation and maintenance manuals.
2. Comply with requirements of newly prepared Record Drawings in Division 01 Section "Project Record Documents."

G. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

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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 Project Record Documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.

B. Related Sections include the following:

1. Division 01 Section "Multiple Contract Summary" for coordinating Project Record Documents covering the Work of multiple contracts.
2. Division 01 Section "Closeout Procedures" for general closeout procedures.
3. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
4. Divisions 02 through 49 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.3 SUBMITTALS

A. Record Drawings: Comply with the following:
1. Number of Copies: Submit copies of Record Drawings as follows:

a. Initial Submittal: Submit **one** set(s) of **plots from corrected Record CAD Drawings** and **one** set(s) of marked-up Record Prints. Architect will initial and date each **plot** and mark whether general scope of changes, additional information recorded, and quality of drafting are acceptable. Architect will return **plots** and prints for organizing into sets, printing, binding, and final submittal.
b. Final Submittal: Submit **one** set(s) of marked-up Record Prints, **one** set(s) of Record Transparencies, Print each Drawing, whether or not changes and additional information were recorded.

1) Electronic Media: **CD-R**.

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B. Record Specifications: Submit **one copy** of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit **one copy** of each Product Data submittal.

1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.

1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an understandable drawing technique.
c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations below first floor.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Change Directive.
k. Changes made following Architect's written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.

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3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Transparencies: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Architect. When authorized, prepare a full set of corrected transparencies of the Contract Drawings and Shop Drawings.

1. Incorporate changes and additional information previously marked on Record Prints. Erase, redraw, and add details and notations where applicable.
2. Refer instances of uncertainty to Architect for resolution.
3. Owner will furnish Contractor one set of transparencies of the Contract Drawings for use in recording information.
4. Print the Contract Drawings and Shop Drawings for use as Record Transparencies. Architect will make the Contract Drawings available to Contractor's print shop.

C. Record CAD Drawings: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Architect. When authorized, prepare a full set of corrected CAD Drawings of the Contract Drawings, as follows:

1. Format: Same CAD program, version, and operating system as the original Contract Drawings.
2. Format: **DWG**, Version Autocad 2006, operating in **Microsoft Windows** operating system.
3. Incorporate changes and additional information previously marked on Record Prints. Delete, redraw, and add details and notations where applicable.
4. Refer instances of uncertainty to Architect for resolution.
5. Architect will furnish Contractor one set of CAD Drawings of the Contract Drawings for use in recording information.
    a. Architect makes no representations as to the accuracy or completeness of CAD Drawings as they relate to the Contract Drawings.
    b. CAD Software Program: The Contract Drawings are available in Autocad 2004.

D. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.

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1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
2. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.

E. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Record Transparencies: Organize into unbound sets matching Record Prints. Place transparencies in durable tube-type drawing containers with end caps. Mark end cap of each container with identification. If container does not include a complete set, identify Drawings included.
3. Record CAD Drawings: Organize CAD information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each CAD file.
4. Identification: As follows:

    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of Architect **and Construction Manager**.
    e. Name of Contractor.

2.2 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders**, Record Specifications,** and Record Drawings where applicable.

2.3 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of

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the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

END OF SECTION 017839

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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 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.
3. Demonstration and training videotapes.

B. Related Sections include the following:

1. Division 01 Section "Project Management and Coordination" for requirements for preinstruction conferences.
2. Divisions 02 through 49 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 SUBMITTALS

A. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. At completion of training, submit one complete training manual(s) for Owner's use.

B. Attendance Record: For each training module, submit list of participants and length of instruction time.

C. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

D. Demonstration and Training Videotapes: Submit two copies within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

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a. Name of Project.
b. Name and address of photographer.
c. Name of Architect and Construction Manager.
d. Name of Contractor.
e. Date videotape was recorded.
f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

1.4 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 Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Photographer Qualifications: A professional photographer who is experienced photographing construction projects.

D. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.
2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
3. Review required content of instruction.
4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

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PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:
   1. Heat generation, including boilers pumps steam distribution piping and water distribution piping.
   2. Refrigeration systems, including chillers cooling towers condensers pumps and distribution piping.
   3. HVAC systems, including air-handling equipment air distribution systems and terminal equipment and devices.
   4. HVAC instrumentation and controls.

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:

   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.

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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.

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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 combined training manual.

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, through Construction Manager, with at least seven days' advance notice.

D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral and a written performance-based test.

E. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

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3.3 DEMONSTRATION AND TRAINING VIDEOTAPES

A. General: Engage a qualified commercial photographer to record demonstration and training videotapes. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Videotape Format: Provide high-quality VHS color videotape in full-size cassettes.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.

END OF SECTION 017900

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of a building or structure in order to allow the installation of new work, including, but not limited to, new ductwork, steel structures, utilities, etc.
2. Repair procedures for selective demolition operations.

B. Related Sections include the following:

1. Division 1 Section “Summary” for use of the premises and phasing requirements.
2. Division 1 Section “Work Restrictions” for restrictions on use of the premises due to Owner or tenant occupancy.
3. Division 1 Section “Construction Progress Documentation” for preconstruction photographs taken before selective demolition.
4. Division 1 Section “Temporary Facilities and Controls” for temporary construction and environmental-protection measures for selective demolition operations.
5. Division 1 Section “Cutting and Patching” for cutting and patching procedures for selective demolition operations.
6. Division 15 Sections for demolishing, cutting, patching, or relocating mechanical items.
7. Division 16 Sections for demolishing, cutting, patching, or relocating electrical items.
8. Refer to mechanical drawings for locations of new ductwork and piping penetrations in bearing walls that will require new lintels.

1.3 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: Detach items from existing construction and deliver them to Owner.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.5 SUBMITTALS

A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

B. Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.

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.
2. Interruption of utility services.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Use of elevator and stairs.
5. Locations of temporary partitions and means of egress, including for other tenants affected by selective demolition operations.
6. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

D. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.

E. Predemolition Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by selective demolition operations. Submit before Work begins.

1.6 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

1.7 PROJECT CONDITIONS

A. Conduct selective demolition so Owner's operations will not be disrupted.

B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

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1. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.

C. Owner assumes no responsibility for condition of areas to be selectively demolished.

1. Conditions existing at the time of inspection for bidding purpose will be maintained by Owner as far as practical.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. Hazardous materials will be removed by Owner before start of the Work.
2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site will not be permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1.8 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.

1. If possible, retain original Installer or fabricator to patch the exposed Work listed below that is damaged during selective demolition. If it is impossible to engage original Installer or fabricator, engage another recognized experienced and specialized firm.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

A. Use repair materials identical to existing materials.

1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
2. Use materials with an installed performance that equals or surpasses that of existing materials.

B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

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B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

1. This project requires the installation of new ductwork through existing walls that extend from the floor to the underside of the roof deck. All cutting of existing walls to allow the installation of new services and ductwork shall be by the Contractors. Reinforcement of the wall by the construction of steel lintels above the new penetrations shall be provided by the Contractor.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. 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 the Architect.

E. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.

F. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES

A. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition operations.

B. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.

1. Arrange to shut off indicated utilities with utility companies.
2. If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building.
3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
4. Refer to Division 15 and 16 Sections for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

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.

1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

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2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
3. Protect existing site improvements, appurtenances, and landscaping to remain.
4. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.

B. Temporary Enclosures: Provide temporary enclosures for protection of existing building and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.

C. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

D. Temporary Shoring: Provide and maintain shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

3.4 POLLUTION CONTROLS

A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.

1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
2. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure. Vacuum carpeted areas.

B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

C. Cleaning: 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.

3.5 SELECTIVE DEMOLITION

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:

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1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. 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.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. 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 fire watch and portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
8. Dispose of demolished items and materials promptly.
9. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.

B. Existing Facilities: Comply with building manager's requirements for using and protecting elevators, stairs, walkways, loading docks, building entries, and other building facilities during selective demolition operations.

C. Removed and Salvaged Items: Comply with the following:

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.

D. Removed and Reinstalled Items: Comply with the following:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
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.

E. 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 cleaned and reinstalled in their original locations after selective demolition operations are complete.

F. Concrete: Demolish in small sections. Cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain, using power-driven saw. Dislodge concrete from

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reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete indicated for selective demolition. Neatly trim openings to dimensions indicated.

G. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.

H. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

I. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

J. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI-WP and its Addendum.

1. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.

3.6 PATCHING AND REPAIRS

A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.

B. Patching: Comply with Division 1 Section "Cutting and Patching."

C. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

1. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.

D. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

E. Floors and Walls: Where walls or partitions that are demolished 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 existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

1. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
2. Where patching occurs in a painted surface, apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.
3. Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

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F. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION 02 4120

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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. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Foundations.
2. Foundation walls.
3. Slabs-on-grade.
4. Suspended slabs.
5. Concrete toppings.
6. Building frame members.

B. Related Sections include the following:

1. Division 03 Section "Architectural Concrete" for general building applications of specially finished formed concrete.
2. Division 31 Section "Earth Moving" for drainage fill under slabs-on-grade.
3. Division 32 Section "Concrete Paving" for concrete pavement and walks.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

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D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.

1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing reshoring.

E. Welding certificates.

F. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Aggregates.

G. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Steel reinforcement and accessories.
4. Waterstops.
5. Curing compounds.
6. Floor and slab treatments.
7. Bonding agents.
8. Adhesives.
9. Semirigid joint filler.
10. Joint-filler strips.
11. Repair materials.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

C. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."

D. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specification for Structural Concrete," **Sections 1 through 5.**
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

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1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

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 Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Products: Subject to compliance with requirements, provide one of the products specified.
3. 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.
4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.

D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

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1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

C. Steel Bar Mats: ASTM A 184/A 184M, fabricated from **ASTM A 615/A 615M, Grade 60**, deformed bars, assembled with clips.

D. Plain-Steel Wire: ASTM A 82, **as drawn**.

E. Deformed-Steel Wire: ASTM A 496.

F. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.4 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.5 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type **I gray**

B. Normal-Weight Aggregates: ASTM C 33, coarse aggregate or better, graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: **3/4 inch** nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Lightweight Aggregate: ASTM C 330, **3/4-inch** nominal maximum aggregate size.

D. Water: ASTM C 94/C 94M[**and potable**.

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2.6 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.7 WATERSTOPS

A. Flexible Rubber Waterstops: CE CRD-C 513, **with factory-installed metal eyelets,** for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Manufacturers:

a. Greenstreak.
b. Progress Unlimited, Inc.
c. Williams Products, Inc.

2. Profile: **As indicated**
3. Dimensions: As indicated.

2.8 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

1. Products:

a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
b. Burke by Edoco; Aqua Resin Cure.

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c. ChemMasters; Safe-Cure Clear.
d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; W.B. Resin Cure.
e. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
f. Euclid Chemical Company (The); Kurez DR VOX.
g. Kaufman Products, Inc.; Thinfilm 420.
h. Lambert Corporation; Aqua Kure-Clear.
i. L&M Construction Chemicals, Inc.; L&M Cure R.
j. Meadows, W. R., Inc.; 1100 Clear.
k. Nox-Crete Products Group, Kinsman Corporation; Resin Cure E.
l. Symons Corporation, a Dayton Superior Company; Resi-Chem Clear Cure.
m. Tamms Industries, Inc.; Horncure WB 30.
n. Unitex; Hydro Cure 309.
o. US Mix Products Company; US Spec Maxcure Resin Clear.
p. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating**, certified by curing compound manufacturer to not interfere with bonding of floor covering**.

1. Products:

a. Anti-Hydro International, Inc.; AH Clear Cure WB.
b. Burke by Edoco; Spartan Cote WB II.
c. ChemMasters; Safe-Cure & Seal 20.
d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Cure and Seal WB.
e. Dayton Superior Corporation; Safe Cure and Seal (J-18).
f. Euclid Chemical Company (The); Aqua Cure VOX.
g. Kaufman Products, Inc.; Cure & Seal 309 Emulsion.
h. Lambert Corporation; Glazecote Sealer-20.
i. L&M Construction Chemicals, Inc.; Dress & Seal WB.
j. Meadows, W. R., Inc.; Vocomp-20.
k. Metalcrete Industries; Metcure.
l. Nox-Crete Products Group, Kinsman Corporation; Cure & Seal 150E.
m. Symons Corporation, a Dayton Superior Company; Cure & Seal 18 Percent E.
n. Tamms Industries, Inc.; Clearseal WB 150.
o. Unitex; Hydro Seal.
p. US Mix Products Company; US Spec Hydrasheen 15 percent
q. Vexcon Chemicals, Inc.; Starseal 309.

2.9 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: **ASTM D 1751, asphalt-saturated cellulosic fiber**.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

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C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types **I and II, non-load bearing**, for bonding hardened or freshly mixed concrete to hardened concrete.

D. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.10 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than [**4100 psi (29 MPa)**] at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than [**5000 psi (34.5 MPa)**] at 28 days when tested according to ASTM C 109/C 109M.

2.11 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Limit water-soluble, chloride-ion content in hardened concrete to [**0.06**] [**0.15**] [**0.30**] [**1.00**] percent by weight of cement.

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C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use **water-reducing**, **high-range water-reducing or plasticizing** admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.12 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Foundations (Pile Caps & Grade Beams): Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: **4000 psi** at 28 days.
2. Maximum Water-Cementitious Materials Ratio: **0.40.**
3. Slump Limit: **5 inches** plus or minus 1 inch .
4. Air Content: **6** percent, plus or minus 1.5 percent at point of delivery for **3/4-inch** nominal maximum aggregate size.

B. Foundation Walls: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: **4000 psi** at 28 days.
2. Maximum Water-Cementitious Materials Ratio: **0.40.**
3. Slump Limit: **5 inches** plus or minus 1 inch .

C. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength:
   a. Interior Slab on Grade: **4000 psi** at 28 days.
   b. Exterior Slab on Grade: **4500 psi** at 28 days.
2. Maximum Water-Cementitious Materials Ratio: **0.40.**
3. Slump Limit: **5 inches** plus or minus 1 inch.

D. Suspended Slabs: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: **6000 psi** at 28 days.
2. Minimum Cementitious Materials Content: **520 lb/cu. yd.**.
3. Slump Limit: **5 inches** , plus or minus 1 inch .

E. Concrete Toppings: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: **3500 psi** at 28 days.
2. Minimum Cementitious Materials Content: **520 lb/cu. yd.**
3. Slump Limit: **5 inches**, plus or minus 1 inch.

F. Building Frame Members: Proportion normal-weight concrete mixture as follows:

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1. Minimum Compressive Strength:
   a. Foundations to First Floor: **6000 psi** at 28 days.
   b. First Floor to Second Floor: **6000 psi** at 28 days.
   c. Second Floor to Roof: **4000 psi** at 28 days.
2. Maximum Water-Cementitious Materials Ratio: **0.40**.
3. Slump Limit: **5 inches** plus or minus 1 inch.
4. Air Content: **6** percent, plus or minus 1.5 percent at point of delivery for **3/4-inch** nominal maximum aggregate size.

2.13 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.14 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Construct forms tight enough to prevent loss of concrete mortar.

D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

E. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

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F. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

G. **Chamfer** exterior corners and edges of permanently exposed concrete.

H. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for **24**hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved **at least 70 percent of** its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

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C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls **as indicated**. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

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C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least **one-third** of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.6 WATERSTOPS

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

3.7 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6

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inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

F. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.8 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces **not exposed to public view**.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

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1. Apply to concrete surfaces **exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete**.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.9 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch (6 mm) in 1 direction.

1. Apply scratch finish to surfaces **indicated and to receive concrete floor toppings or to receive mortar setting beds for bonded cementitious floor finishes**.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces **indicated to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo**.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces **indicated exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system**.

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3.10 MISCELLANEOUS CONCRETE ITEMS

A. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

B. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.11 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.12 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.13 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a **special inspector and qualified testing and inspecting agency** to perform field tests and inspections and prepare test reports.

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B. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections:

1. Steel reinforcement placement.
2. Headed bolts and studs.
3. Verification of use of required design mixture.
4. Concrete placement, including conveying and depositing.
5. Curing procedures and maintenance of curing temperature.
6. Verification of concrete strength before removal of shores and forms from beams and slabs.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.

   a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C 31/C 31M.

   a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.

7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

   a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.

8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).

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9. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
13. Correct deficiencies in the Work that test reports and inspections indicate dos not comply with the Contract Documents.

E. Measure floor and slab flatness and levelness according to ASTM E 1155 (ASTM E 1155M) within **48** hours of finishing.

END OF CAST-IN-PLACE CONCRETE

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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. This Section includes unit masonry assemblies consisting of the following:
   1. Concrete masonry units (CMUs).
   2. Concrete and masonry lintels.
   3. Reinforcing steel.
   4. Masonry joint reinforcement.
   5. Ties and anchors.
   6. Miscellaneous masonry accessories.
   .

B. Related Sections include the following:

   1. Division 01 Section "LEED Requirements".
   2. Division 07 Section "Bituminous Dampproofing" for dampproofing applied to cavity face of backup wythes of cavity walls.
   3. Division 07 Section "Penetration Firestopping" for firestopping at openings in masonry walls.
   4. Division 07 Section “Flexible Flashing System”.
   5. Division 07 Section "Joint Sealants" for sealing control and expansion joints in unit masonry.
   6. Division 08 Section "Louvers and Vents".

C. Products installed, but not furnished, under this Section include the following:

   1. Steel lintels and shelf angles for unit masonry, furnished under Division 05 Section "Metal Fabrications."
   2. Flexible flashing furnished under Division 07 Section “Flexible Flashing System”.

1.3 DEFINITIONS

A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

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1.4 PERFORMANCE REQUIREMENTS

A. Provide structural unit masonry that develops net-area compressive strengths (f'_m) equal to 1500 psi.

B. Determine net-area compressive strength (f'_m) of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Precast Concrete U-Lintels - Provide manufacturers catalog engineering data which shall include load ratings for gravity, uplift, and lateral loads in units of pounds per linear foot.

B. LEED Submittals:

1. Product Certificates for Credit MR 5.1 and Credit MR 5.2: For products and materials required to comply with requirements for regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.

C. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Stone Trim Units: Show sizes, profiles, and locations of each stone trim unit required.
3. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
4. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

D. Samples for Initial Selection: For the following:

1. Decorative concrete masonry units, in the form of small-scale units.
2. Colored mortar.
3. Weep holes/vents.

E. Samples for Verification: For each type and color of the following:

1. Exposed concrete masonry units.
2. Pre-faced concrete masonry units.

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3. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.
4. Stone trim.
5. Weep holes/vents.
6. Accessories embedded in masonry.

F. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.

1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

G. Qualification Data: For testing agency.

H. Certified Mill Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Reinforcing bars, for each shipment used to resist flexural, shear and axial forces in reinforced masonry shear walls.

I. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:

1. Masonry units.

    a. Include material test reports substantiating compliance with requirements.
    b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.

2. Cementitious materials. Include brand, type, and name of manufacturer.
3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
4. Grout mixes. Include description of type and proportions of ingredients.
5. Reinforcing bars.
6. Joint reinforcement.
7. Anchors, ties, and metal accessories.

J. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

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1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109 for compressive strength and ASTM C 91 for air content.
2. Include test reports, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

K. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

L. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1093 for testing indicated, as documented according to ASTM E 548.

B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.

C. Contractor shall coordinate with the masonry manufacturer the order to purchase and pallet blending of pigmented and colored masonry products to ensure uniformity of color in the masonry products.

D. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.

E. Preconstruction Testing Service: Contractor shall engage a qualified independent testing agency to perform preconstruction testing indicated below. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.

1. Concrete Masonry Unit Test: For each type of unit required, per ASTM C 140.
2. Mortar Test (Property Specification): For each mix required, per ASTM C 109 for compressive strength and ASTM C 91 for air content.
3. Grout Test (Compressive Strength): For each mix required, per ASTM C 1019.

F. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

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G. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects. Comply with requirements in Division 01 Section "Quality Requirements" for mockups.

1. Build sample panels for each type of exposed unit masonry construction, include masonry returns, corbelling or racking, and corners, in sizes approximately 60 inches long by 48 inches high by full thickness.
2. Where masonry is to match existing, erect panels adjacent and parallel to existing surface.
3. Clean one-half of exposed faces of panels with masonry cleaner indicated.
4. Protect approved sample panels from the elements with weather-resistant membrane.
5. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.

    a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless such deviations are specifically approved by Architect in writing.

H. Precast Concrete U-Lintels

1. Fabricators Qualifications: Units shall be fabricated by a firm engaged in the manufacturing of precast and prestressed concrete U-lintels for a minimum of 5 years. Fabricator shall have a quality assurance program that complies with the procedures of Manual 116 by the Precast/Prestressed Concrete Institute (PCI).
2. Plant records of production and quality control shall be kept in accordance with PCI recommendations and made available upon request from the Architect.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

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E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 PROJECT CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
2. Where 1 wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

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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. Products: Subject to compliance with requirements, provide one of the products specified or equal as approved by Architect.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified or equal as approved by Architect.
3. Basis-of-design: Subject to compliance with the requirements, provide the named product or a comparable product, or if listed, a comparable product by one of the following manufacturers or equal as approved by Architect.

2.2 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not uses units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

2.3 CONCRETE MASONRY UNITS (CMUs)

A. Regional Materials: Provide CMUs that have been manufactured within 500 miles (800 km) of Project site from aggregates and cement that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.

B. Shapes: Provide shapes indicated and as follows:

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
2. Provide bullnose units for outside corners, unless otherwise indicated.

C. Concrete Masonry Units: ASTM C 90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
2. Weight Classification: Normal weight.
3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
5. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.

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6. Provide two core masonry units unless indicated otherwise.
7. Provide solid units with uniform exposed surfaces where corbels or racking would expose cores or unfinished surfaces.

2.4 LINTELS

A. General: Provide lintels as scheduled on contract documents.

B. Precast Concrete U-Lintels:

1. Basis-of-design: The design for precast concrete U-lintels is based on products manufactured by CAST-CRETE Corporation, PO Box 24567, Tampa, Florida, 33623. Subject to compliance with the requirements provide the named product or an equivalent approved by the engineer.
2. Concrete Materials:

    a. Portland Cement: ASTM C150 Type I or III, gray color
    b. Aggregates: ASTM C33
    c. Water: potable
    d. Admixtures: Shall not contain calcium chloride or chloride ions.

3. Reinforcing:

    a. Deformed Reinforcement: ASTM A615 Grade 40 or 60
    b. Prestressing Strand: ASTM A416 270 ksi LL

4. Fabrication:

    a. Unless specified otherwise, conform to PCI MNL-116.
    b. All U-lintel units that are not prestressed shall be made of concrete with a minimum compressive strength of 3500 psi at 28 days.
    c. All U-lintel units that are prestressed shall be made of concrete with a minimum compressive strength of 6000 psi at 28 days.
    d. All units shall have a sand block finish except prestressed, 6 inch wide, and 12 inch wide U-lintels may be smooth form finished.
    e. Tolerances shall be per PCI MNL-116.
    f. Minor patching in plant is acceptable provided structural adequacy of units is not impaired.

5. Furnishing: Furnish to the concrete masonry unit installer all units that will be installed as a part of the work of that section.
6. Protection:

    a. If storage is required prior to erection, take all necessary precautions to provide protection to prevent damage prior to installation. Maintain units free of dirt and airborne pollutants until immediately prior to erection.
    b. Protect all stored and installed units from jobsite debris and impact.

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c. Units damaged during storage shall be replaced if beyond repair to restore its structural adequacy. Replace all units that are damaged due to mishandling at the jobsite.

7. Length: Masonry opening plus minimum 8-inches bearing each end.
8. Provide lintels required to support loads indicated, or as scheduled.

C. Steel Lintels

1. Install steel lintels where indicated.
2. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.
3. All lintels located in exterior walls are to be galvanized.

2.5 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207, Type S.

D. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.

1. Products:

a. Bayer Corporation, Industrial Chemicals Div.; Bayferrox Iron Oxide Pigments.
b. Davis Colors; True Tone Mortar Colors.
c. Solomon Grind-Chem Services, Inc.; SGS Mortar Colors.

E. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.
4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

F. Aggregate for Grout: ASTM C 404.

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G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

1. Products:

a. Addiment Incorporated; Mortar Kick.
b. Euclid Chemical Company (The); Accelguard 80.
c. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Morset.
d. Sonneborn, Div. of ChemRex; Trimix-NCA.

H. Water: Potable.

2.6 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615, Grade 60.

B. Masonry Joint Reinforcement, General: ASTM A 951.

1. Interior Walls: Mill- galvanized, carbon steel.
2. Exterior Walls, Wet or Humid Interior Area Walls, and Walls Containing Pressure Piping and Shower/Kitchen Area Walls: Hot-dip galvanized, carbon steel.
3. Wire Size for Side Rods: 9-gage.
4. Wire Size for Cross Rods: 9-gage.
5. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
6. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units at all block.

C. Masonry Joint Reinforcement for Single-Wythe Masonry: Provide truss type with single pair of side rods and cross rods spaced not more than 16-inches o.c.

1. Provide Dur-O-Wal No. D/A 310 truss reinforcing or comparable product.

D. Masonry Joint Reinforcement for Multiwythe Composite Masonry Below Grade: Provide truss type with 3 continuous side rods and cross rods spaced not more than 16-inches o.c. Width equal to 1 1/4 inches less than total wall thickness.

1. Provide Dur-O-Wal No. D/A 310 TR truss reinforcing or comparable product.

E. Masonry Joint Reinforcement for Cavity-Wall Masonry:

1. Adjustable (2 piece) type with single pair of side rods and cross tie not more than 16-inches on center. Provide separate adjustable bent wire veneer ties, eyes centered, engaging the cross tie eyes. Cross ties are rectangular. Space side rods for embedment within each face shell of backup wythe and size adjustable ties to extend at least 5/8-inch from outside face.

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a. Provide Dur-O-Wal, Inc. No. D/A 370, Dur-O-Eye Truss Reinforcing and Ties or a comparable product.

F. Masonry Joint Reinforcement for Concrete Masonry Veneer: Provide truss type with single pair of side rods and cross rods. Width equal to 1 1/4 inches less than total wall thickness.

1. Provide Dur-O-Wal No. D/A 310 truss reinforcing or comparable product.

G. Reinforce each course of block cut back for fire extinguisher cabinets, electrical boxes and toilet accessory type recessed items. Mortar 9 gage reinforcing wire in joints, that is 24-inches longer than recessed opening width on both sides.

2.7 TIES AND ANCHORS

A. Materials: Provide ties, reinforcing and anchors, specified in subsequent articles, made from materials that comply with this article, unless otherwise indicate.

1. Carbon-Steel Wire: ASTM A 82.
2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.
3. Mill- galvanized, carbon steel.
4. Anchors and ties shall be 16-inches on-center each way.
5. Horizontal reinforcing shall be 16-inches on-center

B. Adjustable Anchors for Connecting to Structure: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- diameter, hot-dip galvanized steel wire.
2. Tie Section for Steel Frame: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.188-inch-(4.8-mm-) diameter, hot-dip galvanized steel wire. Mill-galvanized wire may be used at interior walls, unless required otherwise.

a. Provide Dur-O-Wal D/A 709 Anchors with D/A 700 to 708 ties or a comparable product.

3. Tie Section for single wythe masonry (4 inches or less) to Steel Column: Notched Column Anchor (corrugated type), length as required, 1 1/2 inch wide X 16 gauge thick, hot dipped galvanized, mill-galvanized may be used at interior walls, unless required otherwise..

a. Provide Dur-O-Wal D/A 604 Anchors or a comparable product.

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C. Fire Rated Wall Breakaway Anchors: Provide non-wire anchors manufactured from rolled strip zinc alloys (710), for masonry firewalls as indicated on the structural drawings. Anchors shall be 1/8" thick non-wire, designed to melt at temperatures over 800 degrees F.

1. Manufacturer: Heckman Building Products.

D. Adjustable Masonry Anchors at Expansion and Control Joints:

1. Provide custom made hot-dipped galvanized steel rods and hooks.
2. Provide 3/8-inch diameter vertical rod anchor welded top and bottom to steel column. Rod shall allow 8-inch vertical hook travel and be 2-3/8-inch away from steel.
3. Hook shall be 1/4-inch diameter rod with 3-inch long legs at both ends. Block leg shall turn down into grouted block cell. Column leg shall be horizontal and be set in middle of 2-3/8-inch rod-to-column space to allow for wall movement.

E. Control Joint Block Shear Connector: Provide sash block either side of control joint and insert Dur-O-Wal regular rubber D/A #2001 in joint full height.

F. Control Joint Foam (Mortar Excluding) Filler: Provide Dur-O-Wal #D/A 2015 rapid expansion joint in veneer control joints held back for bond breaker and sealant. Apply sealant at cavity face of block prior to applying dampproofing to make building airtight.

1. Compressible Control Joint Foam Filler: Provide Dur-O-Wal #D/A 2010 rapid soft joint with adhesive backing under shelf angles to allow for vertical veneer movement. Hold back for sealant and bond breaker.

G. Joint Stabilizing Anchors: Provide Dur-O-Wal #DA 2200 joint stabilizing anchors at veneer control joints and block interior wall, running wall, corner, "Tee", and "Ell" joints.

1. Provide joint stabilizing anchors at connection of new masonry to existing masonry or concrete walls.

H. Strap Anchors: Z-Type bent steel shape, 1 1/2-inch x 1/4-inch thick, by length required; hot dip galvanized to ASTM A153 B2 finish.

I. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins.

1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153.

J. Partition Top Anchors: 12-gage steel channel with slot to allow movement and 12 gage strap designed for channel. Fabricate from steel, hot-dip galvanized after fabrication. Provide products by one of the following;

1. Dur-O-Wall; DA901 and DA931.

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2. Hohmann & Barnard, Inc.; #360 and PTA-364.

K. Adjustable Anchors for Connecting Veneer to studs:

1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:

   a. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.

2. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.

   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

      1) Dayton Superior Corporation, Dur-O-Wal Division; D/A 210 with D/A 700-708.
      2) Heckmann Building Products Inc.; 315-D with 316.
      3) Hohmann & Barnard, Inc.; DW-10.

   b. Anchor Section: Sheet metal plate with screw holes top and bottom and with raised rib-stiffened strap stamped into center to provide a slot between strap and plate for inserting wire tie.
   c. Fabricate sheet metal anchor sections and other sheet metal parts from 0.105-inch thick, steel sheet, galvanized after fabrication.
   d. Wire Ties: Triangular wire ties fabricated from 0.187-inch diameter, hot-dip galvanized steel wire sized to extend within 1-inch of masonry veneer face.

3. Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 diameter by length required to penetrate steel stud flange with not less than three exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours per ASTM B 117.

   a. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:

      1) ITW Buildex; Teks Maxiseal with Climaseal finish.
      2) Textron Inc., Textron Fastening Systems; Elco Dril-Flex with Stalgard finish.

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2.8 MISCELLANEOUS ANCHORS

A. Unit Type Inserts in Concrete: Cast-iron or malleable-iron wedge-type inserts.

B. Dovetail Slots in Concrete: Furnish dovetail slots with filler strips, of slot size indicated, fabricated from 0.034-inch, galvanized steel sheet.

C. Anchor Bolts: Headed or L-shaped steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

D. Postinstalled Anchors: Provide chemical anchors, with capability to sustain, without failure, a load equal to six times the load imposed when installed in solid or grouted unit masonry 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 agency.

1. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 for bolts and nuts; ASTM A 666 or ASTM A 276, Type 304 or 316, for anchors.

2.9 EMBEDDED FLASHING MATERIALS

A. Provide embedded flashing systems as covered in Division 07 Section “Flexible Flashing System”.

B. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:

1. Stainless Steel: ASTM A 240, Type 304, 0.016 inch thick.
2. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
3. Fabricate through-wall metal flashing embedded in masonry from stainless steel, with ribs at 3-inch (76-mm) intervals along length of flashing to provide an integral mortar bond.
4. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.

C. Application: Unless otherwise indicated, use the following:

1. Where flashing is indicated to receive counterflashing, use metal flashing.
2. Where flashing is indicated to be turned down at or beyond the wall face, and below finish grade, use metal flashing.
3. Where flashing is partly exposed and is indicated to terminate at the wall face, use flexible flashing.
4. Where flashing is fully concealed, use flexible flashing.

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D. Single-Wythe CMU Flashing System: System of CMU cell flashing pans and interlocking CMU web covers made from high-density polyethylene incorporating chemical stabilizers that prevent UV degradation. Cell flashing pans have integral weep spouts that are designed to be built into mortar bed joints and weep collected moisture to the exterior of CMU walls and that extend into the cell to prevent clogging with mortar.

E. Elastomeric Sealants for Sheet Metal Flashings: ASTM C 920, chemically curing urethane, polysulfide or silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene or PVC.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Weep/Vent Products: Use one of the following, unless otherwise indicated:

1. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch less than depth of outer wythe; in color selected from manufacturer's standard.

a. Products:

1) Mortar Net USA, Ltd.; Mortar Net Weep Vents.
2) CavClear Weep Vents; Archovations, Inc.

a) Color to match mortar or as selected by Architect.

E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Provide the following configuration:

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a. Strips, full-depth of cavity and 10 inches wide, with dovetail shaped notches 7 inches deep that prevent mesh from being clogged with mortar droppings.

2. Products:

a. Mortar Net USA, Ltd.; Mortar Net.
b. CavClear Masonry Mat: Archovations, Inc.

F. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated.

1. Products:

a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

2.11 MASONRY CLEANERS

A. Job Mixed Detergent Solution:

1. Proprietary Cleaner: Manufacturer's phosphate free cleaner designed for removing mortar/grout stains, efflorescence, and other stains from masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer.

a. Available Manufacturers:
b. Savogran.
c. Hillyard.

2.12 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Limit cementitious materials in mortar to portland cement and lime.
3. Limit cementitious materials in mortar for exterior and reinforced masonry to portland cement and lime.

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4. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.

1. For masonry below grade or in contact with earth, use Type M.
2. For reinforced masonry and interior non-load-bearing partitions, use Type S.
3. For masonry veneer, use Type N.

D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

1. Pigments shall not exceed 10 percent of portland cement by weight.
2. Pigments shall not exceed 5 percent of by weight.
3. Mix to match Architect's sample.

E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.

1. Mix to match Architect's sample.

F. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

G. Epoxy Pointing Mortar: Mix epoxy pointing mortar to comply with mortar manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

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1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

1. Mix units from several pallets or cubes as they are placed.

F. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:

1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
2. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
3. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

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5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
6. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.
7. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.3 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond unless another bond pattern is indicated on Drawings; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4-inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

H. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.

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1. Install compressible filler in joint between top of partition and underside of structure above.
2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around anchors. Space anchors 48 inches o.c., unless otherwise indicated.
3. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 07 Sections.

3.4 MORTAR BEDDING AND JOINTING

A. Lay hollow brick and concrete masonry units as follows:

1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.

1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
2. Allow cleaned surfaces to dry before setting.
3. Wet joint surfaces thoroughly before applying mortar.

D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

1. For glazed masonry units, use a nonmetallic jointer 3/4 inch or more in width.

E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.5 COMPOSITE MASONRY

A. Bond wythes of composite masonry together using one of the following methods:

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1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.67 sq. ft. of wall area spaced not to exceed 24 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.

    a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.

2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.

    a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
    b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties.

B. Collar Joints: Solidly fill collar joints by parging face of first wythe that is laid and shoving units of other wythe into place.

C. Corners: Provide interlocking masonry unit bond in each wythe and course at corners, unless otherwise indicated.

1. Provide continuity with masonry joint reinforcement at corners by using prefabricated L-shaped units as well as masonry bonding.

D. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together as follows:

1. Provide individual metal ties not more than 16 inches o.c.
2. Provide continuity with masonry joint reinforcement by using prefabricated T-shaped units.
3. Provide rigid metal anchors not more than 48 inches o.c. If used with hollow masonry units, embed ends in mortar-filled cores.

3.6 CAVITY WALLS

A. Bond wythes of cavity walls together using the following method:

1. Masonry Joint Reinforcement: Installed in horizontal mortar joints.

    a. Adjustable (two-piece) type reinforcement to allow for differential movement regardless of whether bed joints align.

2. Masonry Veneer Anchors: Comply with requirements for anchoring masonry veneers.

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B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

C. Coat cavity face of backup wythe to comply with Division 07 Section "Bituminous Dampproofing."

D. Installing Cavity-Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.

1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.7 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 16 inches o.c.
2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.

    a. Reinforcement above is in addition to continuous reinforcement.

B. Masonry Joint Reinforcement for Concrete Masonry Veneer: Provide reinforcement spaced vertically at 16 inches o.c. at joints that do not contain veneer anchors.

C. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

D. Provide continuity at wall intersections by using prefabricated T-shaped units.

E. Provide continuity at corners by using prefabricated L-shaped units.

F. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.8 ANCHORING MASONRY TO STRUCTURAL MEMBERS

A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:

NOT FOR BIDDING PURPOSES

1. Provide an open space not less than 1/2 inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry to structural members with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.9 ANCHORING MASONRY VENEERS

A. Anchor masonry veneers to wall framing, concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:

1. Fasten screw-attached anchors through sheathing to wall framing with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
2. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
3. Space anchors as indicated, but not more than 16 inches o.c. vertically and 24 inches o.c. horizontally with not less than 1 anchor for each 2.67 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.

3.10 CONTROL AND EXPANSION JOINTS

A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form joints in concrete masonry using one of the following methods:

1. Install preformed control-joint gaskets designed to fit standard sash block.
2. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
3. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

3.11 LINTELS

A. General: Provide lintels as scheduled on contract documents.

B. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

NOT FOR BIDDING PURPOSES

3.12 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.

B. Install flashing as follows, unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and through inner wythe to within 1/2 inch of the interior face of wall in exposed masonry. Where interior face of wall is to receive furring or framing, carry flashing completely through inner wythe and turn flashing up approximately 2 inches on interior face.
3. At masonry-veneer walls with stud backup, extend flashing through veneer, across air space and insulation behind veneer, and up face of sheathing at least 8 inches; with upper edge terminating behind air /vapor barrier. Secure top edge of flashing with termination bar attached through sheathing to stud backup.
4. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
5. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

E. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:

1. Use specified weep/vent products to form weep holes.
2. Space weeps 24 inches o.c., unless otherwise indicated.

F. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in Part 2 "Miscellaneous Masonry Accessories" Article.

NOT FOR BIDDING PURPOSES

3.13 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches.

3.14 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform testing and inspection items as defined in Section 014010 - Structural Tests and Special Inspections. Contractor is required to cooperate with the Independent Agency for the tests and inspections listed in Section 014010 - Structural Tests and Special Inspections and not for completing those requirements. Allow inspectors access to scaffolding and work areas, as needed to perform inspections.

3.15 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

NOT FOR BIDDING PURPOSES

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.
7. Clean stone trim to comply with stone supplier's written instructions.
8. Clean limestone units to comply with recommendations in ILI's "Indiana Limestone Handbook."

3.16 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

END OF SECTION 042000

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Roof deck.

2. Composite floor deck.

3. Noncomposite form deck.

1.2 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

C. Product certificates.

D. Welding certificates.

E. Field quality-control test and inspection reports.

F. Research/Evaluation Reports: For steel deck.

1.3 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."

B. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: Indicated by design designations of applicable testing and inspecting agency.

2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.

C. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

NOT FOR BIDDING PURPOSES

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ASC Profiles, Inc.
2. Canam Steel Corp.;The Canam Manac Group.
3. Consolidated Systems, Inc.
4. DACS, Inc.
5. D-Mac Industries Inc.
6. Epic Metals Corporation.
7. Marlyn Steel Decks, Inc.
8. New Millennium Building Systems, LLC.
9. Nucor Corp.; Vulcraft Division.
10. Roof Deck, Inc.
11. Valley Joist; Division of EBSCO Industries, Inc.
12. Verco Manufacturing Co.
13. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

2.2 ROOF DECK

A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:

1. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 33 (230) minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer.
    a. Color: Manufacturer's standard - Select one of first two subparagraphs below for galvanized steel sheet.
2. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 (230) minimum zinc coating.
3. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 (230) minimum zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.

NOT FOR BIDDING PURPOSES

a. Color: Manufacturer's standard.

4. Deck Profile: As indicated on drawings.

5. Profile Depth: As indicated on drawings.

6. Design Uncoated-Steel Thickness: As indicated on drawings.

2.3 COMPOSITE FLOOR DECK

A. Composite Steel Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 30, with the minimum section properties indicated, and with the following:

1. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 33 (230) minimum, with top surface phosphatized and unpainted and underside surface shop primed with manufacturers' standard baked-on, rust-inhibitive primer.

2. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 (230), G30 (Z90) minimum zinc coating.

3. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 (230), G30 (Z90) minimum zinc coating; with unpainted top surface and cleaned and pretreated bottom surface primed with manufacturer's standard baked-on, rust-inhibitive primer.

4. Profile Depth: As indicated on drawings.

5. Design Uncoated-Steel Thickness: As indicated on drawings.

2.4 NONCOMPOSITE FORM DECK

A. Noncomposite Steel Form Deck: Fabricate ribbed-steel sheet noncomposite form-deck panels to comply with "SDI Specifications and Commentary for Noncomposite Steel Form Deck," in SDI Publication No. 30, with the minimum section properties indicated, and with the following:

1. Uncoated Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 33 (230) minimum.

2. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 33 (230) minimum, with top and underside surface shop primed with manufacturer's standard baked-on, rust-inhibitive primer.

a. Color: Manufacturer's standard

3. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 (230) min., G30 (Z90) min zinc coating.

4. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 (230) min, G60 (Z180) zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.

a. Color: Manufacturer's standard.

NOT FOR BIDDING PURPOSES

5. Profile Depth: As indicated on drawings.

6. Design Uncoated-Steel Thickness: As indicated on drawings.

7. Span Condition: As indicated on drawings.

2.5 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 (4.8-mm) minimum diameter.

D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, manufacturer's written instructions, requirements in this Section, and as indicated.

B. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

C. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

D. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

E. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.

F. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

G. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

H. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm).

NOT FOR BIDDING PURPOSES

I. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and weld or mechanically fasten flanges to top of deck. Space welds or mechanical fasteners not more than 12 inches (305 mm) apart with at least one weld or fastener at each corner.

1. Install reinforcing channels or zees in ribs to span between supports and weld or mechanically fasten.

J. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.

1. Weld cover plates at changes in direction of roof-deck panels, unless otherwise indicated.

K. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations, unless otherwise indicated.

L. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.

3.2 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field welds will be subject to inspection.

C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.

D. Remove and replace work that does not comply with specified requirements.

E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.3 REPAIRS

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.

END OF STEEL DECKING

NOT FOR BIDDING PURPOSES

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. This Section includes the following:

1. Steel framing and supports for overhead doors.
2. Steel framing and supports for mechanical and electrical equipment.
3. Steel framing and supports for applications where framing and supports are not specified in other Sections.
4. Loose bearing and leveling plates.
5. Steel weld plates and angles for casting into concrete not specified in other Sections.
6. Miscellaneous steel trim including steel angle corner guards steel edgings.
7. Metal bollards.

B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance of Ladders: Provide ladders capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.

B. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

NOT FOR BIDDING PURPOSES

1.4 SUBMITTALS

A. Product Data: For the following:

1. Nonslip aggregates and nonslip-aggregate surface finishes.
2. Metal nosings and treads.
3. Paint products.
4. Grout.

B. Shop Drawings: Show fabrication and installation details for metal fabrications.

1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
2. Provide templates for anchors and bolts specified for installation under other Sections.
3. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Mill Certificates: Signed by manufacturers of stainless-steel sheet certifying that products furnished comply with requirements.

D. Welding certificates.

E. Qualification Data: For professional engineer.

1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.2, "Structural Welding Code--Aluminum."
3. AWS D1.3, "Structural Welding Code--Sheet Steel."
4. AWS D1.6, "Structural Welding Code--Stainless Steel."

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.

NOT FOR BIDDING PURPOSES

2. Provide allowance for trimming and fitting at site.

1.7 COORDINATION

A. Coordinate installation of anchorages for metal fabrications. 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.

B. Coordinate installation of steel weld plates and angles for casting into concrete that are specified in this Section but required for work of another Section. Deliver such items to Project site in time for installation.

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 Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Products: Subject to compliance with requirements, provide one of the products specified.
3. 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.
4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.3 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304.

C. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.

NOT FOR BIDDING PURPOSES

D. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

E. Rolled-Stainless-Steel Floor Plate: ASTM A 793.

F. Steel Tubing: ASTM A 500, cold-formed steel tubing.

G. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

H. Slotted Channel Framing: Cold-formed metal channels with continuous slot complying with MFMA-3.

1. Size of Channels: 1-5/8 by 1-5/8 inches unless indicated otherwise.
2. Material: Galvanized steel complying with ASTM A 653/A 653M, structural steel, Grade 33, with G90 coating; 0.108-inch nominal thickness.
3. Material: Steel complying with ASTM A 1008/A 1008M, structural steel, Grade 33; 0.0966-inch minimum thickness; coated with rust-inhibitive, baked-on, acrylic enamel.

I. Cast Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.

2.4 NONFERROUS METALS

A. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.

B. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.

C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

D. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

2.5 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, nuts and, where indicated, flat washers; ASTM F 593 for bolts and ASTM F 594 for nuts, Alloy Group 1.

NOT FOR BIDDING PURPOSES

D. Anchor Bolts: ASTM F 1554, Grade 36.

1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.

E. Eyebolts: ASTM A 489.

F. Machine Screws: ASME B18.6.3.

G. Lag Bolts: ASME B18.2.1.

H. Wood Screws: Flat head, ASME B18.6.1.

I. Plain Washers: Round, ASME B18.22.1.

J. Lock Washers: Helical, spring type, ASME B18.21.1.

K. Cast-in-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.

L. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material for Anchors in Exterior Locations: Alloy Group 1 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.

2.6 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Shop Primers: Provide primers that comply with Division 09 painting Sections.

C. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

NOT FOR BIDDING PURPOSES

E. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

F. Concrete Materials and Properties: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

2.7 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work true to line and level with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

NOT FOR BIDDING PURPOSES

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.8 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate supports for operable partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Show Drawings.

C. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.

1. Fabricate units from slotted channel framing where indicated.
2. Furnish inserts if units are installed after concrete is placed.

D. Galvanize exterior miscellaneous framing and supports where indicated.

E. Prime interior miscellaneous framing and supports with zinc-rich primer where indicated.

2.9 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Weld adjoining members together to form a single unit where indicated.

B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches, unless otherwise indicated.

C. Galvanize loose steel lintels located in exterior walls.

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2.10 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

B. Galvanize plates after fabrication.

C. Prime plates with zinc-rich primer.

2.11 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with not less than two integrally welded steel strap anchors for embedding in concrete.

2.12 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

C. Galvanize exterior miscellaneous steel trim and interior miscellaneous steel trim, where indicated.

D. Prime interior miscellaneous steel trim, where indicated with zinc-rich primer.

2.13 METAL BOLLARDS

A. Fabricate pipe bollards from 3/8-inch thick, 6 inch diameter schedule 80 steel pipe.

1. Exterior pipe bollards; Hot dip galvanize all exterior pipe bollards.

a. Min. depth 4 feet below grade.
b. Embed in full concrete
c. Taper concrete away at base of sleeve.

2. Interior pipe bollards;

a. Fabricate bollards with 3/8 inch thick steel baseplates for bolting to concrete slab. Drill baseplates at all four corners for anchors.

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b. Provide four 3/4-inch epoxy bolts (min 4-inch embedment) at each bollard.

3. Fill all pipe bollards with 3,000 psi concrete, round concrete on top of bollard.
4. Paint all pipe bollard caution yellow.

2.14 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

2.15 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:

1. ASTM A 123/A 123M, for galvanizing steel and iron products.
2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."

C. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.16 STAINLESS-STEEL FINISHES

A. Remove tool and die marks and stretch lines or blend into finish.

B. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

C. Bright, Directional Satin Finish: No. 4.

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D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

2.17 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).

C. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

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F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

B. Anchor supports for operable partitions securely to and rigidly brace from building structure.

3.3 INSTALLING BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.

1. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 INSTALLING METAL BOLLARDS

A. Anchor bollards in place with concrete footings. Support and brace bollards in position in footing excavations until concrete has been placed and cured.

B. Fill bollards solidly with concrete, mounding top surface.

C. Paint bollards "OSHA" using galvanizing primer and two finish coats of High Performance Coating.

3.5 INSTALLING EXPANDED METAL MESH IN HOLLOW METAL FRAMES

A. Cut Mesh to fit opening dimensions of frame. Securely tack weld expanded metal mesh a minimum every 6-inches to the non-removable stop. Grind and finish welds smooth, reinstall removable stop flush with metal mesh and re-prime disturbed surfaces and prime metal mesh. Finish paint entire system.

NOT FOR BIDDING PURPOSES

3.6 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 09 painting Sections.

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 055000

NOT FOR BIDDING PURPOSES

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. This Section includes steel pipe and tube handrails, guardrails and railings.

B. Related Sections include the following:

1. Division 03 Section “Cast-in-Place Concrete”
2. Division 05 Section "Metal Stairs" for steel pipe handrails and railings included with metal stairs.
3. Division 05 Section “Security Metal Fasteners”.
4. Division 09 Sections “High Performance Coating” and "Painting".

1.3 PERFORMANCE REQUIREMENTS

A. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

1. Steel: 72 percent of minimum yield strength.

B. Structural Performance of Handrails and Railings: Provide handrails and railings complying with requirements of ASTM E 985 for structural performance, based on testing performed according to ASTM E 894 and ASTM E 935.

C. Structural Performance of Handrails and Railing Systems: Engineer, fabricate, and install handrails and railing systems to withstand the following structural loads without exceeding the allowable design working stress of the materials for handrails, railing systems, anchors, and connections. Apply each load to produce the maximum stress in each of the respective components comprising handrails and railing systems.

1. Top Rail of Guardrail Systems: Capable of withstanding the following loads applied as indicated:

a. Concentrated load of 200 lb applied at any point and in any direction.
b. Uniform load of 50 lb per linear ft. applied horizontally and concurrently with uniform load of 100 lb per linear ft. applied vertically downward.
c. Concentrated load need not be assumed to act concurrently with uniform loads.

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2. Handrails Not Serving as Top Rails: Capable of withstanding the following loads applied as indicated:

   a. Concentrated load of 200 lb applied at any point and in any direction.
   b. Uniform load of 50 lb per linear ft. applied in any direction
   c. Concentrated and uniform loads need not be assumed to act concurrently.

3. Infill Area of Guardrail Systems: Capable of withstanding a horizontal concentrated load of 200 lb applied to one sq. ft. at any point in the system.

   a. Above load need not be assumed to act concurrently with loads on top rails of railing systems in determining stress on guard.

D. Thermal Movements: Provide handrails and railings that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

E. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected handrails and railings.
2. Grout, anchoring cement, and paint products.

B. Shop Drawings: Show fabrication and installation of handrails and railings. Include plans, elevations, sections, component details, and attachments to other Work.

1. Provide comprehensive engineering analysis, signed and sealed, certified by the qualified professional engineer responsible for its preparation submitted for Owner's records. Include cover letter signed and sealed by professional engineer indicating building code and design criteria used for analysis and that analysis was performed by or under their direct supervision.

C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for products with factory-applied color finishes.

D. Samples for Verification: For each type of exposed finish required, prepared on components indicated below and of same thickness and metal indicated for the Work.

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If finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

E. Product Test Reports: From a qualified testing agency indicating products comply with requirements, based on comprehensive testing of current products.

F. Product Test Reports: From a qualified testing agency indicating handrails and railings comply with ASTM E 985, based on comprehensive testing of current products.

G. Qualification Data: For professional engineer.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

B. Source Limitations: Obtain each type of handrail and railing through one source from a single manufacturer.

C. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."

D. Professional Engineer Qualifications: A professional engineer who is legally authorized 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 pipe and tube railings that are similar to those indicated for this Project in material, design, and extent.

1.6 STORAGE

A. Store handrails and railings in a dry, well-ventilated, weathertight place.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify handrail and railing dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.8 COORDINATION

A. Coordinate installation of anchorages for handrails and railings. 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.

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1.9 SCHEDULING

A. Schedule installation so handrails and railings are mounted only on completed walls. Do not support temporarily by any means that does not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.1 METALS

A. General: Provide metal free from pitting, seam marks, roller marks, stains, discolorations, and other imperfections where exposed to view on finished units.

B. Steel and Iron: Provide steel and iron in the form indicated, complying with the following requirements:

1. Steel Pipe: ASTM A 53; finish, type, and weight class as follows:

a. Black finish, unless otherwise indicated.
b. Type F, or Type S, Grade A, standard weight (Schedule 40), unless another grade and weight are required by structural loads.

2. Steel Tubing: Cold-formed steel tubing, ASTM A 500, Grade A, unless another grade is required by structural loads.
3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
4. Iron Castings: Malleable iron complying with ASTM A 47, Grade 32510.

C. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

2.2 WELDING MATERIALS, FASTENERS, AND ANCHORS

A. Welding Electrodes and Filler Metal: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

B. Fasteners for Anchoring Handrails and Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring handrails and railings to other types of construction indicated and capable of withstanding design loads.

1. For steel handrails, railings, and fittings, use plated fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating.

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C. Fasteners for Interconnecting Handrail and Railing Components: Weld all metal.

D. Cast-in-Place and Postinstalled Anchors: Anchors of type indicated below, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry 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 agency.

1. Cast-in-place anchors.
2. Chemical anchors.
3. Expansion anchors.

2.3 HOT-DIPPED GALVANIZING

A. Hot-dip galvanize all exterior ferrous metal railings after fabricating. Field welding is not permitted.

2.4 PAINT

A. Shop primers and painting for interior (Non-Inmate areas) and exterior exposed ferrous metal.

1. Provide primers and finish painting that complies with Division 09 Section “Painting”.

B. Shop primers and painting for interior (Inmate Areas Only) and exterior exposed ferrous metal.

1. Provide primers and finish painting that complies with Division 09 Section "High Performance Coatings”.

2.5 GROUT AND ANCHORING CEMENT

A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

B. Interior Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Use for interior applications only.

C. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site

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to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.6 FABRICATION

A. General: Fabricate handrails and railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Assemble handrails and railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Form changes in direction of railing members as follows:

1. By radius bends of radius indicated.

D. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.

E. Welded Connections: Fabricate handrails and railings for connecting members by welding. Cope components at perpendicular and skew connections to provide close fit, or use fittings designed for this purpose. Weld connections continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
5. Fabricate splice joints for field connection using an epoxy structural adhesive where this is manufacturer's standard splicing method.
6. Tack weld all bolted connections and exposed fasteners for all metal stairs and handrails in all inmate/secure areas.

F. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect handrail and railing members to other work, unless otherwise indicated.

G. Provide inserts and other anchorage devices for connecting handrails and railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads

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imposed by handrails and railings. Coordinate anchorage devices with supporting structure.

H. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.

I. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.

J. Cut, reinforce, drill, and tap components, as indicated, to receive finish hardware, screws, and similar items.

K. Provide weep holes or another means to drain entrapped water in hollow sections of handrail and railing members that are exposed to exterior or to moisture from condensation or other sources.

L. Fabricate joints that will be exposed to weather in a watertight manner.

M. Close exposed ends of handrail and railing members with prefabricated end fittings.

N. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns, unless clearance between end of railing and wall is 1/4 inch or less.

O. Toe Boards: Provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

P. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.

2.7 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Provide exposed fasteners with finish matching appearance, including color and texture, of handrails and railings.

2.8 STEEL FINISHES

A. Galvanized Handrails and Railings: Hot-dip galvanize exterior steel handrails and railings to comply with ASTM A 123. Hot-dip galvanize hardware for exterior steel and iron handrails and railings to comply with ASTM A 153/A 153M.

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B. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:

1. ASTM A 123, for galvanizing steel and iron products.
2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

C. Fill vent and drain holes that will be exposed in finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

D. For galvanized handrails and railings, provide galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.

E. For nongalvanized steel handrails and railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors to be embedded in exterior concrete or masonry.

F. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed handrails and railings:

1. Exteriors (SSPC Zone 1B): SSPC-SP 6, "Commercial Blast Cleaning."
2. Interiors (SSPC Zone 1A): SSPC-SP 7, "Brush-off Blast Cleaning."

G. Apply shop primer to prepared surfaces of handrail and railing components, unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.

1. Do not apply primer to galvanized surfaces.
2. Stripe paint edges, corners, crevices, bolts, and welds.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required to install handrails and railings. Set handrails and railings accurately in location, alignment, and elevation; measured from established lines and levels and free from rack.

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1. Do not weld, cut, or abrade surfaces of handrail and railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
3. Align rails so variations from level for horizontal members and from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

C. Adjust handrails and railings before anchoring to ensure matching alignment at abutting joints. Space posts at interval indicated, but not less than that required by structural loads.

D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing handrails and railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2-inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6-inches of post.

3.4 ANCHORING POSTS

A. Form or core-drill holes not less than 5-inches deep and 3/4-inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's written instructions:

1. Nonshrink, nonmetallic grout or anchoring cement.

B. Cover anchorage joint with flange of same metal as post, attached to post as follows:

1. Welded to post after placing anchoring material.

C. Leave anchorage joint exposed; wipe off surplus anchoring material; and leave 1/8-inch build-up, sloped away from post.

3.5 ANCHORING RAILING ENDS

A. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces.

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1. Weld flanges to railing ends.

3.6 ATTACHING HANDRAILS TO WALLS

A. Attach handrails to wall with wall brackets. Provide bracket with 1-1/2-inch clearance from inside face of handrail and finished wall surface.

B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

C. Secure wall brackets to building construction as follows:

1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
2. For hollow masonry anchorage, use toggle bolts.

3.7 CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 Sections "High Performance Coatings" and Painting.

3.8 PROTECTION

A. Protect finishes of handrails and railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at the time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 055213

NOT FOR BIDDING PURPOSES

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. This Section includes the following:

1. Plywood backing panels.
2. Rooftop equipment bases and support curbs.
3. Wood blocking and nailers.
4. Countertop support brackets.

B. Related Sections include the following:

1. Division 06 Section “Interior Architectural Woodwork” for interior woodwork not specified in this Section.
2. Division 07 Roofing Sections.

1.3 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, net amount of preservative retained, and chemical treatment manufacturer’s written instructions for handling, storing, installing, and finishing treated material.
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, both before and after exposure to elevated temperatures when tested according to ASTM D 5516 and ASTM D 5664.
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.

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1.4 DELIVERY, STORAGE AND HANDLING

A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

B. Deliver interior wood materials that are to be exposed to vie only after building is enclosed and weatherproof, wet work other than painting is dry, and HVAC system is operating and maintaining temperature and humidity at occupancy levels.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

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. Wood Blocking

1. Plywood: Either DOC PS 1 or DOC PS 2, unless otherwise indicated.
2. Thickness: Not less than 3/4-inch.
3. Comply with “Code Plus” provisions in APA Form No. E30K, “APA Design/Construction Guide: Residential & Commercial”.
4. Factory mark panels according to indicated standard.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA.

1. Preservative Chemical: Acceptable to authorities having jurisdiction.

B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood. Do not use material that is warped, wet, has been stored uncovered, or does not comply with requirements for untreated material.

C. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

D. Application: Treat all roofing and exterior wall blocking.

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2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Provide interior construction blocking and backing materials that comply with performance requirements in AWPA. Identify fire-retardant-treated wood with appropriate classification marking of UL, U.S. Testing, Timber products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures, when tested by a qualified independent testing agency according to ASTM D5664 for lumber and ASTM D 5516 for plywood.
2. Use treatment that does not promote corrosion of metal fasteners.

2.4 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction.

B. For items of dimension lumber size, provide Construction, Stud, or No. 2 grade lumber with 19 percent maximum moisture content and any of the following species:

1. Mixed southern pine; SPIB.
2. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.
4. Eastern softwoods; NELMA.
5. Northern species; NLGA.
6. Western woods; WCLIB or WWPA.

2.5 BACK BOARD PANEL PRODUCTS

A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, plywood 3/4-inch thick.

2.6 COUNTERTOP SUPPORT BRACKETS

A. Basis-of-Design: Provide brackets as manufactured by A & M Hardware Inc., Manheim, PA; Telephone: 888-647-0200, or equal as approved by Professional.

1. ADA compliant, powder coated steel brackets.
2. Install brackets 4 feet o.c. and at 45 degree angle in corners.
3. Brackets shall be 1/8 inch thick and fastened to wall substrate in manner capable of supporting in excess of 200 lbs. each.
4. Provide tallest and deepest size that will fit within the clearances required by ADA.
5. Color: As selected by Architect from manufacturers full range of color options.

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2.7 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Provide fasteners with hot-dip zinc coating complying with ASTM A 153.

B. Nails, Wire, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening to Cold-Formed Metal Framing ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

F. Lag Bolts: ASME B18.2.1.

G. Bolts: Steel bolts complying with ASTM C 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

H. 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 E488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

2.8 CONSTRUCTION ADHESIVE

A. Adhesives for Field Gluing Panels to Framing: Formulation complying with ASTM D 3498 that is approved for use with type of construction panel indicated by both adhesive and panel manufacturers.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit 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.

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B. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

C. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.

D. Use fasteners of appropriate type and length. Predrill members when necessary to avoid splitting wood.

3.2 ROOF BLOCKING

A. Install where indicated and where required for attaching to 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.

END OF SECTION 061053

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SECTION 079200 - 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. This Section includes joint sealants for the following applications, including those specified by reference to this Section:

1. Exterior joints in the following vertical surfaces and horizontal nontraffic surfaces:

   a. Control and expansion joints in cast-in-place concrete.
   b. Control and expansion joints in unit masonry.
   c. Joints between different materials listed above.
   d. Perimeter joints between materials and frames of doors and windows.
   e. Control and expansion joints in ceilings and other overhead surfaces.
   f. Other joints as indicated.

2. Exterior joints in the following horizontal traffic surfaces:

   a. Control, expansion, and isolation joints in cast-in-place concrete slabs, paving, sidewalks, or curbing.
   b. Other joints as indicated.

3. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:

   a. Perimeter joints of exterior openings where indicated.
   b. Tile control and expansion joints at floor, base, and wall joints.
   c. Vertical joints on exposed surfaces of interior unit masonry walls and partitions.
   d. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
   e. Joints between plumbing fixtures and adjoining walls, floors, and counters.
   f. Other joints as indicated.

4. Interior joints in the following horizontal traffic surfaces:

   a. Control and expansion joints in cast-in-place concrete slabs.
   b. Control and expansion joints in tile flooring.

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c. Other joints as indicated.

1.3 PERFORMANCE REQUIREMENTS

A. Provide joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

1.4 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. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.

E. Qualification Data: For Installer and testing agency.

F. 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.
3. Required primers and masking of all adjacent surfaces are included.

G. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

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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. Perform tests under environmental conditions replicating those that will exist during installation.
2. Submit not fewer than nine pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
5. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

D. Mockups: Before installing joint sealants, apply elastomeric sealants as follows to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution:

1. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.

E. Preconstruction Field-Adhesion Testing: Before installing elastomeric 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 type of elastomeric sealant and joint substrate indicated.
   b. Each type of nonelastomeric sealant and joint substrate indicated.

3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.

F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.

1.6 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.
2. When joint substrates are wet.

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3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

A. Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance or other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion, except for acrylic latex sealants - 1 year.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance or other requirements specified in this Section within specified warranty period.

1. Warranty Period: Beginning from date of Substantial Completion as follows:

a. 1 Year: Acrylic Latex Sealants.
b. 5 Years: Polyurethane and all traffic grade sealants and silicones.
c. 20 Years: Exterior vertical grade silicone sealants.

C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:

1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
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 MANUFACTURERS

A. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

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B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

B. Suitability for Immersion in Liquids. Where elastomeric sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247 and qualify for the length of exposure indicated by reference to ASTM C 920 for Class 1 or 2. Liquid used for testing sealants is deionized water, unless otherwise indicated.

C. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

2.4 LATEX JOINT SEALANTS

A. Latex Sealant Standard: Comply with ASTM C 834, and other requirements indicated for each sealant specified.

2.5 PREFORMED JOINT SEALANTS

A. Preformed Foam Sealants: Manufacturer's standard preformed, precompressed, open-cell foam sealant that is manufactured from high-density urethane foam impregnated with a nondrying, water-repellent agent; is factory produced in precompressed sizes in roll or stick form to fit joint widths indicated; is coated on one side with a pressure-sensitive adhesive and covered with protective wrapping; develops a watertight and airtight seal when compressed to the degree specified by manufacturer; and complies with the following:

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1. Properties: Permanently elastic, mildew resistant, nonmigratory, nonstaining, and compatible with joint substrates and other joint sealants.

    a. Density: Manufacturer's standard.

2.6 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.

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 where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.7 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.

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B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

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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. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

D. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

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 below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
4. Provide flush joint configuration where indicated per Figure 5B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 5C in ASTM C 1193.

    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, producing seal continuity at ends, turns, and intersections of joints. For applications at

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low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in compliance with sealant manufacturer's written instructions.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed elastomeric sealant joints as follows:

   a. Perform 10 tests for the first 1000 feet of joint length for each type of elastomeric sealant and joint substrate.
   b. Perform 1 test for each 1000 feet of joint length thereafter or 1 test per each floor per elevation.

2. Test Method: Test joint sealants according to in Appendix X1 in ASTM C 1193, as appropriate for type of joint-sealant application indicated.

   a. For joints with dissimilar substrates, verify adhesion to each substrate separately; do this by extending cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field-adhesion-test log.
4. Inspect tested joints and report on the following:

   a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
   b. Whether sealants filled joint cavities and are free of voids.
   c. Whether sealant dimensions and configurations comply with specified requirements.

5. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
6. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with

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other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial 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 ELASTOMERIC JOINT-SEALANT SCHEDULE

A. Interior Mildew-Resistant Silicone Sealant - Interior sealants at all toilet, shower and food prep areas: Provide products formulated with fungicide that are intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes, and that comply with the following:

1. Products:

    a. 786 Mildew Resistant; Dow Corning.
    b. Sanitary 1700; GE Silicones.
    c. NuFlex 302; NUCO Industries, Inc.
    d. 898 Silicone Sanitary Sealant; Pecora Corporation.
    e. PSI-611; Polymeric Systems, Inc.
    f. Tremsil 600 White; Tremco.

2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Use Related to Exposure: NT (nontraffic).
5. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated, O.

    a. Use O Joint Substrates: Coated glass, color anodic aluminum, aluminum coated with a high-performance coating, galvanized steel, and ceramic tile.

6. Applications: Interior non-secure (non inmate or inmate staff) areas.

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7. Contractor shall seal all plumbing fixtures to walls.

B. Security Sealant: For all inmate and secure areas, provide product formulated with pick and pull resistant properties.

1. Product:

a. Basis-of-Design Product: The design for security sealant is based on Pecora Corporation Dynaflex SC one part, paintable, urethane security sealant. Subject to compliance with requirements provide the named product or a comparable product by one of the following:

1) GE.
2) Tremco.
3) Dow.
4) Sonneborn.

b. Type and Grade: ASTM C-920, Type M, Grade NS, Class 12.5.
c. ASTM C661 Shore A Hardness: 5 Years: 55.
d. ASTM D412 Tensile Strength: 350 PSI.

2. Applications: Seal interior or exterior control joints and all joints in secure areas as follows:

a. Precast joints with adjacent materials (including floors).
b. Gaps at fittings, fixtures, or penetrations.
c. Masonry joints, corners, control joints and joints with adjacent materials including floors.
d. Seal all fittings and fixtures such as lights, sprinkler heads and HVAC devices to walls.
e. Seal all door opening gaps and window opening gaps.
f. Seal all detention equipment and furnishings to walls and ceilings.
g. Where interior or exterior joint sealants are in inmate areas or in staff and inmate areas.

C. Interior Horizontal Slab Sawed Control Joint Sealant:

1. Product:

a. Basis-of-Design Product: The design for flexible epoxy sealant: Sikadur 51 NS/SL by Sika Corp. Subject to compliance with requirements provide the named product or a comparable product by one of the following:

1) GE.
2) Tremco.
3) Dow.
4) Sonneborn.

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b. Type and Grade: M (two component) and NS (nonsag) and P (Self-Leveling).
c. Use Related to Exposure: T (Traffic).
d. Applications: Interior.
e. ASTM D 2240 Shore A Hardness at 28 days: 80.
f. ASTM C 822 Bond Strength at 2 days: 800 PSI.
g. Modulus of Elasticity 1,800 PSI.
h. ASTM D 638 Tensile Strength at 14 days: 650 PSI.

D. Interior Block And Block-To-Concrete Or Metal Joint Sealant Under Resinous Flooring Or High Performance Coating:

1. Multicomponent Nonsag Urethane Waterproof Sealant:

a. Products:

1) Bostik Findley; Chem-Calk 500.
2) Pacific Polymers, Inc.; Elasto-Thane 227 R Type II (Gun Grade).
3) Polymeric Systems Inc.; PSI-270.
4) Tremco; Dymeric.

2. Type and Grade: M (multicomponent) and NS (nonsag).
3. Class: 25.
4. Additional Movement Capability: 40 percent movement in extension and 25 percent in compression for a total of 65 percent movement.
5. Use Related to Exposure: NT (nontraffic).
6. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.

a. Use O Joint Substrates: Steel, concrete, masonry and ceramic tile.

7. Strike sealant flush for smooth coating application.

E. Building Façade Weather Sealant (in non-inmate areas):

1. Basis-of-Design Product: The design for building façade weather sealant is based on Sonolastic 150 silyl-terminated polyether of high molecular weight polypropylene oxide base sealant as manufactured by Sonneborn. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

a. Pecora.
b. GE.
c. Dow.
d. Tremco.
e. Sika.

2. Type and Grade: S (single component) and NS (nonsag).

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3. Class: 25.
4. Use Related to Exposure: NT (nontraffic).
5. Applications: Exterior weather joints on all vertical and horizontal masonry building material surfaces (including sealing of all roofing flashing joints and gaps).
6. Extreme joint movement capability: +100 percent to -50 percent.
7. Sealant shall be paintable.
8. Sealant shall be non-staining.
9. Sealant shall have ASTM D412 tensile strength of 290 psi.
10. Sealant shall have ultimate elongation at break of 865 percent.

F. Exterior Glazed Aluminum Assembly Single-Component Neutral and Basic Curing Silicone Sealant:

1. Basis-of-Design Product: The design for exterior glazed aluminum assemblies is based on Dow Corning Corporation, 790. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

a. GE Silicones; SilPruf LM SCS2700.
b. Tremco; Spectrum 1 (Basic).

G. Exterior Horizontal Expansion and Paving Control Joint Sealant:

1. Products:

a. NR-200 Urexpan; Pecora Corporation.
b. Sikaflex 2c SL; Sika Corporation.
c. THC 900; Tremco, Inc.

2. Type and Grade: M (two component) and NS (nonsag) and P (Self-Leveling).
3. Use Related to Exposure: T (Traffic).

3.8 LATEX JOINT-SEALANT SCHEDULE

A. Latex Sealant: Wall and ceiling joints to be painted; provide products complying with the following:

1. Products:

a. Chem-Calk 600; Bostik Inc.
b. NuFlex 330; NUCO Industries, Inc.
c. LC 160 All Purpose Acrylic Caulk; Ohio Sealants, Inc.
d. AC-20; Pecora Corporation.
e. PSI-701; Polymeric Systems, Inc.
f. Sonolac; Sonneborn Building Products Div., ChemRex, Inc.
g. Tremflex 834; Tremco.

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2. Type: OP.
3. Grade: NF.
4. Applications: Interior masonry, gypsum board and concrete non-inmate or inmate/staff joints to be painted.

3.9 PREFORMED JOINT-SEALANT SCHEDULE

A. Preformed Foam Sealant: Where joint sealants of this type are indicated, provide products complying with the following:

B. Basis-of-Design: The design for preformed soint sealant is based on Colorseal as manufactured by Emseal Joint Systems, Ltd. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

a. Schul International.
b. Dayton Superior.
c. Fox Industries.
d. Sandell.
e. Tremco.

2. Applications: Fill all building exterior wall expansion joints at just-below-the-face interior and exterior faces.
3. Color: As selected by Architect.

3.10 EXPANDING FOAMED-IN-PLACE JOINT SEALANT

A. Foam Sealant:

1. Insta-Seal (a one-component product) by Insta-Foam Products, Inc.
2. Froth-Pack (a two-component) by Insta-Foam Products, Inc.
3. Corbond (a two-component) by Corbond Corporation, Bozeman, Montana.

B. Applications: Install at all voids around perimeter of door frames, louver frames, window frames and curtain wall/storefront frames in exterior walls; voids around penetrations in roof deck construction; and where necessary to insulate dead air spaces at thermal envelope of building.

END OF SECTION 079200

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1. GENERAL

1.1. SECTION INCLUDES

A. Comply with the requirements of Division 1.

B. Provide the following products as listed on the door schedule and shown on the drawings, including but not limited to the following:

1. Hollow metal doors
2. Hollow metal frames
3. Side lights, transom frames and borrowed lights
4. Hollow metal panels
5. Preparation of hollow metal doors and frames for finish hardware.

1.2. RELATED SECTIONS

A. The following description of work is included for reference only and shall not be presumed complete:

1. Finish carpentry: 06 20 00
2. Wood doors: 08 14 00
3. Stainless steel doors: 08 11 19
4. Sound control door assemblies: 08 34 73
5. Door hardware: 08 71 00
6. Glazing: 08 80 00
7. Painting and coating: 09 90 00
8. Electrical: 26 00 00

1.3. REFERENCES

A. ANSI A250.3-2007: Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames

B. ANSI A250.4-2001: Test Procedure and Acceptance Criteria for Physical Endurance for Steel Door and Hardware Reinforcing

C. ANSI A250.10-1998 (R2004): Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames

D. ANSI A250.13-2008: Testing and Rating of Severe Windstorm Resistant Components for Swinging Door Assemblies

E. ANSI/UL 1784-2004: Air Leakage Tests of Door Assemblies, 3rd edition

F. ASTM A653/A653M-10: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

G. ASTM E90-09: Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

H. ASTM C518 – 04: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

I. ASTM E413-04: Classification for Rating Sound Insulation

J. NAAMM-HMMA 803-08: Steel Tables

K. NAAMM-HMMA 810-09: Hollow Metal Doors

L. NAAMM-HMMA 820-08: Hollow Metal Frames

M. NAAMM-HMMA 831-11: Recommended Hardware Locations for Hollow Metal Doors and Frames

N. NAAMM-HMMA 840-07: Guide Specification for Installation of Hollow Metal Doors and Frames

O. NAAMM-HMMA 850-00: Fire Rated Hollow Metal Doors and Frames

P. NFPA 80-10: Standard for Fire Door and Other Opening Protectives

Q. NFPA 101: Life Safety Code

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R. NFPA 105-10: Standard for the Installation of Smoke Door Assemblies
S. NFPA 252-08: Standard Methods of Fire Tests of Door Assemblies
T. NFPA 257-07: Standard on Fire Tests for Window and Glass Block Assemblies
U. CAN/ULCS770-09: Standard Test Method for Determination of Long-term Thermal Resistance of Closed-Cell Thermal Insulating Foams
V. UL 10C: Standard for Safety Positive Pressure Fire Tests of Door Assemblies

1.4. PRE-INSTALLATION MEETING

A. Plan and manage a pre-installation meeting to explain the proper methods to install hollow metal doors and frames.

1.5. SUBMITTALS

A. Make submittals in accordance with Section 01 33 00.
B. Provide the following items in the submittal package:
    1. Door schedule
    2. Elevations of each door type
    3. Details of doors, including vertical and horizontal edge details and metal thickness
    4. Frame details for each frame type, including profiles and metal thickness
    5. Locations of reinforcements and preparation for hardware
    6. Details of each different wall opening condition
    7. Details of anchorage, joints, field splices and connections
    8. Details of accessories
    9. Details of moldings, removable stops and glazing
    10. Details of conduit and preparations for power, signal, and control systems
C. Upon Architect request, provide technical information on selected items.
D. Upon Architect request, provide 254 mm x 254 mm (10 in x 10 in) corner sample on selected items.
    1. Doors: Show vertical edge, end channels, core, hinges and other applied hardware reinforcements; glazing if applicable.
    2. Frames: Show profile, corner joint at head and jamb, anchors, glazing stop to show intersection between head and jamb; fixed panels if applicable.

E. Finish paint: Submit finish paint color samples of 127 mm x 127 mm (5 in x 5 in).
F. Provide products meeting the following LEED performance criteria:

    1. MRc4: For a product with recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content. Provide product with maximum pre-consumer and post-consumer recycled content available, supported by appropriate documentation

G. Test and evaluation reports: Submit the following test and evaluation reports:
    1. Steel door and frame assemblies supplied under this section meet acceptance criteria of ANSI A250.4, Level A **[**Level B**]**, **[**Level C**]**
    2. Primer applied on steel door and frame assemblies meet acceptance criteria of ANSI A250.10.
    3. Factory painted steel door and frame assemblies meet acceptance criteria of ANSI A250.3.
    4. Insulated doors supplied in exterior openings meet specified thermal resistance rating.
    5. Acoustic door and frame assemblies provide the STC and sound TL values specified within the critical frequency range, as determined and scheduled by the Consultant.
    6. Windstorm rated assemblies meet standard ANSI A250.13, Class 1 requirements.
    7. Ensure reports include name of testing authority, date of test, location of test facility, descriptions of test specimens, procedures used in testing and indicate compliance with acceptance criteria of the test.

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H. Closeout submittals
1. Provide the following information to the Owner:
a. One copy of the as-built door and frame schedule;
b. Name, address and phone number of manufacturer's distributors;
c. One copy of the manufacturer's product warranty;
d. Manufacturer's product maintenance instructions.

1.6. QUALITY ASSURANCE
A. Manufacturers: Execute work in this Section by a manufacturer who is a member of NAAMM. Ensure product quality meets standards set by this association.
B. Ensure product is manufactured by a firm experienced in design and production of standard and custom commercial steel door and frame assemblies, integration of builders' or electronic hardware and glazing assemblies, and other items affecting work.
C. Distributors: Execute work in this Section by a distributor who has a minimum of 5 years' experience in similar projects.
D. Installers: Execute work in this Section by an installer who has a minimum of 5 years' experience in similar projects.
E. Doors and frames from a single source manufacturer.

1.7. DELIVERY, STORAGE AND HANDLING
A. Delivery:
1. Make deliveries in accordance with Section 01 65 00.
2. Identify products with a label indicating manufacturer's name, Architect's opening number, product description and dimensions.
3. Protect doors and frames during shipping.
4. Upon delivery, inspect products for quantity and damage.
5. Repair or replace damaged products before installation.

B. Storage and handling:
1. Store and handle products in accordance with Section 01 66 00.
2. Store products in a clean, dry and secure area.
3. Store and protect materials in accordance with NAAMM-HMMA 840.
4. Remove wrappings or coverings from doors upon delivery at site. Store doors and welded frames in a vertical position with a minimum of 6 mm (1/4 in) space between them. Place material on blocking at least 102 mm (4 in) off the ground to permit air circulation.

1.8. WARRANTY
A. Manufacturer's warranty: One year from substantial completion of the project on both material and workmanship.

2. PRODUCTS

2.1. MANUFACTURERS
A. Acceptable manufacturers:
1. De La Fontaine Inc. : www.delafontaine.com.
2. Republic Doors : www.republicdoor.com
3. Mesker Doors : www.meskerdoor.com.
4. HMF : www.hmfexpress.com.
5. Karpen Steel Products : www.karpensteel.com.

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B. Substitutions:
1. Comply with Section 01 25 00
2. Equal products in design, function and quality will be accepted upon Architect's approval only.

2.2. MATERIALS

A. Steel requirements:

1. Interior doors and frames: Comply with ASTM A653, Designation ZF 120 (A40)
2. Exterior doors and frames: Comply with ASTM A653, Designation ZF 180 (A60).

2.3. ACCESSORIES

A. Glazing moldings and stops

1. Sandwich overlapping kit
   a. Two components with welded mitered corners and secured with minimum # 6 corrosion-resistant countersunk sheet metal screws.
   b. Glazing moldings fabricated from 20-gauge, 0.8 mm (0.032 in) minimum.
   c. Fire-rated doors shall be prepared for listed glazing as required in accordance with the door manufacturer's fire rating procedure.
   d. Install screws on non-secure side.
   e. 18-gauge, 1.1 mm (0.042 in) channel reinforcements on glass size equal to or bigger than half-glass.
   f. Glazing to comply with Section 08 80 00.

2. Flush kit
   a. On non-secure side, provide a full flush, non-removable molding.
   b. Glazing moldings fabricated from 20-gauge, 0.8 mm (0.032 in) minimum.
   c. Removable glass stops shall be channel-shaped, 20-gauge, 0.8 mm (0.032 in) minimum thickness, with tight-fitting butt or mitered corners and secured with minimum # 6 corrosion-resistant countersunk sheet metal screws.
   d. Fire-rated doors shall be prepared for listed glazing as required in accordance with the door manufacturer's fire rating procedure.
   e. Install screws on non-secure side.
   f. 18-gauge, 1.1 mm (0.042 in) channel reinforcements on glass size equal to or bigger than half-glass.
   g. Glazing to comply with Section 08 80 00.

B. Frame accessories

1. Provide dust/mortar box at strike location on drywall and masonry frames.
2. Provide mortar guards for hinge reinforcements on masonry frames.
3. Provide temporary spreaders on welded frames. Provide one (1) bar for frames with less than 178 mm (7 in) jamb depth. Provide two (2) bars for frames with 178 mm (7 in) or greater jamb depth.
4. Drill holes for silencers. Single openings: 3 per strike jamb, located at hinge height. Pair openings: 2 per header at approximately 150 mm (6 in) each side of centerline of head stop.

C. Louvers

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1. Louvers for non-fire rated doors shall be welded inverted V type, Y type.
2. Inverted V and Y type vanes shall be not less than 18-gauge, 1.1 mm (0.042 in) thickness.
3. Fire-rated doors shall be prepared for listed, automatic closing, fusible link; fire door louvers.
4. Louvers for exterior doors shall be provided with insect and/or bird screens.
5. Provide louvers of same material as door sheet.

2.4. DOOR FABRICATION

A. Door cores:

1. Interior openings: Impregnated honeycomb, with 25 mm (1 in) cell maximum diameter. Steel stiffened core: Continuous vertically formed steel sections, full thickness of the interior space between door faces. Stiffeners shall be 22 gauge, 0.6 mm (0.026 in) minimum thickness, spaced 152 mm (6 in) apart and securely fastened to both face sheets by industrial glue or laser welds **[**spot welded spaced a maximum of 127 mm (5 in) o. c. vertically**]**. Spaces between stiffeners shall be filled with polystyrene core Type 1, fire retardant conforming to ASTM C518.

2. Temperature rise: Core composition to limit temperature rise on unexposed side of door to 250 degrees C (450 F) at 30 minutes. Test core as part of complete assembly in accordance with NFPA 252.

B. Hollow metal doors in heavy duty application

1. Physical performance: Level A according to ANSI A250.4.
2. Metal thickness: 16-gauge, 1.34 mm (0.053 in).
3. Edge construction: Full flush lock seam on edge **[**full flush lock seam on edge, industrial adhesive or tack welded every 254 mm (10 in) and putty filled**]**, **[**full flush seamless with continuously welded edge seam; flush internal edge reinforcements of 16-gauge, 1.34 mm (0.053 in)**]**.
4. Fabricate door to be flush with one continuous face free from joints, tool markings and abrasions, and with provision for glass and/or louvers as indicated on Door Schedule and Drawings.

C. Door models

1. As indicated in the Door and Frame schedule.

D. End channels:
   1. Interior door:
      a. Top of door: Close top of door with same material as face sheets, minimum 18-gauge, 1.1 mm (0.042 in). Steel inverted channel, projection welded. **[**Steel flush channel unfilled, projection welded.**]**,**[**Fully continuously welded centered seam, no putty with flush internal reinforcement of minimum 18-gauge, 1.1 mm (0.042 in)**]**.
      b. Bottom of door: Close bottom of door with same material as face sheets, minimum 18-gauge, 1.1 mm (0.042 in). Steel inverted channel projection welded. **[**Steel flush channel unfilled, projection welded**]**, **[**Fully continuously welded centered seam, no putty with flush internal reinforcement of minimum 18-gauge, 1.1 mm (0.042 in)**]**.

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E. Vertical edges on active doors:

1. Beveled edges on both sides: 3 mm per 50 mm, (1/8 in per 2 in). Square vertical edges are not acceptable.

2.5. FRAME FABRICATION

A. Hollow metal frames in heavy duty application

1. Frames:
   a. Physical performance: Level A according to ANSI A250.4.
   b. Metal thickness: 16-gauge, 1.34 mm (0.053 in).
   c. Metal thickness for openings over 1219 mm (48 in): 14-gauge, 1.70 mm (0.067 in).
   d. Frame assembly: Face welded, dressed smooth with seamless face. **[**Continuously welded through the entire profile, dressed smooth with seamless face**]**, Knockdown frames are not acceptable.

2.6. ANCHORS

A. Suitable for wall conditions
   1. Located close to hinge reinforcements and at the same height on strike jamb. Quantity: 2 per jamb up to 1,524 mm (60 in) of door opening height, one additional anchor for each additional 762 mm (30 in) of door height (or fraction thereof).
   2. Provide a welded adjustable floor anchor at the bottom of each jamb on welded frames; same material as frame and with 2 holes for bolting to floor.
   3. Masonry anchors: Provide T-strap wall anchors, minimum 16-gauge, 1.34 mm (0.053 in).
   4. Existing wall anchors: Minimum 18-gauge, 1.1 mm (0.042 in), spot welded to the frame.
   5. Steel/wood stud anchors: Minimum 18-gauge, 1.1 mm (0.042 in). Provide steel snap-in or welded in "Z" type stud anchors.
   6. Knockdown frame: Adjustable compression anchors and L brackets spot welded to back of frame.

2.7. CLEARANCES

A. On fire-rated openings: Comply with NFPA 80
B. On non-fire rated openings, the clearance shall be 3 mm (1/8 in) between the door and frame and between meeting edges of a pair of doors. The clearance between the bottom of the door and the bottom of the frame shall be 19 mm (3/4 in) without threshold.

2.8. MANUFACTURING TOLERANCES

A. Frame:
   1. Width and height: +1.6 mm (1/16 in), -0.8 mm (-1/32 in)
   2. Face, stop and rabbet: +/- 0.8 mm (+/- 1/32 in)
   3. Jamb depth: +/- 1.6 mm (+/- 1/16 in),

B. Door:
   1. Width and height: +/- 1.2 mm (+/- 3/64 in)
   2. Thickness: +/- 1.6 mm (+/- 1/16 in)
   3. Edge flatness: 1.6 mm (1/16 in) maximum
   4. Surface flatness: 3.1 mm (1/8 in) maximum
   5. Door twist: +/- 1.6 mm (+/- 1/16 in)

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C. Hardware:
   1. Cutouts: Template dimension +0.38 mm (+0.015 in)
   2. Location: +/- 0.8 mm (+/- 1/32 in)
   3. Between hinge centerlines: +/- 0.4 mm (+/- 1/64)

2.9. FIRE-RATED OPENINGS

A. Manufacture doors and frames as successfully tested in accordance with:
   1. NFPA 80
   2. NFPA 252
   3. NFPA 257
   4. UL 10C
B. Identify each product with a fire label from one of the following testing agency: Underwriters Laboratories, Warnock Hersey (ITS).

2.10. FRAME HARDWARE PREPARATION

A. Factory to prepare hollow metal frame to receive template mortised hardware; include cut-outs, reinforcement, mortising, drilling, and tapping according to the Door and Hardware Schedule and templates.
B. Surface applied hardware: Factory reinforced only, 12-gauge, 2.36 mm (0.093 in).
C. Hinge and pivot reinforcements: 10-gauge, 3.12 mm (0.123 in) high frequency hinge reinforcements, with a flange **[**7-gauge, 4.24 mm (0.167 in) flat hinge reinforcements**]**.
D. Strike reinforcement: 16-gauge, 1.34 mm (0.053 in) **[**12-gauge, 2.36 mm (0.093 in)**]**.
E. Closer reinforcement: 12-gauge, 2.36 mm (0.093 in).
F. Other reinforcements: 16-gauge, 1.34 mm (0.053 in) **[**12-gauge, 2.36 mm (0.093 in)**]**.

2.11. DOOR HARDWARE PREPARATION

A. Factory to prepare hollow metal door to receive template mortised hardware; include cut-outs, reinforcement, mortising, drilling, and tapping according to the Door and Hardware Schedule and templates.
B. Surface applied hardware: Factory reinforced only, 16-gauge, 1.34 mm (0.053 in), **[**12-gauge; 2.36 mm (0.093 in)**]**.
C. Hinge and pivot reinforcements: 10-gauge, 3.12 mm (0.123 in) high frequency hinge reinforcements, with a flange **[**7-gauge, 4.24 mm (0.167 in) flat hinge reinforcements.
D. Lock front reinforcement: 12-gauge, 2.36 mm (0.093 in).
E. Flush bolt reinforcement: 12-gauge, 2.36 mm (0.093 in).
F. Closer reinforcement: 16-gauge, 1.34 mm (0.053 in) **[**12-gauge, 2.36 mm (0.093 in)**]**.
G. Other reinforcements: 16-gauge, 1.34 mm (0.053 in) **[**12-gauge, 2.36 mm (0.093 in)**]**.

2.12. FINISHING

A. Galvannealed steel A40/A60: Factory applied primer to protect the area where zinc was removed in the welding process.
B. Primer: Comply with ANSI A250.10.
C. Factory prefinished doors and frames: Comply with ANSI A250.3.
   1. Select color from manufacturer's standard color chart **[**custom color selected by the Designer**]**.
   2. Provide touch-up paint for field repairs.

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3. EXECUTION

3.1. EXAMINATION

A. Inspect rough openings to detect problems that would prevent the proper installation of doors and frames.
B. Rough openings shall be square, level and plumb with accurate dimensions.

3.2. INSTALLATION

A. Remove temporary spreaders on welded frames before installation and verify frame dimensions, swing, fire rating and opening number.
B. For grouted frames, apply on site a coat of bituminous coating inside the frame throat.
C. Install doors and frames in accordance with:
   1. Approved door and hardware schedule
   2. Approved shop drawings
   3. Manufacturer's recommendations
   4. Local building codes
   5. NFPA 80
   6. NFPA 105
   7. ANSI/DHI A115.1G
   8. NAAMM HMMA 840
D. Install STC assemblies per manufacturer's installation instructions.
E. Install Windstorm assemblies per manufacturer's installation instructions.

3.3. ADJUSTING, CLEANING AND PROTECTION

A. Repair or replace damaged products.
B. Correct defects in installation.
C. Clean area in accordance with Section 01 74 00.
D. Protect doors and frames until transfer of the building to the Owner.

3.4. INSPECTION

A. Inspection of fire rated openings
   1. Comply with NFPA 80 requirements.
   2. Fire door assemblies shall be inspected and tested by an individual with knowledge and understanding of the operating components of the type of door. This person must confirm the door assembly will perform its intended function when exposed to fire conditions.
   3. A report shall be written for the AHJ and shall be submitted to the Owner.
   4. All deficiencies must be corrected before turning keys to the Owner.

END OF THIS SECTION

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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. This Section includes manually and electric-motor operated overhead coiling doors:

B. Related Sections include the following:
1. Division 04 Section “Unit Masonry:
2. Division 05 Section "Metal Fabrications" for miscellaneous steel supports.
3. Division 05 Section “Security Metal Fasteners” for all fasteners in inmate and inmate/staff areas.
4. Division 08 Section “Door Hardware” for lock cylinders and keying.
5. Division 28 for building fire alarm connections.
6. Division 26 Sections for electrical service and connections for powered operators and accessories.

1.3 PERFORMANCE REQUIREMENTS

A. Overhead coiling service doors:
1. Wind Loads: Design door assembly to withstand wind/suction load of 20 psf (958 Pa) without damage to door or assembly components.
2. Operation: Design door assembly, including operator, to operate for not less than 20,000 cycles.

B. Overhead coiling insulated doors:
1. Wind Loads: Design door assembly to withstand wind/suction load of 20 psf (958 Pa) without damage to door or assembly components.
2. Operation: Design door assembly, including operator, to operate for not less than 20,000 cycles.

C. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

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D. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

1.4 SUBMITTALS

A. Reference Division 01 “Submittal Procedures”; submit the following items:

1. Completed Acceptance Certification confirming compliance with requirements of this Section.
2. Test Data confirming compliance with Performance Requirements article.
3. Product Data.
4. Shop Drawings: Include special conditions not detailed in Product Data. Show interface with adjacent work.
5. Quality Assurance/Control Submittals:

    a. Provide proof of manufacturer ISO 9001:2000 registration.
    b. Provide proof of manufacturer and installer qualifications.
    c. Provide manufacturer's installation instructions.

6. Closeout Submittals:

    a. Operation and Maintenance Manual.
    b. Certificate stating that installed materials comply with this specification.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer Qualifications: ISO 9001:2000 registered and a minimum of five years experience in producing doors of the type specified.
2. Installer Qualifications: Manufacturer's approval.

1.6 DELIVERY STORAGE AND HANDLING

A. Reference Division 01 “Product Requirements”.

B. Follow manufacturer's instructions.

1.7 WARRANTY

A. Standard Warranty: Two years from date of substantial completion against defects in material and workmanship.

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B. Maintenance: Submit for owner's consideration and acceptance of a maintenance service agreement for installed products.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis-of-Design: The design for Overhead Coiling Service Doors is based on "Overhead Door Corp"., 2501 S. State Hwy. 121, Suite 200, Lewisville, TX 75067. ASD. Tel. Toll Free: (800) 275-3290. Phone: (469) 549-7100. Fax: (972) 906-1499. Web Site: www.overheaddoor.com. E-mail: sales@overheaddoor.com. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

1. Cornell.
2. Cookson.
3. Approved Equal

2.2 INSULATED OVERHEAD COILING SERVICE DOORS

A. Industrial Doors: Overhead Door Corporation, 625 Series Service Doors (Exterior Insulated Doors). DOORS 117A and 117B
   1. Curtain: Interlocking roll-formed slats as specified following. Endlocks shall be attached to each end of alternate slats to prevent lateral movement.
      a. Curved profile type C-187 for doors up to 15 feet 4 inches (4.67 m) wide, fabricated of:
      .
         1) 18 gauge galvanized steel.

B. Flat profile type F-265I for doors up to 40 feet (12.19 m) wide.

C. Front slat fabricated of:
   1. 22 gauge stainless steel.

D. Back slat fabricated of:
   1. 24 gauge stainless steel.
      a. Slat cavity filled with CFC-free foamed-in-place, polyurethane insulation

E. Finish:
   1. Stainless Steel: Slats and hood shall be stainless steel finished as follows.
      a. Finish: No. 4 satin finish.

F. Weatherseals:
   1. Vinyl bottom seal.

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G. Bottom Bar:
1. Two stainless steel angles minimum thickness 1/8 inch (3 mm) bolted back to back to reinforce curtain in the guides

H. Guides:
1. Three stainless steel angles minimum thickness 1/8 inch (3 mm) for doors over 15 feet 4 inches (4.67 m) wide or high.

I. Brackets:
1. Stainless steel to support counterbalance, curtain and hood.

J. Counterbalance: Helical torsion spring type housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to 0.03 inch per foot of span. Counterbalance is adjustable by means of an adjusting tension wheel.

K. Hood:
1. Stainless steel, 24 gauge hood with intermediate supports as required.

L. Manual (Back-Up) Operation:
1. Chain hoist for doors up to 96 SF

2.3 Electric Motor Operation: Provide UL listed electric operator, size as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second.

A. Sensing Edge Protection:
1. Electric sensing edge.

B. Operator Controls:
1. Push-button and key operated control stations with open, close, and stop buttons.
2. Controls for both interior and exterior location.
3. Controls flush mounted.

C. Motor Voltage: 115/208 single phase, 60 Hz.

2.4 Locking:

A. Cylinder lock for electric operation with interlock switch.

2.5 Wall Mounting Condition:

A. Between jambs mounting.

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2.6 Vision Lites: Provide with 3 inch by 5/8 inch (76 mm by 16 mm) uniformly spaced openings.

A. Provide with Plexiglas covers over openings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates upon which work will be installed and verify conditions are in accordance with approved shop drawings.

B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.

C. Commencement of work by installer is acceptance of substrate.

3.2 INSTALLATION

A. General: Install door and operating equipment with necessary hardware, anchors, inserts, hangers and supports.

B. Follow manufacturer's installation instructions.

3.3 ADJUSTING

A. Following completion of installation, including related work by others, lubricate, test, and adjust doors for ease of operation, free from warp, twist, or distortion.

3.4 CLEANING

A. Clean surfaces soiled by work as recommended by manufacturer.

B. Remove surplus materials and debris from the site.

3.5 DEMONSTRATION

A. Demonstrate proper operation to Owner's Representative.

B. Instruct Owner's Representative in maintenance procedures.

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END OF SECTION 083323

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SECTION 08 71 00 – DOOR HARDWARE

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes furnishing and installation of door hardware for doors specified in "Hardware Sets" and required by actual conditions. Including screws, bolts, expansion shields, electrified door hardware, and other devices for proper application of hardware.

B. Where items of hardware are not specified and are required for intended service, such omission, error or other discrepancy shall be submitted to Architect fourteen calendar days prior to bid date for clarification by addendum.

C. Products supplied but not installed under this Section:
   1. Electrified hardware will be furnished under this Section, but installed by the security contractor.

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

E. Related Divisions:
   1. Division 08 Openings
   2. Division 26 Electrical
   3. Division 28 Access Control

1.02 REFERENCES

A. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI):
   1. ANSI/BHMA A156.1 Butts & Hinges (2006)
   2. ANSI/BHMA A156.2 Bored & Preassembled Locks & Latches (2003)
   3. ANSI/BHMA A156.3 Exit Devices (2008)
   4. ANSI/BHMA A156.4 Door Controls – Closers (2008)
   5. ANSI/BHMA A156.6 Architectural Door Trim (2010)
   6. ANSI/BHMA A156.7 Template Hinge Dimensions (2009)
   7. ANSI/BHMA A156.8 Door Controls – Overhead Stops and Holders (2010)
   8. ANSI/BHMA A156.13 Mortise Locks & Latches (2005)
   9. ANSI/BHMA A156.18 Materials & Finishes (2006)
   10. ANSI/BHMA A156.21 Thresholds (2009)
   11. ANSI/BHMA A156.22 Door Gasketing Systems (2005)
   12. ANSI/BHMA A156.25 Electrified Locks (2007)
   13. ANSI/BHMA A156.28 Keying Systems (2007)
   14. ANSI/BHMA A156.31 Electric Strikes (2007)
   15. ANSI/BHMA A156.115 Hardware Preparation in Steel Doors and Steel Frames (2006)
   16. ANSI/BHMA A156.115W Hardware Preparation in Wood Doors with Wood or Steel Frames (2006)

B. International Code Council/American National Standards Institute (ICC/ANSI)/ADA:

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1. ICC/ANSI A117.1 Standards for Accessible and Usable Buildings and Facilities (2003)
2. Americans with Disabilities Act Accessibility Guidelines (ADAAG).

C. Underwriters Laboratories, Inc. (UL):
1. UL 10C Positive Pressure Fire Test of Door Assemblies
2. UL 1784 Air Leakage Test of Door Assemblies
3. UL/ULC Listed

D. Door and Hardware Institute (DHI):
1. DHI Publication – Keying Systems and Nomenclature (1989)
2. DHI Publication – Abbreviations and Symbols
3. DHI Publication – Installation Guide for Doors and Hardware
4. DHI Publication – Sequence and Format of Hardware Schedule (1996)

E. National Fire Protection Agency (NFPA)
1. NFPA 70 National Electrical Code (2008)
2. NFPA 80 Standard for Fire Doors and Other Opening Protective's (2007)
3. NFPA 101 Life Safety Code (2006)
4. NFPA 105 Standard for the Installation of Smoke Door Assemblies (2007)

F. Building Codes
1. IBC International Building Code (2009)
2. Local Building Code

1.03 SUBMITTALS

A. Submit in accordance with Conditions of the Contract and Division 1 Administrative Requirements.

B. Shop Drawings:
1. Hardware schedule shall be organized in vertical format illustrated in DHI Publications Sequence and Formatting for the Hardware Schedule. Include abbreviations and symbols page according to DHI Publications Abbreviations and Symbols. Complete nomenclature of items required for each door opening as indicated.
2. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of hardware.
3. Architectural Hardware Consultant (AHC), as certified by DHI, who shall affix seal attesting to completeness and correctness, shall review hardware schedule prior to submittal.

C. Submit manufacturer's catalog sheet on design, grade and function of items listed in hardware schedule. Identify specific hardware item per sheet, provide index, and cover sheet.

D. Coordination:

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1. Distribute door hardware templates to related divisions within fourteen days of receiving approved door hardware submittals.

E. Electrified Hardware: Provide electrical information to include voltage, and amperage requirements for electrified door hardware and description of operation.
   1. Description of operation for each electrified opening to include description of component functions including location, sequence of operation and interface with other building control systems.
   2. Wiring Diagrams: Detail wiring for power, signal, and control system and differentiate between manufacturers installed and field installed wiring. Include the following:
      a. System schematic
      b. Point to point wiring diagram
      c. Riser diagram
      d. Elevation of each door
   3. Detail interface between electrified door hardware and fire alarm, access control, security, and building control systems.

F. Upon door hardware submittal approval, provide for each electrified opening, three copies of point to point diagrams.

G. Closeout Submittals: Submit to Owner in a three ring binder or CD if requested.
   1. Warranties.
   2. Maintenance and operating manual.
   3. Maintenance service agreement.
   4. Record documents.
   5. Copy of approved hardware schedule.
   6. Copy of approved keying schedule with bitting list.
   7. Door hardware supplier name, phone number and fax number.

1.04 QUALITY ASSURANCE

A. Electrified door hardware shall be Listed and Labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authority having jurisdiction.

B. Hardware supplier shall employ an Architectural Hardware Consultant (AHC) as certified by DHI and a member of the seal program who shall be available at reasonable times during course of work for Project hardware consultation.
   1. Electrified Door Hardware Supplier Qualifications: Experienced door hardware supplier who has completed projects with electrified door hardware 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.

C. Door hardware shall conform to ICC/ANSI A117.1.
   1. Handles, Pulls, Latches, Locks and operating devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.

D. Fire Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and

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labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL 10C, unless otherwise indicated.

E. Smoke and Draft Control Door Assemblies: Where smoke and draft control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

F. Door hardware shall be certified to ANSI/BHMA standards as noted, participate and be listed in BHMA Certified Products Directory.

G. Substitution request: Refer to Division 1Substitutions for procedures to submit products meeting the requirements in this Section.

H. Pre-installation Meeting: Comply with requirements in Division 1 Section "Project Meetings."
1. Convene meeting seven days before installation. Participants required to attend: Contractor, installer, material supplier, manufacturer representatives, electrical contractor, security consultant and fire alarm consultant.
2. Include in conference decisions regarding proper installation methods and procedures for receiving and handling hardware.
3. Review sequence of operation for each type of electrified door hardware, inspect, and discuss electrical roughing-in and other preparatory work performed by other trades.
4. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.

I. Within fourteen days of receipt of approved door hardware submittals contact Owner with representative from hardware supplier to establish a keying conference. Verify keyway, visual key identification, number of master keys and keys per lock. Provide keying system per Owners instructions.

J. Installer Qualifications: Specialized in performing installation of this Section and shall have five years minimum documented experience.

K. Hardware listed in 3.07- Hardware Schedule is intended to establish a type and grade.

1.05 DELIVERY, STORAGE AND HANDLING

A. Provide a clean, dry and secure room for hardware delivered to Project but not yet installed.

B. Furnish hardware with each unit marked and numbered in accordance with approved finish hardware schedule. Include door and item number for each type of hardware.

C. Pack each item complete with necessary parts and fasteners in manufacturer's original packaging.

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D. Deliver permanent keys and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to Owner shall be established at "Keying Conference."

E. Waste Management and Disposal
   1. Separate waste materials for reuse or recycling in accordance with Division 1.

1.06 WARRANTY

A. General Warranty: Owner may have under provisions of the Contract Documents and shall be an addition and run concurrent with other warranties made by Contractor under requirements of the Contract documents.

B. Special Warranty: Warranties specified in this article shall not deprive Owner of other rights. Contractor, hardware supplier, and hardware installer shall be responsible for servicing hardware and keying related problems.
   1. Ten years for manual door closers.
   2. Five years for mortise, auxiliary and bored locks.
   3. Five years for exit devices.
   4. Two years for electromechanical door hardware.

C. Products judged defective during warranty period shall be replaced or repaired in accordance with manufacturer's warranty at no cost to Owner. There is no warranty against defects due to improper installation, abuse and failure to exercise normal maintenance.

D. Maintenance Tool and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, removal and replacement of door hardware.

PART 2 – PRODUCTS

2.01 HINGES

A. Hinges, electric hinges shall be of one manufacturer as listed for continuity of design and consideration of warranty.

B. Standards: Products to be certified and listed by the following:
   1. Butts and Hinges: ANSI/BHMA A156.1
   2. Template Hinge Dimensions: ANSI/BHMA A156.7

C. Butt Hinges:
   1. Hinge weight and size unless otherwise indicated in hardware sets:
      a. Doors up to 36" wide and up to 1-3/4" thick provide hinges with a minimum thickness of .134" and a minimum of 4-1/2" in height.
      b. Doors from 36" wide up to 42" wide and up to 1-3/4" thick provide hinges with a minimum thickness of .145" and a minimum of 4-1/2"" in height.
      c. For doors from 42" wide up to 48" wide and up to 1-3/4" thick provide hinges with a minimum thickness of .180" and a minimum of 5" in height.

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d. Doors greater than 1-3/4" thick provide hinges with a minimum thickness of .180" and a minimum of 5" in height.
e. Width of hinge is to be minimum required to clear surrounding trim.

2. Base material unless otherwise indicated in hardware sets:
   a. Exterior Doors: 304 Stainless Steel, Brass or Bronze material.
   b. Interior Doors: Steel material.
   c. Fire Rated Doors: Steel or 304 Stainless Steel materials.
   d. Stainless Steel ball bearing hinges shall have stainless steel ball bearings. Steel ball bearings are unacceptable.

3. Quantity of hinges per door unless otherwise stated in hardware sets:
   a. Doors up to 60"in height provide 2 hinges.
   b. Doors 60" up to 90" in height provide 3 hinges.
   c. Doors 90" up to 120" in height provide 4 hinges.
   d. Doors over 120" in height add 1 additional hinge per each additional 30" in height.
   e. Dutch doors provide 4 hinges.

4. Hinge design and options unless otherwise indicated in hardware sets:
   a. Hinges are to be of a square corner five-knuckle design, flat button tips and have ball bearings unless otherwise indicated in hardware sets.
   b. Out-swinging exterior and out-swinging access controlled doors shall have non-removable pins (NRP) to prevent removal of pin while door is in closed position.
   c. When full width of opening is required, use hinges that are designed to swing door completely from opening when door is opened to 95 degrees.
   d. Electric Through Wire (ETW) to have appropriate number of wires to transfer power through door frame to door for proper connection of finish hardware and certified to handle an amperage rating of 3.5AMPS/continuous duty with 16.0AMPS/intermittent duty.
   e. Provide mortar boxes for frames that require any electrically modified hinges if not an integral part of frame.
   f. When shims are necessary to correct frame or door irregularities, provide metal shims only.

5. Acceptable Manufactures:

	Standard Weight	Heavy Weight
a. Hager	BB1279/BB1191	BB1168
b. Bommer	BB5000/BB5002 BB5004	
c. McKinney	TA2714/TA2314	T4A3786

2.02 ELECTRIC STRIKES

A. Provide for use with type of locks shown on hardware schedule.

B. Standards: Manufacturer shall meet the following:

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1. ANSI/BHMA A156.31 Electric Strikes and Frame Mounted Actuators Grade 1
2. UL Tested 1500 lb. static strength.
3. UL listed for Fire Doors and Frames where applicable.
4. UL 1034 Burglary Resistance
5. UL10C.3H fire rated, 4'x 8'door

C. Material and Design:
1. To accept up to ¾" latch bolt and 1" deadbolt.
2. Field reversible, Fail Safe of Fail Secure
3. Dual voltage 12/24 VDC.
4. Tamper resistant, stainless steel corrosion resistance parts, and cast body and keeper.

D. Acceptable Manufactures:
1. HES: 9600 series

2.03 LOCKS AND LATCHES

A. Locks and latches shall be of one manufacturer as listed for continuity of design and consideration of warranty.

B. Standards: Product to be certified and listed by following:
1. ANSI/BHMA A156.2 Series 4000 Certified to Grade 1.
2. ANSI/BHMA A250.13 Certified for a minimum design load of 1150lbf (100psf) for single out swinging doors measuring 36" in width and 84" in height and a minimum design load of 1150lbf (70psf) for out swinging single doors measuring 48" in width and 84" in height.
3. UL/cUL Labeled and listed for functions up to 3 hours for single doors up to 48" in width and up to 96" in height.
4. UL10C/UBC 7-2 Positive Pressure Rated.
5. ICC/ANSI A117.1.

C. Lock and latch function numbers and descriptions of manufactures series as listed in hardware sets.

D. Material and Design:
1. Lock and Latch chassis to be Zinc dichromate for corrosion resistance.
2. Keyed functions to be of a freewheeling design to help resists against vandalism.
3. Non-handed, field reversible.
4. Thru-bolt mounting with no exposed screws.
5. Levers shall be Zinc cast and plated to match finish designation in hardware sets.
6. Roses shall be of solid Brass or Stainless Steel material.

E. Latch and Strike:
1. Stainless Steel latch bolt with minimum of ½" throw and deadlocking for keyed and exterior functions. Provide ¾" latchbolt for pairs of fire rated doors where required by door manufacture. Standard backset to be 2-3/4" and faceplate shall be adjustable to accommodate a square edge door or a standard 1/8" beveled edge door.
2. Strike is to fit a standard ANSI A115 prep measuring 1-1/4" x 4-7/8" with proper lip length to protect surrounding trim.

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F. Acceptable Manufactures:
   1. Schlage: ND Series.

2.04 LOCKS AND LATCHES

A. Locks and latches shall be of one manufacturer as listed for continuity of design and consideration of warranty.
B. Standards: Product to be certified and listed by following:
   1. ANSI/BHMA A156.13 Series 1000 Certified to Grade 1 for Operational and Security.
   2. UL/cUL Labeled and listed up to 3 hours for single doors up to 48" in width and up to 96" in height.
   3. UL10C/UBC 7-2 Positive Pressure Rated.
   4. ICC/ANSI A117.1.

C. Lock and latch function numbers and descriptions of manufactures series as listed in hardware sets.

D. Material and Design:
   1. Lock cases from fully wrapped, 12 gauge steel, Zinc dichromate for corrosion resistance.
   2. Non-handed, field reversible without opening lock case.
   3. Break away spindles to prevent unlocking during forced entry or vandalism.
   4. Levers are to be Zinc cast, Forged Brass or Stainless Steel and plated to match finish designation in hardware sets.
   5. Sectional Roses are to be of solid Brass or Stainless Steel material and have a minimum diameter of 2-7/16".
   6. Armor fronts are to be self-adjusting to accommodate a square edge door or a standard 1/8" beveled edge door.

E. Latch and Strike:
   1. Stainless Steel latch bolt with minimum of ¾" throw and deadlocking for keyed and exterior functions.
   2. Strike is to fit a standard ANSI A115 prep measuring 1-1/4" x 4-7/8" with proper lip length to protect surrounding trim.
   3. Deadbolts to be 1-3/4" total length with a minimum of a 1" throw and ¾" internal engagement when fully extended and made of Stainless Steel material.

F. Electric Locks
   1. Fail Secure (power unlock) Outside trim is locked when there's no power and unlocked when power is applied. Lockset will be locked in the event of a power failure. (EU)

G. Acceptable Manufactures:
   1. Schlage: L Series.

2.05 EXIT DEVICES

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A. Shall be touch pad type, finish to match balance of door hardware. Exit Devices shall be of one manufacturer as listed for continuity of design and consideration of warranty.

B. Standards: Manufacturer to be certified and or listed by the following:
   1. BHMA Certified ANSI A156.3 Grade 1
   2. UL/cUL Listed for up to 3 hours for "A" labeled doors
   3. UL10C/UBC 7-2 Positive Pressure Rated
   4. UL10B Neutral Pressure Rated
   5. UL 305Listed for Panic Hardware

C. Material and Design:
   1. Touch pad shall extend a minimum of one half-door width. Freewheeling lever design shall match design of locks levers. Exit device to mount flush with door.
   2. Latchbolts:
      a. Rim device – ¾" throw, Pullman type with automatic dead-latching, stainless steel
      b. Surface vertical rod device – Top ½" throw, Pullman type with automatic dead-latching, stainless steel. Bottom ½" throw, Pullman type, held retracted during door swing, stainless steel.
   3. Fasteners: Wood screws, machine screws and thru-bolts.

D. Lock and Latch Functions: Function numbers and descriptions of manufacturer's series and lever styles indicated in door hardware sets.

E. Acceptable Manufactures:
   1. Hager Companies: 4500 Series
   2. Von Duprin: 99 Series
   3. Sargent: 80 Series

2.06 HIGH SECURITY LOCK

A. Shall be of one manufacturer as listed for continuity of design and consideration of warranty.

B. Standards and Codes:
   1. NFPA 101.
   2. ICC/ANSI A117.1.
   3. UL/cUL Labeled and listed.
   4. Federal Specifications FFL2740A and FFL2890

C. Acceptable Manufactures:
   1. Southern Folger Adam (210-533-1231)

2.07 CYLINDERS AND KEYING

A. Cylinders shall be of one manufacturer as listed for continuity of design and consideration of warranty.

B. Standards: Manufacturer shall meet the following:
   1. Auxiliary Locks: ANSI/BHMA A156.5
   2. DHI Handbook "Keying systems and nomenclature" (1989)

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C. Cylinders:
   1. Manufacturer's standard tumbler type, six pin.
   2. Shall be furnished with cams/tailpieces as required for locking device that is being furnished for project.

D. Keying:
   1. Copy of Owners approved keying schedule shall be submitted to Owner and Architect with documentation of which keying conference was held and Owners sign-off.
   2. Provide a bitting list to Owner of combinations as established, and expand to twenty five percent for future use or as directed by Owner.
   3. Key into Owner's existing keying system.
   4. Keys to be shipped to Owner's representative, individually tag per keying conference.

E. Acceptable manufactures:
   1. Schlage

2.08 CLOSERS

A. Shall be product of one manufacturer. Unless otherwise indicated on hardware schedule, comply with manufacturer's recommendation for size of closer, depending on width of door, frequency of use, atmospheric pressure, ADAAG requirements, and fire rating.

B. Standards: Manufacturer to be certified and or listed by the following:
   1. BHMA Certified ANSI A156.4 Grade 1
   2. ADA Compliant ANSI A117.1
   3. UL/cUL Listed up to 3 hours.
   4. UL10C Positive Pressure Rated
   5. UL10B Neutral Pressure Rated

C. Material and Design:
   1. Provide cast iron non-handed bodies with full plastic covers.
   2. Closers shall have separate staked adjustable valve screws for latch speed, sweep speed, and backcheck.
   3. Provide Tri-Pack arms and brackets for regular arm, top jamb, and parallel arm mounting.
   4. One-piece seamless steel spring tube sealed in hydraulic fluid.
   5. Double heat-treated steel tempered springs.
   6. Precision-machined heat-treated steel piston.
   7. Triple heat-treated steel spindle.
   8. Full rack and pinion operation.

D. Mounting:
   1. Out swing doors shall have surface parallel arm mount closers except where noted on hardware schedule.
   2. In swing doors shall have surface regular arm mount closers except where noted on hardware schedule.

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3. Provide brackets and shoe supports for aluminum doors and frames to mount fifth screw.
4. Furnish drop plates where top rail conditions on door do not allow for mounting of closer and where backside of closer is exposed through glass.

E. Size closers in compliance with requirements for accessibility (ADDAG). Comply with following maximum opening force requirements.
1. Interior hinged openings: 5.0 lbs.
2. Fire rated and exterior openings shall have minimum opening force allowable by authority having jurisdiction.

F. Fasteners: Provide self-reaming and self-tapping wood and machine screws and sex nuts and bolts for each closer.

G. Acceptable manufactures:
1. Hager Companies: 5100 Series
2. LCN: 4040 Series
3. Sargent: 281 Series

2.09 PROTECTIVE TRIM

A. Size of protection plate: Single doors, size two inches less door width (LDW) on push side of door, and one inch less on pull side of door. For pairs of doors, size one inch less door width (LDW) on push side of door, and ½ inch on pull side of door.
1. Kickplates 10” high or sized to door bottom rail height

B. Standards: Manufacturer shall meet requirements for:
1. Architectural Door Trim: ANSI/BHMA A156.6
2. UL

C. Material and Design:
1. 0.050” gage stainless steel
2. Corners shall be square. Polishing lines or dominant direction of surface pattern shall run across the door width of plate.
3. Bevel top, bottom and sides uniformly leaving no sharp edges. Edges shall be de-burred.
4. Countersink holes for screws. Screws holes shall be spaced equidistant eight inches CTC, along a centerline not over ½ inch in from edge around plate. End screws shall be a maximum of 0.53 inch from corners.

D. UL label stamp required on protection plates when top of plate is more than 16 inches above bottom of door on fire rated openings. Verify door manufactures UL listing for maximum height and width of protection plate to be used.

E. Acceptable Manufactures:
1. Hager Companies: 194S
2. Trimco
3. Burns

2.10 STOPS AND HOLDERS

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A. Wall Stops: Provide door stops wherever necessary to prevent door or hardware from striking an adjacent partition or obstruction. Provide wall stops when possible. Door stops and holders mounted in concrete floor or masonry walls shall have stainless steel machine screws and lead expansion shields.

B. Standards: Manufacturer shall meet requirements for:
1. Auxiliary Hardware: ANSI/BHMA A156.16

C. Acceptable Manufactures:

	Convex
1. Hager Companies	232W
2. Rockwood	
3. Burns	

D. Overhead Stops and Holders: Provide overhead stop and holders for doors that open against equipment, casework sidelights and other objects that would make wall stops/holders and floor stops/holders inappropriate. Provide sex bolt attachments for mineral core wood door applications.

E. Standards: Manufacturer shall be certified by the following:
1. Overhead Stops and Holders: ANSI/BHMA A156.8 Grade 1

F. Acceptable Manufactures:

	Heavy Duty Surface
1. Hager	7000 SRF Series
2. Glynn Johnson	90 Series
3. Sargent	590 Series

2.11 POWER SUPPLY (for modular access control)

A. Shall be of one manufacturer as listed for continuity of design and consideration of warranty.

B. Standards: Manufacturer shall meet requirements for:
1. UL Listed

C. Design:
1. Use with modular access control systems
2. Field selectable filtered and regulated 12 VDC or 24 VDC constant voltage
3. 1 AMP load capacity
4. Circuit breaker protected AC input voltage, secondary output PTC protected
5. Fire alarm input provides simultaneous release of Fail Safe locks and holders
6. Interface relay
7. LED status indicators provide information regarding AC input, DC output, and battery backup status

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8. Separate inputs for activation switch on entry and egress and ingress side of opening.
9. 5 amp hour battery backup
10. Input 115 VAC (230 VAC optional)
11. Optional dual 12 VDC or 24 VDC output

D. Acceptable Manufacturers:
1. Hager 2908

2.12 DOOR GASKETING AND WEATHERSTRIP

A. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing where indicated on hardware schedule. Provide non-corrosive fasteners for exterior applications.
1. Perimeter gasketing: Apply to head and jamb, forming seal between door and frame.
2. Meeting stile gasketing: Fasten to meeting stiles, forming seal when doors are in closed position.
3. Door bottoms: Apply to bottom of door, forming seal with threshold or floor when door is in closed position.
4. Sound Gasketing: Cutting or notching for stop mounted hardware not permitted.
5. Drip Guard: Apply to exterior face of frame header. Lip length to extend 4” beyond width of door.

B. Standards: Manufacturer shall meet requirements for:
1. Door Gasketing and Edge Seal Systems: ANSI/BHMA A156.22

C. Smoke-Labeled Gasketing: Comply with NFPA 105 listed, labeled, and acceptable to authorities having jurisdiction, for smoke control indicated.
1. Provide smoke labeled gasketing on 20 minute rated doors and on smoke rated doors.

D. Fire-Rated Gasketing: Comply with NFPA 80 listed, labeled, and acceptable to Authorities Having Jurisdiction, for fire ratings indicated.

E. Acceptable Manufactures:
1. Perimeter Gasketing:

	Adhesive Applied	Stop Applied
a. Hager Companies:	721S	881S
b. Zero:		
c. Reese:		

2. Door Bottom Sweeps:
a. Hager Companies: 750S
b. Zero:
c. Reese:

3. Overhead Drip Guard
a. Hager Companies: 810S
b. Zero:
c. Reese:

2.13 THRESHOLDS

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A. Set thresholds for exterior and acoustical openings in full bed of sealant with lead expansion shields and stainless steel machine screws complying with requirements specified in Division 7 Section "Joint Sealants". Notched in field to fit frame by hardware installer. Refer to Drawings for special details.

B. Standards: Manufacturer to be certified by the following:
   1. Thresholds: ANSI/BHMA A156.21
   2. Americans with Disabilities Act Accessibility Guidelines (ADAAG).

C. Acceptable Manufactures:
   1. Hager Companies: 417S/520S
   2. Zero
   3. Reese

2.14 FINISHES

A. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if within range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within range of approved Samples.

B. Comply with base material and finish requirements indicated by ANSI/BHMA A156.18 designations in hardware schedule.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install hardware per manufacturer's instructions and in compliance with:
   1. NFPA 80.
   2. NFPA 105.
   3. ICC/ANSI A117.1.
   4. ANSI/BHMA A156.115 Hardware Preparation in Steel Doors and Steel Frames
   5. ANSI/BHMA A156.115W Hardware Preparation in Wood Doors with Wood or Steel Frames
   6. DHI Publication – Installation Guide for Doors and Hardware
   7. UL10C/UBC7-2

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8. Local building code.
9. Approved shop drawings.
10. Approved finish hardware schedule.

B. Do not install surface mounted items until finishes have been completed on substrates involved. Set unit level, plumb and true to line location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

3.03 FIELD QUALITY CONTROL

A. Material supplier to schedule final walk through to inspect hardware installation ten business days before final acceptance of Owner. Material supplier shall provide a written report detailing discrepancies of each opening to General Contractor within seven calendar days of walk through.

3.04 ADJUSTMENT, CLEANING AND DEMONSTRATING

A. Adjustment: Adjust and check each opening to ensure proper operation of each item of finish hardware. Replace items that cannot be adjusted to operate freely and smoothly or as intended for application at no cost to Owner.

B. Cleaning: Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no cost to Owner.

C. Demonstration: Conduct a training class for building maintenance personnel demonstrating the adjustment, operation of mechanical and electrical hardware. Special tools for finished hardware to be turned over and explained usage at this meeting.

3.05 PROTECTION

A. Leave manufacturer's protective film intact and provide proper protection for all other finish hardware items that do not have protective material from the manufacture until Owner accepts Project as complete.

3.06 HARDWARE SET SCHEDULE

A. Guide: Door hardware items have been placed in sets which are intended to be a guide of design, grade, quality, function, operation, performance, exposure, and like characteristics of door hardware, and may not be complete. Provide door hardware required to make each set complete and operational.

B. Hardware schedule does not reflect handing, backset, method of fastening and like characteristics of door hardware and door operation.

C. Review door hardware sets with door types, frames, sizes and details on drawings. Verify suitability and adaptability of items specified in relation to details and surrounding conditions.

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3.07 HARDWARE SCHEDULE

Heading 1

Door # 101
Each opening to receive

Qty.	Type	Description	Finish
1 ea.	Exit Device	4501 x RIM	626
1 ea.	Exit Device Trim	45NL x WTN	626
1 ea.	Cylinder	20-022	626
1 ea.	Electric Strike	9600	630
1 ea.	Edge Filler	336A	600
1 ea.	Lock Filler	336D	600

Reuse remainder of existing hardware

Card Reader by Security Consultant

Description of operation:
Door is normally closed and secure, entry by key leaves trim in locked position
Upon proper card validation, electric strike releases allowing entry
Door relocks upon closing
Free egress all times
Door remains closed and locked during power failure or fire alarm activation (fail secure)

Heading 2

Door # 103
Each opening to receive

Qty.	Type	Description	Finish
3 ea.	Hinges	BB1279 x 4.5” x 4.5”	652
1 ea.	Storeroom Lockset	ND80PD x RHO	626
1 ea.	Closer	5100	689
1 ea.	Kickplate	194S	630
1 ea.	Wall Stop	232W	630
1 ea.	Gasket	721S	CHARCOAL

Heading 3

Door # 106
Each opening to receive

Qty.	Type	Description	Finish
3 ea.	Hinges	BB1279 x 4.5” x 4.5”	652
1 ea.	Classroom Lockset	ND70PD x RHO	626

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1 ea.	Closer	5100	689
1 ea.	Overhead Stop	7016 x SRF	630
1 ea.	Kickplate	194S	630
1 ea.	Gasket	721S	CHARCOAL

Heading 4

Door # 117A
Each opening to receive

Qty.	Type	Description	Finish

Hardware by door supplier

Heading 5

Door # 117B
Each opening to receive

Qty.	Type	Description	Finish
3 ea.	Hinges	BB1191 x 4.5” x 4.5” x NRP	630
1 ea.	Exit Device	4501 x RIM	626
1 ea.	Exit Device Trim	45NL x WTN	626
1 ea.	Cylinder	20-022	626
1 ea.	Electric Strike	9600	630
1 ea.	Closer	5100 x HDCS	689
1 ea.	Kickplate	194S	630
1 ea.	Threshold	520SV	MIL
1 ea.	Sweep	770SV	MIL
1 ea.	Weatherstrip	881SN	MIL
1 ea.	Drip Guard	810S	MIL

Card Reader by Security Consultant

Description of operation:
Door is normally closed and secure, entry by key leaves trim in locked position
Upon proper card validation, electric strike releases allowing entry
Door relocks upon closing
Free egress all times
Door remains closed and locked during power failure or fire alarm activation (fail secure)

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Heading 6

Door # 118
Each opening to receive

Qty.	Type	Description	Finish
1 ea.	Electrified Hinge	BB1168 x 4.5” x 4.5” x ETW	652
2 ea.	Hinges	BB1168 x 4.5” x 4.5” x NRP	652
1 ea.	Electrified Lockset	10600E	626
1 ea.	Closer	5100 x HDCS	689
1 ea.	Kickplate	194S	630
1 ea.	Threshold	417S	MIL
1 ea.	Sweep	750SN	MIL
1 ea.	Gasket	721S	CHARCOAL
1 ea.	Power Supply	As Needed	

Card Reader by Security Consultant

Description of operation:
Door is normally closed and secure, entry by key leaves trim in locked position
Upon proper card validation, lever releases allowing entry
Door relocks upon closing
Free egress all times
Door remains closed and locked during power failure or fire alarm activation (fail secure)

Heading 7

Door # 119
Each opening to receive

Qty.	Type	Description	Finish
1 ea.	Electrified Hinge	BB1279 x 4.5” x 4.5” x ETW	652
2 ea.	Hinges	BB1279 x 4.5” x 4.5” x NRP	652
1 ea.	Electrified Lockset	L9082P x EU x 06A	626
1 ea.	Closer	5100 x HDCS	689
1 ea.	Kickplate	194S	630
1 ea.	Gasket	721S	CHARCOAL
1 ea.	Power Supply	PS914-2RS	

(2)Card Reader by Security Consultant

Description of operation:
Door is normally closed and secure, entry by key from either side leaves trim in locked position
Upon proper card validation from either side, lever releases allowing entry
Door relocks upon closing
Door remains closed and locked during power failure or fire alarm activation (fail secure)

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END OF SECTION

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SECTION 089000
LOUVERS AND VENTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Provide louvers complying with performance requirements indicated as demonstrated by testing according to AMCA 500-L.

B. Submittals: Product Data and Shop Drawings.

PART 2 - PRODUCTS

2.1 LOUVERS

A. Horizontal, Extruded-Aluminum Louvers:

1. Manufacturers
   a. Arrow United Industries; a division of Mestek, Inc.
   b. Greenheck Fan Corporation.
   c. Ruskin Company; Tomkins PLC.

2. Louver Depth: 2 inches.
3. Aluminum Thickness: 0.063 inch for blades and for frames.
4. Free Area: Not less than 1.32 sqft.
5. Air Performance: Not more than 0.06 static pressure drop at 600-fpm 0-fpm intake velocity.

2.2 MATERIALS

A. Aluminum Extrusions: ASTM B 221 Alloy 6063-T5.

B. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel.

2.3 LOUVER FINISHES

A. Galvanized-Steel Louvers: Mill Finish

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install louvers level, plumb, and at indicated alignment with adjacent work.

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B. Provide perimeter reveals of uniform width for sealants and joint fillers, as indicated.

C. Use concealed anchorages where possible.

D. Protect metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

END OF SECTION 08 9000

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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. This Section includes the following:

1. Light gage interior metal drywall studs for partitions and bulkhead framing.
2. Metal drywall ceiling framing, furring and accessories.
3. Metal drywall suspended ceiling grid system.
4. Gypsum board and anchorages, and control joints.
5. Architectural metal drywall profiles.
6. Acoustical insulation and sealants.
7. Taped and sanded joint treatment.
8. Installation of items supplied by other sections and trades.

B. Products installed but furnished under other sections:

1. Metal wall/ceiling access panels furnished by other trades, as appropriate to project.
2. Lighting fixture frames and rings, etc., within gypsum board ceiling system.

C. Related Sections include the following:

1. Division 05 Section "Cold-Formed Metal Framing": For exterior and interior load-bearing and exterior non-load bearing framing.
2. Division 06 Section "Miscellaneous Rough Carpentry": Fire retardant wood blocking and framing.
3. Division 08 Section "Hollow Metal Doors and Frames": Hollow metal door frames, sidelight frames, and individual interior borrowed light frames.
4. Division 08 Section "Access Doors": Manufactured metal access panel assemblies.
5. Division 09 Section "Painting": Priming and final field paint finish.

1.3 SUBMITTALS

A. Shop Drawings, Product Data, and Samples: Submit in accordance with Division 01.

B. Shop Drawings: Indicate special details associated with fireproofing, acoustical seals, and ceiling and bulkhead framing.

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C. Product Data: Provide manufacturer's descriptive literature on metal framing, gypsum board, joint tape, and installation instructions and procedures.

D. Samples: Prior to delivery of materials, submit to jobsite for approval by Architects samples of the following:

1. One 12-inch sample of floor and ceiling track, metal screw stud, and accessories.
2. One 4-inch by 4-inch sample of each proposed type wallboard and accessories, properly labeled.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ASTM C754, ASTM C840, GA-214, and GA-216.

B. Maintain copies of GA-214 and GA-216 documents on site.

C. When fire resistive construction is detailed or noted on the Drawings, perform work in accordance with GA-600.

1.5 QUALIFICATIONS

A. Erector Qualifications: Company specializing in the erection of metal stud framing and gypsum wallboard systems on at least three acceptable projects equal in scope to work specified.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery:

1. Deliver all products and materials in manufacturer's original unopened packaging, containers, or bundles with labels intact and legible.
2. Remove all items delivered in broken, damaged, rusted, or unlabeled condition from site immediately.

B. Handling: Handle and protect all materials and metal accessories from damage, dampness or wetting.

C. Storage:

1. Store all materials inside under cover, providing protection from damage and exposure to the elements, stacked flat, and off floor.
2. Stack wallboard so that lengths are not over short lengths, avoid overloading floor system.
3. Store adhesives and ready-mixed joint compound in dry area, provide protection against freezing at all times.
4. Damaged, frozen, and deteriorated materials shall be removed from job site.

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1.7 JOB CONDITIONS

A. Environmental Conditions:

1. Temperature: During cold weather, in areas receiving wallboard installation and joint finishing, maintain temperature range between 55 degrees F and 70 degrees F for 24 hours before, during, and after gypsum wallboard and joint treatment applications.
2. Ventilation:

a. Provide adequate ventilation to carry off excess moisture during and following adhesive and joint compound treatment applications.
b. Use temporary air circulators in enclosed area lacking natural ventilation. Under slow drying conditions, allow additional drying time between coats of joint treatment.
c. Protect installed materials from drafts during hot, dry weather.

B. Protection: Protect adjacent surfaces against damage and stains.

PART 2 - PRODUCTS

2.1 METAL FRAMING MATERIALS

A. Provide metal wall and bulkhead framing materials in accordance with GA 216.
B. Metal Studs - Drywall Type: ASTM C645: non-load bearing, galvanized sheet steel, ASTM A525; Cee-shaped, size as indicated, conforming to the following:

1. Rated/non-rated, non-bearing metal stud partitions with single/double layer drywall: 25 gage up to 11-feet 6-inches in height; 20 gage over 11-feet 6-inches in height.
2. Rated/non-rated, load bearing metal stud partition with single/double layer drywall: 20 gage.
3. Metal studs for ceiling and bulkhead framing: 25 gage.
4. Metal stud partitions with gypsum board/cement backerboard and ceramic tile finish: 20 gage or heavier.
5. Metal stud framing at hollow metal door and light openings: 20 gage.
6. Metal studs for infill framing at renovation/alteration areas: 25 gage.
7. Runners: Of same material and thickness as studs.

C. Ceiling Runner: Provide with extended leg retainer.

D. Furring, Bridging and Bracing: Of same material as studs; thickness to suit purpose.

E. Sheet Metal Backing: 20 gage thickness, galvanized steel.

F. Fasteners: GA-216.

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G. Touch-Up Primer for Galvanized Surfaces: SSPC SP 20, zinc rich.

H. Anchorage to Substrate: Tie wire, screws, nails and other metal supports, of type and size to suit application; to rigidly secure materials in place.

2.2 SOFFIT AND BULKHEAD FRAMING

A. Channels:

1. Fabricated of 16 gage cold-rolled steel, factory applied black asphaltum rust-resistant paint.
2. Minimum weight per 1,000 lineal feet:

a. Depth: 2 inches, 590 lbs.
b. Depth: 1-1/2-inches, 300 lbs.

B. Furring Channels: Screw-type, hat-shaped, 25 gage.

C. Optional Framing: Metal stud, ASTM C645 and GA 216, galvanized sheet steel, screw-type, Cee-shaped, minimum 25 gage.

D. Ceiling Hangers: Minimum 8 gage, galvanized, annealed steel wire.

E. Tie Wire: 16 gage, galvanized, annealed steel wire.

F. Anchorage to Substrate: Tie wire, screws, nails and other metal supports, of type and size to suit application; to rigidly secure materials in place.

2.3 SUSPENDED GYPSUM BOARD CEILING GRID SYSTEM

A. Grid Suspension System for Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

a. Armstrong World Industries, Inc.; HD8906, Drywall Grid Systems.
b. Chicago Metallic Corporation; 650-C, Drywall Furring System.
c. USG Corporation; DGLW, Drywall Suspension System.

2.4 GYPSUM BOARD MATERIALS

A. Size: Provide in maximum lengths and widths available that will minimize joints and correspond with support system indicated.

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B. Surface Burning Characteristics: When tested in accordance with ASTM E84 requirements.

1. Flame Spread Index: 25 maximum.
2. Smoke Development: 0.

C. General: Comply with ASTM C 1396, as applicable to type of gypsum board indicated.

1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. American Gypsum Co.
b. BPB America Inc.
c. G-P Gypsum.
d. Lafarge North America Inc.
e. National Gypsum Company.
f. USG Corporation.
g. Or equal as approved by Architect.

D. Standard Gypsum Board: Gypsum core wall panel surfaced with paper on front, back, and long edges.

1. Thickness: 5/8-inch thickness unless otherwise indicated.
2. Edges: Tapered long edges and square cut ends.

E. Fire Rated Gypsum Board: Gypsum core wall panel with additives to enhance fire resistance of the core; surfaced with paper on front, back, and long edges.

1. Thickness: 5/8-inch thickness unless otherwise indicated.
2. Edges: Tapered long edges and square cut ends.

F. Moisture Resistant Gypsum Board: Coated glass mat-faced with treated gypsum core panel; physical properties conforming to the applicable sections of ASTM C 1177 and ASTM C 630; "DensArmor Plus Interior Panels" as manufactured by G-P Gypsum Corp., or equal as approved by Architect.

1. Thickness: 5/8-inch thickness unless otherwise indicated.
2. Edges: Tapered long edges and square cut ends.
3. Locations: For use at interior gypsum board ceilings at Locker Rooms, Showers, Toilet Rooms and wet or high moisture areas.

G. Glass-Mat, Water-Resistant Backing Board: Mold-resistant tile backer board with glass mat facings and acrylic coating complying with ASTM C 1178; "DensShield Tile Backer" as manufactured by G-P Gypsum Corp., or equal as approved by Architect.

1. Thickness: 5/8-inch thickness unless otherwise indicated.
2. Edges: Square.

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H. Exterior Gypsum Sheathing Board: Gypsum core wall panel with additives to enhance the water resistance of the core; surfaced with water repellent paper front, back, and along edges; complying with ASTM C79; fire-resistant.

1. Thickness: 1/2-inch thick unless otherwise indicated.
2. Edges: V-shaped tongue and grooved edges for horizontal application.

I. Impact Resistant Fiber-Reinforced Gypsum Board: Non-paper faced, fiber-reinforced, gypsum wall panel; fire rated as required; complying with ASTM C1278 and ASTM C36; "Fiberock VHI Panels" as manufactured by USG.

1. Thickness: 5/8-inch thickness unless otherwise indicated.
2. Edges: Tapered long edges and square cut ends.

2.5 GYPSUM BOARD ACCESSORIES

A. Provide gypsum wallboard accessories in accordance with GA 216.

B. Fasteners: Screws ASTM C1002, self-drilling, self-tapping, Bugle Head, for use with power driven tool.

1. Type "S": for wallboard application to sheet metal framing
2. Type "W": for wallboard application to wood framing.
3. Fire Rated Construction: Same type and size as used in fire rating test.
4. Non-Fire Rated Construction: Type and size as recommended by gypsum board manufacturer.

C. Metal Trim Accessories: Size required for thickness of wallboard used, fabricated from galvanized steel and roll-formed zinc, or other corrosion resistant treatment.

1. Corner Beads: Formed galvanized steel angle, 1/8-inch round bead, 1-1/4-inch perforated metal flanges, ASTM C1047.
2. Edge Trim: Formed galvanized steel casing bead, 0.014-inch thick base steel, face nailed, reveal bead and exposed metal flange surface finished with joint compound, ASTM C1047.
3. Control Joints: Manufacturer's standard roll-formed zinc with 1/4-inch “V” shaped slot protected by plastic tape, for face application, exposed flange surfaces finished with joint compound, ASTM C1047.

D. Joint Treatment Materials:

1. Joint Tape: ASTM C475; paper reinforcing tape, perforated.
2. Joint Compound: ASTM C475; drying type pre-mixed vinyl base compounds.

E. Laminating Adhesive: Manufacturer's recommended laminating adhesive or liquid contact adhesive for double-layer systems.

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F. Architectural Metal Drywall Profiles:

1. Provide, where indicated, extruded and roll-formed Architectural profiles as manufactured by Fry Reglet.
2. Designs: As indicated on drawings.
3. Material: Extrusions shall be of 6063 T5 aluminum alloy, and roll formed shapes shall be of 3003 H-14 aluminum alloy.
4. Construction: Profile shall incorporate continuous integral tapering fins for surface contact. Fins shall be punched with 1/4-inch holes staggered 1/2-inch o.c. to accept standard screw fastening.
5. Finish: Profiles shall receive a factory applied high porosity corrosion resistant primer compatible with materials commonly in use in conjunction with commercial interiors, i.e. joint compound, latex or enamel paints, and wall covering adhesives.

2.6 ACOUSTICAL ACCESSORIES

A. Acoustical Insulation: Preformed mineral fiber, ASTM C665, Type 1; unfaced, friction fit type, thickness equal to stud depth or as indicated; “Thermafiber SAFB”.

B. Acoustical Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board; type as recommended by gypsum manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that site conditions are ready to receive work and opening dimensions are as indicated on Contract Drawings and approved shop drawings.

3.2 METAL STUD INSTALLATION - GENERAL

A. Install metal stud framing in accordance with manufacturer’s instructions, and ASTM C754, except as otherwise specified below.

B. Install members true to lines and levels to provide surface flatness with maximum variation of 1/8-inch in 10 feet in any direction.

3.3 INSTALLATION - METAL STUDS

A. Floor and Ceiling tracks:

1. Align floor and ceiling tracks.

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2. Attach metal runners at floor and ceiling to structural elements with appropriate power driven fasteners.
3. Attach tracks to structure with fasteners located 2 inches from each end and spaced at maximum 24 inches on centers.
4. Maintain clearance under structural building members to avoid deflection transfer to studs. Provide extended leg ceiling runners.

B. Metal Stud:

1. Plumb and align studs.
2. Space studs 16 inches on center, unless otherwise indicated.
3. Attach studs to floor and ceiling tracks by crimping flange of runner track, screwing, tack welding or method recommended by stud manufacturer.
4. If necessary, splice studs by nesting with minimum lap of 8 inches.
5. Refer to Drawings for indication of partitions extending to finished ceiling only and for partitions extending through the ceiling to the structure above.

C. Framing Around Door and Light Openings:

1. Install double studs at each jamb of door, continuous for full height of partition.
2. Attach stud track horizontally on each side of opening, at frame head height.

    a. Install jack studs at 16 inches on centers over head of door frame.
    b. Attach jack studs to runner track and anchor top in same manner as provided for full studs.

3. Screw, bolt or weld stud to jamb anchors of frame, as recommended by stud manufacturer.
4. Anchor a second stud to stud at doorjamb, as recommended in manufacturer's printed instructions, nested to form a box.
5. Provide headers above and below framed wall openings having an area of 2 square feet or more.

D. Corners and Intersections:

1. Form corners and intersection of partitions with three studs as detailed in ASTM C754, Figures 2 and 3. Two-stud corner construction is not acceptable.
2. Place studs forming internal corners 2 inches from point of partition intersections.

E. Blocking: Bolt or screw steel channels to studs. Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, and other similar items.

3.4 INSTALLATION - WALL FURRING

A. Attach wall furring for direct attachment to concrete block and/or concrete walls.

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B. Erect furring channels horizontally or vertically; space maximum 16 inches on center, not more than 4 inches from floor and ceiling lines or abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.

C. Where furring channels are installed directly to exterior walls and a possibility of moisture penetration through walls exists, install asphalt felt paper protection strip between the channel and wall.

3.5 INSTALLATION - SUSPENDED GYPSUM BOARD CEILING GRID SYSTEM

A. Install ceiling furring at height(s) indicated, independent of walls, columns, and above ceiling work.

B. Ceiling Hangers: Coordinate location of hangers with other work.

1. Attach hangers to steel members by use of acceptable clips, or by wrapping around, or through steel members and bolting, tying, on tack welding hanger to itself.
2. Space hangers 48 inches on centers and within 6 inches of perimeter walls.
3. Locate hanger within 6 inches of ends of main runner channels.
4. Attach lower end of hanger to main runner channel by double wrap wire-typing (saddle tied) and given three twists around itself.

    a. Prevent twisting and turning to the main runner channel.
    b. Develop full strength of hanger.

C. Main Runner Channels:

1. Spacing: 36 inches on centers.
2. Locate main runner channel within 6 inches of parallel walls.
3. Splicing:

    a. Overlap ends a minimum of 12 inches.
    b. Interlock flanges.
    c. Secure splice near end of each channel by tie wire double looped.

D. Cross Furring:

1. Spacing 16 inches on centers.
2. Wire tie cross furring channels to main runners by saddle tying and twisting the end three times around itself.
3. Splicing:

    a. Overlap ends of cross furring a minimum of 8 inches.
    b. Interlock channel flanges.
    c. Wire-Tie near each end with two loops of wire.

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4. Do not continue cross furring across control or expansion joints.
5. No suspension grillage to come in contact with abutting partitions of load bearing walls.
6. Frame around all ceiling penetrations and provide supplemental framing in plane of suspension if required.

E. Reinforcing:

1. Reinforce openings in ceiling suspension system, which interrupt main carrying channels or furring channels, with lateral channel bracing.
2. Extend bracing minimum 24 inches beyond each end of openings.
3. Laterally brace suspension system where required.

3.6 FURRING FOR FIRE RATINGS

A. Install furring for fire resistance ratings in accordance with appropriate UL requirements and/or Design Numbers indicated.

3.7 INSPECTION BEFORE WALLBOARD INSTALLATION

A. Check framing for adequate spacing and alignment.

B. Verify that spacing of installed framing does not exceed maximum allowable spacing for thickness of wallboard to be used.

C. Verify that frames are set for thickness of wallboard to be used.

D. Do not proceed with installation of wallboard until deficiencies are corrected and surface to receive wallboard are acceptable.

E. Protrusions of framing, twisted framing members, or unaligned members must be repaired before installation of wallboard is started.

F. Commencing installation of wallboard means “acceptance” of existing conditions.

3.8 INSTALLATION - GENERAL

A. Install gypsum board in accordance with recommendations GA-214, GA-216 and manufacturer's instructions.

B. Use wallboard of maximum lengths to minimize ends joints. Stagger end joints when they occur, and locate end joints as for as possible from center of wall or ceiling.

C. Abut wallboard without forcing. Neatly fit ends and edges of wallboard. Do not place butt ends against tapered edges.

NOT FOR BIDDING PURPOSES

D. Support ends and edges of wallboard panels on framing or furring members, except for face layer of double layer construction.

3.9 INSTALLATION - WALLBOARD OVER FRAMING

A. Single Layer Construction:

1. Ceilings:

a. Gypsum wallboard shall be applied first to ceiling with long dimension at right angles to framing using panels of maximum practical length.
b. Position end joints over framing members and stagger in adjacent rows.
c. Fit ends and edges closely, do not force together, fasten panels to furring with mechanical fasteners, spaced 12 inches o.c., in field of panels and along abutting ends and edges.

2. Walls:

a. Apply wallboard horizontally for wall height of 8 feet or less and vertically for wall height greater than 8 feet. When installing wallboard horizontally, attach upper panel first.
b. Apply single layer fire rated wallboard vertically, with edges occurring over firm bearing.
c. Stagger end joints to occur on different framing members on opposite sides of partition.

3. Mechanical Fastening:

a. Screws:

1) Attach single layer of wallboard to metal framing with power driven screws.
2) Minimum edge clearance from mechanical fastener: 3/8-inch.
3) Stagger mechanical fasteners opposite each other on adjacent ends and edges.
4) Sand abutting ends or edges over support surface.
5) Space screws 16 inches o.c. when framing is spaced 16 inches o.c., or 12 inches o.c. when framing is spaced 24 inches o.c.
6) Drive screws with positive clutch electric screwgun.

B. Double Layer Construction:

1. Ceilings:

a. Apply wallboard face layer perpendicular to edges of base layer.
b. Position end joints of face layer to offset base layer joints by at lest 10 inches.

NOT FOR BIDDING PURPOSES

c. Gypsum wallboard shall be installed in such manner to provide two hour fire resistant rating shown, when indicated, and in accordance with requirements of UL.

2. Walls:

a. Apply wallboard base layer vertically.
b. Stagger vertical joints of base layer on opposite side of partition to occur on different framing members.
c. Apply face layer horizontally, minimum offset of joints between face layer and face layer shall be at least 10 inches.
d. Gypsum wallboard shall be installed in such manner to provide two hour fire resistant ratings indicated, and in accordance with requirements of UL.

3. Adhesive Lamination:

a. Apply adhesive with notched spreader or caulking gun, as recommended by wallboard manufacturer, for this particular application and job condition.

4. Permanent Attachment:

a. Permanently attach face layer with specified fasteners in accordance with UL requirements for systems selected.

3.10 CONTROL JOINTS

A. Non-Rated Gypsum Construction: Gypsum panel surfaces shall be isolated with control joints or other means, as detailed and at locations indicated on the drawings, if not shown, where:

1. Partition, furring or column fireproofing abuts a structural element (except floor) or dissimilar wall or ceiling;
2. Ceiling or soffit abuts a structural element, dissimilar wall or partition or other vertical penetration;
3. Construction changes within plane of partition or ceiling;
4. Partition or furring run exceeds 30 feet.
5. Ceiling dimensions exceed 50 feet in either direction with perimeter relief, 30 feet without relief;
6. Exterior soffits exceed 30 feet in either direction;
7. Wings of “L”, “U” and “T” shaped ceiling areas are joined;
8. Expansion or control joints occur in the exterior wall.
9. Less-than-ceiling height door/light frames shall have control joints extending to the ceiling from latch side of door. Ceiling height doorframes may be used as control joints.

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B. Fire-Rated Gypsum Construction: Gypsum panel surfaces shall be isolated with control joints or other means, as detailed and at locations indicated on the drawings, if not shown, where:

1. A partition, wall, or ceiling traverses a construction joint (expansion, seismic, or building control element) in the base building structure.
2. Where a wall or partition runs in an uninterrupted straight plane exceeding 30 feet.

    a. Full height doorframes may be considered a control joint.

3. Interior Ceilings with Perimeter Relief: Control joints shall be installed so that linear dimensions between control joints shall not exceed 50 feet and total areas between control joints shall not exceed 2500 sq.ft.
4. Interior Ceilings without Perimeter Relief: Control joints shall be installed so that linear dimensions between control joints shall not exceed 30 feet and total area between control joints shall not exceed 900 sq.ft.
5. Exterior Ceilings and Soffits: Control joints shall be installed so that linear dimensions between control joints shall not exceed 30 feet and total area between control joints shall not exceed 900 sq.ft.
6. A control joint or intermediate blocking shall be installed where ceiling framing members change direction.
7. A control joint is desired or incorporated as a design accent or Architectural feature.

3.11 INSTALLATION - ACOUSTICAL ACCESSORIES

A. Place acoustical insulation in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions.

B. Apply acoustical sealant within partitions in accordance with manufacturer's instructions and recommended procedures.

3.12 INSTALLATION - METAL ACCESSORIES AND ARCHITECTURAL PROFILES

A. Install corner beads and edge trim as specified in ASTM C840.

B. Install corner beads at external corners

C. Install edge trim at perimeter of openings and at juncture with other materials except, where covered by casings or flanges.

D. Install Architectural metal drywall profiles in accordance with manufacturer's instructions.

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3.13 INSTALLATION OF ACCESS PANELS

A. Install metal access panels and rigidly secure in place, as required by other sections and other trades.

B. Install in accordance with manufacturer's printed instructions and requirements of regulatory agencies, when applicable.

C. Coordinate the installation of rough bucks, anchors, blocking, mechanical and electrical work which is to be placed in or behind wall framing and ceiling furring. Allow such items to be installed after framing and furring is complete.

3.14 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile.
3. Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated.

E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.

F. Glass-Mat, Water-Resistant Backing Panels: Finish according to manufacturer's written instructions.

3.15 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8-inch in 10 feet in any direction.

3.16 REPAIRS AND CLEANING

A. Punctures:

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1. When face paper is punctured, fasten approximately 1-1/2-inch from defective fastening and remove defective fastener.
2. Fill all damaged surface areas with compound.
3. Leave clear depression to receive tape.
4. Permit prefill joint compound to harden prior to application of tape

B. Ridging:

1. Do not repair ridging until condition has fully developed; approximately six months after installation of one heating season.
2. Sand ridges to receive reinforcing tape without cutting through tape.
3. Fill concave areas on both sides of ridge with topping compound.
4. After fill is dry, blend in topping compound over repaired area.

C. Cracks:

1. Fill all cracks with compound and finish smooth and flush.

END OF SECTION 092115

NOT FOR BIDDING PURPOSES

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 resinous flooring systems with epoxy body coat(s).

1. Application Method: Troweled or Screened.

B. Related Sections include the following:

1. Division 7 Section 07920 “Joint Sealants” for sealants installed at joints in resinous flooring systems.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer’s technical data, application instructions, and recommendations for each resinous flooring component required.

B. Samples for Initial Selection: For each type of exposed finish required.

C. Samples for Verification: For each resinous flooring system required, 6 inches (150 mm) square, applied to a rigid backing by Installer for this Project.

D. Product Schedule: Use resinous flooring designations indicated in Part 2 and room designations indicated on Drawings in product schedule.

E. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

F. Material Test Reports: For each resinous flooring component.

G. Material Certificates: For each resinous flooring component, signed by manufacturer.

H. Maintenance Data: For resinous flooring to include in maintenance manuals.

I. List of References: Provide a minimum of five related projects.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer (applicator) who is experienced in applying resinous flooring systems similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance, and who is acceptable to resinous flooring manufacturer.

NOT FOR BIDDING PURPOSES

1. Engage an installer who employs only persons trained and approved by resinous flooring manufacturer for applying resinous flooring systems indicated.
2. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, through one source from a single manufacturer. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.

C. Federal Agency Approvals: Where indicated, provide resinous flooring systems approved by the USDA for use indicated.

D. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Apply full-thickness mockups on 48-inch- (1200-mm-) square floor area selected by Architect.

a. Include 48-inch (1200-mm) length of integral cove base.

2. Simulate finished lighting conditions for Architect's review of mockups.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

B. Store materials to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.

B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.

C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.

1.7 Warranty: The contractor and the manufacturer shall furnish a standard guarantee of the 1/8-inch Decorative Slurry / Broadcast Epoxy Flooring System for a period of TWO years after substantial completion. The labor and material guarantee shall include loss of bond and wear-through to the concrete substrate from normal use.

NOT FOR BIDDING PURPOSES

PART 2 - PRODUCTS

2.1 RESINOUS FLOORING (Floor Finish G)

A. Manufacturers: Basis-of-Design Product: Subject to compliance with requirements, provide Stonhard, Inc.; Stonblend GSI. or an equivalent product by one of the following:

1. Crossfield Products Corp., Dex-O-Tex.
2. Dur-A-Flex Inc.
3. Seamless Technologies.

B. System Characteristics:

1. Color and Pattern: As selected by Architect from manufacturer's full range.
2. Wearing Surface: Textured for slip resistance.
3. Integral Cove Base: 4 inches high as indicated on toilet room elevations.
4. Overall System Thickness: 3/16 inch (4.8 mm).
5. Federal Agency Approvals: USDA approved for food-processing environments.

C. System Components: Manufacturer's standard components that are compatible with each other and as follows:

1. Body Coat(s):

a. Resin: Epoxy
b. Formulation Description: 100 percent solids
c. Application Method: Troweled or screened.
d. Aggregates: Colored quartz (ceramic-coated silica).

2. Primer: Type recommended by manufacturer for substrate and body coat(s) indicated.

a. Formulation Description: 100 percent solids

3. Waterproofing Membrane: Type recommended by manufacturer for substrate and primer and body coat(s) indicated.

a. Formulation Description: 100 percent solids

4. Reinforcing Membrane: Flexible resin formulation that is recommended by manufacturer for substrate and primer and body coat(s) indicated and that prevents substrate cracks from reflecting through resinous flooring.

a. Formulation Description: 100 percent solids
b. Provide fiberglass scrim embedded in reinforcing membrane.

5. Topcoat: Chemical-resistant sealing or finish coat(s).

a. Resin: Urethane
b. Formulation Description: 100 percent solids
c. Type: Clear
d. Finish: Matte.
e. Number of Coats: Two.

NOT FOR BIDDING PURPOSES

D. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:

1. Compressive Strength: 6000 per ASTM C 579.
2. Tensile Strength: 1500 per ASTM C 307.
3. Flexural Modulus of Elasticity: 5.0×10^5 per ASTM C 580.
4. Water Absorption: 0.2 per ASTM C 413.
5. Coefficient of Thermal Expansion: 1.8×10^{-5} per ASTM C 531
6. Impact Resistance: No chipping, cracking, or delamination and not more than 1/16 inch (1.6 mm) permanent indentation per MIL-D-3134.
7. Resistance to Elevated Temperature: No slip or flow of more than 1/16 inch (1.6 mm) per MIL-D-3134.
8. Abrasion Resistance: .06 maximum weight loss per ASTM D 4060.
9. Flammability: Self-extinguishing per ASTM D 635.
10. Hardness: 85-90, Shore D per ASTM D 2240.
11. Bond Strength: >250, 100 percent concrete failure per ACI 503R.

2.2 ACCESSORY MATERIALS

A. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.

B. Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated.

1. Use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry, and neutral Ph substrate for resinous flooring application.

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.

1. Roughen concrete substrates as follows:

a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
b. Comply with ASTM C 811 requirements, unless manufacturer's written instructions are more stringent.

2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.
3. Verify that concrete substrates are dry.

NOT FOR BIDDING PURPOSES

a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) of slab in 24 hours.
b. Perform plastic sheet test, ASTM D 4263. Proceed with application only after testing indicates absence of moisture in substrates.
c. Perform additional moisture tests recommended by manufacturer. Proceed with application only after substrates pass testing.

4. Verify that concrete substrates have neutral Ph and that resinous flooring will adhere to them. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.

C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations.

3.2 APPLICATION

A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.

1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
3. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations.

a. Apply joint sealant to comply with manufacturer's written recommendations.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Apply waterproofing membrane, where indicated, in manufacturer's recommended thickness.

1. Apply waterproofing membrane to integral cove base substrates.

D. Apply reinforcing membrane to substrate cracks.

E. Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.

F. Apply self-leveling slurry body coat(s) in thickness indicated for flooring system.

1. Broadcast aggregates and, after resin is cured, remove excess aggregates to provide surface texture indicated.

NOT FOR BIDDING PURPOSES

G. Apply troweled or screeded body coat(s) in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When cured, sand to remove trowel marks and roughness.

H. Apply grout coat, of type recommended by resinous flooring manufacturer to fill voids in surface of final body coat and to produce wearing surface indicated.

I. Apply topcoat(s) in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer.

3.3 FIELD QUALITY CONTROL

A. Core Sampling: At the direction of Owner and at locations designated by Owner, take one core sample per 1000 sq. ft. (92.9 sq. m) of resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take two additional samples. Repair damage caused by coring and correct deficiencies.

B. Material Sampling: Owner may, at any time and any number of times during resinous flooring application, require material samples for testing for compliance with requirements.

1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

C. Project Monitoring: The project must be monitored by a manufacturer's representative throughout the installation process and at critical periods of installation deemed appropriate by the Architect.

D. Owner Rights: The Owner reserves the right to request copies of all invoices for materials.

3.4 CLEANING AND PROTECTING

A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION 09671

NOT FOR BIDDING PURPOSES

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. This Section includes surface preparation and field application of painting systems to items and surfaces scheduled for interior non-secure, non-inmate areas.

B. This Section includes the following:

1. Preparation of surfaces to receive finish.
2. Finished Areas: Painting and finishing of all surfaces throughout the interior and exterior of the project, except those items of equipment specified to be painted by other trades, shall receive finishing under this Section by the General Construction Contract, including:

    a. General: Ferrous metals, wood, plaster, drywall, concrete and masonry surfaces where scheduled or noted.
    b. Mechanical: Items such as access panels, exposed piping, throughout project.
    c. Electrical: Items such as access panels, exposed conduits, non-finished or prime painted metals and other equipment throughout Project.

3. Mechanical and Electrical Equipment Rooms: Painting and finishing of all heating, ventilating, air conditioning, plumbing and electrical equipment and lines, except those items of equipment specified under "Finished Areas" above, shall receive finishing under this Section by the Mechanical and Electrical Construction Contracts, including:

    a. Equipment and supports on the roof, roof drain strainers, exterior exposed gas piping.

4. It shall be understood that all exposed surfaces, piping, conduits, ductwork, equipment and similar items, left unfinished in "Finished Areas" throughout the project by the requirements of other specifications and/or trades shall be painted or finished under the General Construction Contract.
5. Finish surfaces in accordance with "Exterior and Interior Painting and Finishing Schedules" at end of this Section.

NOT FOR BIDDING PURPOSES

C. Work Not Included:

1. Items Not Requiring a Paint Finish: Field painting, in general, will not be required on the following:

a. Interior face brick, ceramic tile, acoustical tile ceilings, structural glazed tile, lead, copper, brass, bronze, aluminum, chromium plate, nickel, stainless steel, and monel metal, unless specifically noted or specified otherwise.

2. Items Factory Painted: Field painting will not be required on these items and equipment that are completely finished at the factory unless noted and/or specified otherwise.

D. Related Sections include the following:

1. Division 04 Section "Unit Masonry" for final field application of block filler and paint finish.
2. Division 05 Section "Structural Steel" for shop priming structural steel.
3. Division 05 Section "Steel Deck" for final field application of paint finish on exposed metal decking.
4. Division 05 Section "Metal Fabrications" for shop priming ferrous metal.
5. Division 05 Section "Pipe and Tube Railings" for final field application of paint finish.
6. Division 09 Section "High-Performance Coatings" for exterior and inmate painting systems.
7. Division 23 for identification devices for piping, valves, and equipment.

1.3 REFERENCE STANDARDS

A. American National Standards Institute (ANSI):

1. ANSI REV.1 - Identification of Piping Systems.

B. Occupational Safety and Health Act (OSHA):

1. OSHA 1910.144 - Safety Color Code for Marking Physical Hazards.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of topcoat product indicated.

C. Samples for Verification: For each type of paint system and each color and gloss of topcoat indicated.

NOT FOR BIDDING PURPOSES

1. Submit Samples on rigid backing.
2. Step coats on Samples to show each coat required for system.

    a. Prepare sample color panels in duplicate for Architect's approval before any painting or materials are ordered; size 4 inches x 12 inches.
    b. Show all of the colors and the various surface finishes (eggshell, satin or gloss) specified with each paint application.
    c. Priming coat shall cover 3/4 of the face of panels, body coat shall cover 5/8 of face, first finish coat shall cover 1/2 of face and the top finish coat shall cover 1/4 of face, thus leaving portions of priming and body coats exposed.
    d. Stains shall be applied to cover not more than 3/4 of face; succeeding varnish coats shall be applied to cover approximately 1/8 less of panel face.

3. Label each coat of each Sample.
4. Label each Sample for location and application area.
5. Installing mechanical, plumbing and electrical contractors are not required to furnish samples for their Work within pipe spaces and equipment rooms.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Manufacturer's Information: Current Manufacturer's product data sheets with complete information on surface preparation, application, handling and storage requirements and VOC data showing compliance with current OTC requirements.

E. Closeout Submittals:

1. Operation and Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.5 MOCK-UP

A. General Construction: Before proceeding with any painting application, prepare and finish a "Sample Room", complete or in part, as directed by Architect.

B. Mechanical Construction: Before proceeding with any painting and identification application, prepare and finish a 4-foot section of pipe and conduit, complete with appropriate line identification, color coding, and flow indication, in the Mechanical/Electrical Equipment Room.

C. Finish all areas and items in accordance with specifications and in colors selected as indicated on Architect's "Color Schedule".

D. Do not apply additional coats until each completed coat has been inspected and approved.

NOT FOR BIDDING PURPOSES

E. When entire room or area is approved, "Sample Room" will serve as a minimum standard for workmanship, appearance, and materials for work throughout project.

F. When 4 foot section of pipe and conduit is approved, mock-up will serve as a minimum standard for workmanship, appearance, and materials for work throughout Equipment Room(s).

1.6 MAINTENANCE MATERIAL

A. Leave on premises, where directed by Architect not less than one gallon of each color used.

B. Containers to be tightly sealed and clearly labeled for identification.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery:

1. Deliver paint materials in sealed original labeled containers, bearing manufacturer's name, type of paint, brand name, color designation, and instructions for mixing and/or reducing.
2. In no case will factory labels be permitted to be installed on containers at job site.

B. Storage and Handling:

1. Provide adequate storage facilities. Store paint materials at minimum ambient temperature of 45 degrees F in well ventilated area.
2. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.8 ENVIRONMENTAL CONDITIONS

A. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below following maximums:

1. Plaster and gypsum wallboard: 12 percent.
2. Masonry, concrete and concrete block: 12 percent.
3. Interior located wood: 15 percent.

B. Ensure surface temperatures or the surrounding air temperature is minimum 40 degrees F before applying finishes. Minimum application temperature for latex paints for interior work is 45 degrees F and 50 degrees F for exterior work. Minimum application temperature for varnish is 65 degrees F.

NOT FOR BIDDING PURPOSES

C. Provide adequate continuous ventilation and sufficient heating facilities to maintain temperatures above 45 degrees F for 24 hours before, during and 48 hours after application of finishes.

D. Provide minimum 20 - 25 foot candles of lighting on surfaces to be finished.

E. Do not apply finishes in areas where dust is being generated.

1.9 PROTECTION

A. Adequately protect other surfaces from paint and damage. Repair damage as a result of inadequate or unsuitable protection.

B. Furnish sufficient drop cloths, shields, and protective equipment to prevent spray droppings from fouling surfaces not being painted and in particular, surfaces within storage and preparation area.

C. Place cotton waste, cloths, and material that may constitute a fire hazard in closed metal containers and remove daily from site.

D. Remove electrical plates, surface hardware, fittings and fastenings, prior to painting operations. These items are to be carefully stored, cleaned, and replaced on completion of work in each area. Do not use solvent to clean hardware that may remove permanent lacquer finish.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design: The paint materials specified in this Specification Section are based on Sherwin-Williams Co., Cleveland, OH from the low odor, health care product line. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

1. PPG Architectural Finishes, Inc., Pittsburgh, PA.
2. ICI, Cleveland, OH.
3. Benjamin Moore & Co., Montvale, NJ.

B. Other paint manufacturer's products will be considered according to requirements of Division 01, and the following requirements:

1. Submit a complete list of proposed material, including manufacturer's name, trade name, data for each product and color charts, and specifically designate by name the "Sherwin-Williams" product that the proposed product will substitute.
2. Submit a paint schedule listing all surfaces and list proposed substitute product.

NOT FOR BIDDING PURPOSES

2.2 MATERIAL

A. Paint, Varnish, Stain, Enamel, Lacquer and Fillers: Type and brand specified in "Painting and Finishing Schedules" at end of Section.

B. Paint Accessory Materials: Linseed oil, shellac, turpentine and other materials not specifically indicated herein but required to achieve the finishes specified of high quality and approved manufacturer.

C. Paints: Ready-mixed except field catalyzed coatings. Pigments fully ground maintaining a soft paste consistency, capable of readily and uniformly dispersing to a complete homogeneous mixture.

D. Paints to have good flowing and brushing properties and be capable of drying or curing free of streaks or sags.

PART 3 - EXECUTION

3.1 INSPECTION

A. Thoroughly examine surfaces scheduled to be painted prior to commencement of work.

B. Report in writing to the appropriate Prime Contractor with copy to Architect, any surface condition that may adversely affect execution, permanence or quality of work, and which cannot be put into an acceptable condition through the preparatory work as included in Article 3.2 - Preparation of Surfaces, specified below.

C. Do not commence painting until such defects and conditions have been corrected and made suitable to properly receive application of finish. Application of paint or finish to surfaces constitutes acceptance of the surfaces.

D. Ensure areas to be painted are clean and free of dust and remain in that condition through the entire painting process.

3.2 PREPARATION OF SURFACES

A. General:

1. Surfaces to be painted shall be clean, including floors and adjacent surfaces.
2. Mildew, efflorescence and all foreign material shall be removed from surface by appropriate methods as recommended by manufacturer.

B. Wood:

1. Sand to smooth and even surface, except where rough texture surface is specified, then vacuum or dust off.

NOT FOR BIDDING PURPOSES

2. Wipe off dust and dirt from all miscellaneous wood items and millwork prior to priming.
3. Spot coat all knots, pitch streaks and runs, and sappy sections with knot sealer.
4. Properly fill nail holes, and minor cracks, open joints and other small defects with putty or wood filler after primer coat has dried, on wood to be painted, then sand between coats.
5. Fill nail holes and porous open grain with putty, paste filler and/or colored putty sticks, on wood to be stained and varnished, then sand between coats.
6. Back prime interior and exterior woodwork.

C. Plaster and Gypsum Wallboard:

1. Plaster:

   a. Fill narrow hairline cracks, small holes and surface imperfections with patching plaster.
   b. Sand smooth, match and adjacent surfaces.

2. Gypsum Wallboard:

   a. Remove contamination from surface and prime to show any defects.
   b. Fill cracks, small holes, and imperfections with drywall joint cement with thin layers.
   c. Sand smooth, do not raise nap of paper.

D. Concrete and Masonry Surfaces:

1. Remove dirt, loose mortar, scale powder and other foreign matter from concrete and concrete block surfaces which are to be painted or to receive a clear sealer.
2. Remove oil and grease with a solution of tri-sodium phosphate, rinse well and allow to thoroughly dry.
3. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after being thoroughly wetted with water; allow to thoroughly dry.

E. Steel and Iron:

1. Remove grease, rust, scale, dirt and dust from steel and on surfaces.
2. Where heavy coatings of scale are evident, remove by wire brushing, sandblasting or other necessary method to ensure a satisfactory surface for painting.
3. Unprimed Steel:

   a. Clean by washing with solvent.
   b. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts and nuts are similarly leaned.
   c. Prime surfaces to indicate any defects; repair defects, then paint.

NOT FOR BIDDING PURPOSES

4. Shop Primed Steel:

a. Sand and scrape surfaces to remove loose primer and rust.
b. Feather out edges to make touch-up patches inconspicuous.
c. Clean surfaces with solvent.
d. Prime bare steel surfaces.

F. Galvanized Metal:

1. Remove surface contamination and oils from galvanized surfaces and wash with solvent.
2. Apply coat of etching type primer.

G. Copper:

1. Painted Finish:

a. Remove contamination from copper surfaces scheduled to receive paint finish by buffing or polishing to a bright color, or solvent washing.
b. Apply vinyl etch primer or mild phosphoric acid cleaner.
c. Apply paint finish while surface is bright and clean.

2. Oxidized Finish:

a. Remove contamination from copper surfaces scheduled to be oxidized.
b. Apply oxidizing solution of copper acetate and ammonium chloride in acetic acid.
c. Rub on repeatedly for correct effect.
d. Once attained, rinse surfaces thoroughly with clear water and allow to dry.

3.3 APPLICATION

A. Do not apply any initial coating until the moisture content of surfaces is within limitations recommended by the paint manufacturer.

B. Apply all paints and varnish with appropriate type brushes and rollers.

C. Rate of application consistency shall be in accordance with recommendations of manufacturer for the type of surface being painted.

D. Keep brushes and rollers clean, free from contaminants, and suitable for the finish required.

E. Comply with manufacturer's recommendations for drying time required between succeeding coats.

F. Each coat shall be slightly darker than preceding coat unless otherwise directed.

NOT FOR BIDDING PURPOSES

G. Sand and dust between coats to achieve required finish. Finish coat shall be smooth, free of brush marks, streaks, laps, pile up of paint, and skipped or missed areas.

H. Cut-in edges of paint adjoining other materials or colors, clean and sharp with no overlapping.

I. Where clear finishes are required ensure tint fillers match wood. Work fillers well into grain before set. Wipe excess from surface.

J. Backprime exterior woodwork, which is to receive paint finish, with exterior primer paint.

K. Backprime interior woodwork, which is to receive paint or enamel finish, with enamel undercoater paint.

L. Backprime interior and exterior woodwork, which is to receive stain and/or varnish finish, with gloss varnish reduced 25 percent with mineral spirits.

M. Prime top and bottom edges of wood and metal doors with enamel undercoat when scheduled to be painted.

N. Prime top and bottom edges of all wood doors with gloss varnish when they are scheduled to receive stain or clear finish.

O. Before painting, remove switch, and coverplates, accessories, and minor hardware, lighting fixtures, and similar minor items or provide ample protection of such items. Upon completion of such space, reinstall removed items.

P. Remove grilles, covers and access panels for mechanical and electrical systems from location and paint separately.

Q. Finish prime painted equipment to color selected.

R. All nameplates and data plates that indicate manufacturer, model, size, capacity, codes, or identifying data printed on equipment, shall not be painted; carefully cut-in.

S. Prime and paint insulated and bare pipes, conduits, boxes, insulated and bare ducts, hangers, brackets, collars and supports, except where items are plated or covered with a pre-finished coating at exposed areas.

T. Replace identification markings on mechanical or electrical equipment when painted over or spattered with same identification devices furnished by the mechanical and electrical sections, at the expense of the painting contractor.

U. Paint exposed conduit and electrical equipment occurring in finished areas. Color and texture to match adjacent surfaces.

NOT FOR BIDDING PURPOSES

V. Paint both sides and edges of plywood backboards for electrical equipment before installing backboards and mounting equipment on them.

3.4 CLEAN-UP

A. Remove all spilled, splashed, or spattered paint promptly from other surfaces and be careful not to mar surface finish of item being cleaned.

B. Touch-up and restore damaged finish and leave project in first class condition.

C. During progress of work, keep premises free from any unnecessary accumulation of tools, equipment, surplus materials and debris.

D. Upon completion of work remove all ladders, scaffolding and staging, and leave premises neat and clean, to the satisfaction of Architect.

3.5 PAINTING AND FINISHING SCHEDULE - EXTERIOR

A. The paragraphs below identify specific construction materials and the appropriate specified painting system to be used on that particular surface; actual material surfaces for this Project shall be as indicated in the "Finish Schedule" or noted on the drawings.

B. Exterior Precast Concrete Stain System: (Indicated as red color band on drawings)

1. Solid Color Waterborne Finish for accent banding on precast concrete.
2. First Coat: S-W Loxon Vertical Concrete Stain, A31 Series
3. Second Coat: S-W Loxon Vertical Concrete Stain, A31 Series (50-250 sq/ft gal)

3.6 PAINTING AND FINISHING SCHEDULE - INTERIOR

A. The paragraphs below identify specific construction materials and the appropriate specified painting system to be used on that particular surface, actual material surfaces for this Project shall be as indicated in the "Finish Schedule" or noted on the drawings.

B. New and existing materials are to be painted, as listed herein. Omit primer on existing materials.

C. Miscellaneous Metals: (Acrylic - Semi-Gloss Luster)

1. Hollow metal doors and frames, existing ceiling grid, steel lintels, exposed steel beams and columns, piping, pipe hangers, radiators, convectors, exposed conduits, panelboard fronts, and non-finished or prime painted metals and other equipment.

NOT FOR BIDDING PURPOSES

a. First Coat: Touch-up shop applied primer with Sherwin-Williams Pro-Cryl Universal Metal Primer, DFT/Coat 3.0 - 4.0 mils. VOC content: 110 g/l 0.92 lb/gal. Meets Greenseal GC-03 “Anti-Corrosive”.
b. Second Coat: Sherwin-Williams ProClassic Waterborne Acrylic Semi-Gloss Enamel, DFT/Coat 1.3 mils. VOC content: 141 g/l 1.18 lb/gal. Meets Greenseal GS-11 Non-Flat category.
c. Third Coat: Sherwin-Williams ProClassic Waterborne Acrylic Semi-Gloss Enamel, DFT/Coat 1.3 mils. VOC content: 141 g/l 1.18 lb/gal. Meets Greenseal GS-11 Non-Flat category.
d. Total Dry Film Thickness: 5.6 - 6.6 mils

D. Interior Woodwork Natural/Stain Finish: Stains and clear finishes are not restricted by Greenseal GS-11.

1. Wood doors, wood trim, wood shelving, and other similar items scheduled or noted to receive stain and/or natural finish.

a. First Coat: Sherwin-Williams Sher-Wood Natural Filler D70T1 (omit on close grain woods or if open pore effect is noted)
b. Second Coat: Sherwin-Williams Wood Classic Interior Oil Stain, A49-200 Series (omit if clear natural finish is scheduled). VOC content: 549 g/l 4.58 lb/gal.
c. Third Coat: Sherwin-Williams Wood Classic Waterborne Polyurethane Varnish A68V91 Gloss Finish. VOC content: 312 g/l 2.60 lb/gal.
d. Fourth Coat:Sherwin-Williams Wood Classic Waterborne Polyurethane Varnish, A68F90 Finish (for satin finish) or Sherwin-Williams A68V91 Finish (for gloss finish). VOC content: 312 g/l 2.60 lb/gal.

E. Drywall and Plaster: (Acrylic Latex - Eg-Shel Luster) Plaster must be fully cured and hard prior to coating.

1. Walls, ceilings and bulkheads.

a. First Coat: Sherwin-Williams Harmony Low Odor Interior Latex Primer, B11W900, DFT/Coat 1.3. VOC content: 0 g/l 0.0 lb/gal.
b. Second Coat: Sherwin-Williams Harmony Low Odor Latex Eg-Shel B9, DFT/Coat 1.6 mils. VOC content: 0g/l 0.0lb/gal.
c. Third Coat: Sherwin-Williams Harmony Low Odor Latex Eg-Shel B9, DFT/Coat 1.6 mils. VOC content: 0 g/l 0.0 lb/gal.
d. Total Dry Film Thickness: 4.5 mils

F. Concrete: (Acrylic Latex - Semi-Gloss Luster)

1. Concrete Surface Preparation:

a. Remove oils, grease or contaminants by solvent cleaning. Brush blast with fine sand abrasive to remove laitance, polymeric form coatings, to open

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voids and bugholes, and to give mechanical adhesive surface for coating. Concrete shall be tested using a moisture meter prior to applying any primer.

b. Patch and smooth surfaces with repair mortar prior to painting. Refer to Drawings for notes.

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2. Walls and ceilings.

    a. 1st Coat: S-W PrepRite Masonry Primer, B28W300 (7 mils wet, 3 mils dry).
    b. 2nd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss, B31 Series.
    c. 3rd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss, B31 Series (4 mils wet, 1.4 mils dry per coat).

G. Concrete Block: (Acrylic Latex - Semi-Gloss Luster)

1. Walls.

    a. First Coat: Sherwin-Williams PrepRite Block Filler, B25W25, DFT/Coat 8.0 mils. VOC content: 42g/l 0.35 lb/gal. Meets GS-11 Flat Category.
    b. Second Coat: Sherwin-Williams Harmony Low Odor Latex Semi-Gloss Enamel B10, DFT/Coat 1.6 mils. VOC content: 0g/l 0.0lb/gal. Meets GS-11 Non-Flat Category.
    c. Third Coat: Sherwin-Williams Harmony Low Odor Latex Semi-Gloss Enamel B10, DFT/Coat 1.6 mils. VOC content: 0 g/l 0.0 lb/gal. Meets GS-11 Non-Flat Category.
    d. Total Dry Film Thickness: 11.2 mils.

H. Exposed Cementitious Fireproofing in Exposed and Open Grid Suspended Ceiling Areas, and where indicated.

1. Minimum two coats Sherwin-Williams Waterborne Acrylic Dryfall Flat Black, B42BW3
2. Apply at 3.0 - 4.5 mils DFT per coat.
3. Note: A test-patch (prior to full installation) is highly recommended to assure compatibility and adhesion to the fireproofing, as well as determine coverage rates due to porosity of the fireproofing. An additional coat of dryfall may be needed for hiding and uniformity over the fireproofing.

I. Pipe Insulation:

1. First Coat: Sherwin-Williams Harmony Latex Primer, B11W900, DFT/Coat 1.3 mils. VOC content: 0g/l 0.0 gal. Meets GS-11 Flat Category.
2. Second Coat: Finish same as adjoining walls.
3. Third Coat: Finish same as adjoining walls.

J. Exposed Structure:

1. When steel joist, metal decking, mechanical piping, electrical conduit, etc., are scheduled to receive painted finish.

    a. Galvanized Metals: (Acrylic – Eg-Shel Luster)

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1) First Coat: Sherwin-Williams Waterborne Acrylic Eg-Shel Dryfall, B42W2, DFT/Coat 3.0 - 5.0 mils. Voc content 58 g/l 0.48 lb/gal. Meets GS-11 Non-Flat Category.
2) Total Dry Film Thickness: 3.0 - 5.0 mils

b. Ferrous Metals:

1) First Coat: Sherwin-Williams DTM Acrylic Primer/Finish, B66W1, DFT/Coat 2.5 - 5.0 mils. VOC content: 138 g/l 1.15 lb/gal. Meets Greenseal Standard GC-03 “Anti-Corrosive” Category.
2) Second Coat: Sherwin-Williams Waterborne Acrylic Eg-Shel Dryfall, B42W2, DFT/Coat 3.0 - 5.0 mils (.076 - .127 mm). VOC content: 58 g/l 0.48 lb/gal. Meets GS-11 Non-Flat Category.
3) Total Dry Film Thickness: 5.5 - 10.0 mils

K. Exposed Galvanized Ductwork: (Acrylic – Semi-Gloss Luster)

1. First Coat: Sherwin-Williams Metalatex Acrylic Semi-Gloss Coating, B42, DFT/Coat 1.5 – 4.0 mils. VOC content: 125 g/l 1.04 lb/gal. Meets GS-11 Non-Flat Category.
2. Second Coat: Sherwin-Williams Metalatex Acrylic Semi-Gloss Coating, B42, DFT/Coat 1.5 – 4.0 mils VOC content: 125 g/l 1.04 lb/gal. Meets GS-11 Non-Flat Category.
3. Total Dry Film Thickness: 3.0 - 8.0 mils
4. Note: Prior to priming, special emphasis must be placed on thoroughly removing fabrication oils, grease, and surface contaminants with "Duosol". Do not use hydrocarbon solvents for cleaning.

END OF SECTION 099100

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SECTION 210500
COMMON WORK RESULTS FOR FIRE SUPPRESSION

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 Seismic-Restraint Loading:

1. Site Class as Defined in the IBC: B
2. Assigned Seismic Use Group or Building Category as Defined in the IBC: II

a. Component Importance Factor: 1.0
b. Component Response Modification Factor: 3
c. Component Amplification Factor: 1.0

2.2 SLEEVES

A. Galvanized-Steel Pipe Sleeves: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

2.3 ESCUTCHEONS & FLOOR PLATES

A. Split-Casting Floor Plates: Cast brass with concealed hinge.

2.4 SEISMIC-RESTRAINT DEVICES

A. Channel Support System: MFMA-4, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.

B. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face and matched to type and size of attachment devices used.

C. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.

1. Adhesive Anchor Bolts: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

PART 3 - EXECUTION

3.1 GENERAL PIPING INSTALLATIONS

A. Install piping free of sags and bends.

B. Install fittings for changes in direction and branch connections.

C. Sleeves:

1. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
2. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
3. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

D. Escutcheons & Floor Plates:

1. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
2. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
3. Install floor plates for piping penetrations of equipment-room floors.
4. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

E. Install unions at final connection to each piece of equipment.

3.2 SEISMIC-RESTRAINT DEVICE INSTALLATION

A. Piping Restraints:

1. Comply with requirements in MSS SP-127 and NFPA 13.

B. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.

C. Install bushing assemblies for anchor bolts, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.

D. Install bushing assemblies for mounting bolts, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

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E. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

F. Drilled-in Anchors:

1. Do not damage existing reinforcing or embedded items during coring or drilling.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications

END OF SECTION 21 0500

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SECTION 21 1000
WATER-BASED FIRE-SUPPRESSION SYSTEMS

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data for valves, sprinklers, specialties, and alarms.
2. Submit sprinkler system drawings identified as "working plans" and calculations according to NFPA 13. Submit required number of sets to authorities having jurisdiction for review, comment, and approval. Include system hydraulic calculations.
3. Submit test reports and certificates as described in NFPA 13.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Design and Installation Approval: Acceptable to authorities having jurisdiction.

B. Hydraulically design sprinkler systems according to NFPA 13.

C. Comply with NFPA 13 and NFPA 70.

D. UL-listed and -labeled and FM-approved pipe and fittings.

2.2 PIPE AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795.

B. Grooved-End Fittings: UL-listed and FM-approved, ASTM A 536, Grade 65-45-12 ductile iron or ASTM A 47 Grade 32510 malleable iron, with grooves or shoulders designed to accept grooved couplings.

C. Grooved-End Couplings: UL 213, ASTM A 536 ductile-iron or ASTM A 47 malleable-iron housing, with enamel finish. Include gaskets, bolts, and accessories.

D. Provide hangers, supports, and seismic restraints with UL listing and FM approval for fire-protection systems.

2.3 SPRINKLERS

A. Automatic Sprinklers: With heat-responsive element complying with the following:

1. UL 199, for applications except residential.

B. Sprinkler Types and Categories: Nominal 1/2-inch orifice for "Ordinary" temperature classification rating unless otherwise indicated or required by application.

C. Sprinkler types include the following:

1. Upright, pendent, and sidewall sprinklers.

D. Sprinkler Finishes: Chrome Plated and Bronze.

E. Sprinkler Guards: Wire-cage type, including fastening device.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Protect piping from earthquake damage as required by NFPA 13.

3.2 SPRINKLER SCHEDULE

A. Rooms without Ceilings: Upright sprinklers.

B. Sprinkler Finishes: Chrome plated in finished spaces, rough bronze in unfinished spaces.

3.3 PIPING SCHEDULE

A. Use steel pipe with threaded, press-seal, roll-grooved, or cut-grooved joints.

1. For steel pipe joined by threaded fittings, use Schedule 40.

3.4 TESTING

A. Flush, test, and inspect sprinkler piping systems according to NFPA 13.

END OF SECTION 21 1000

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SECTION 22 0500
COMMON WORK RESULTS FOR PLUMBING

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Hangers and Supports for Plumbing Piping Equipment:

1. Structural Performance: Hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

a. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
b. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

2.2 SLEEVES AND SLEEVE SEALS

A. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.

2.3 GROUT

A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

1. Characteristics: Nonshrink; recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

2.4 ESCUTCHEONS AND FLOOR PLATES

A. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.

B. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.

2.5 HANGERS AND SUPPORTS FOR PLUMBING PIPING EQUPMENT

A. Copper Pipe Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

B. Fastener Systems:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

PART 3 - EXECUTION

3.1 GENERAL PIPING INSTALLATIONS

A. Install piping free of sags and bends.

B. Install fittings for changes in direction and branch connections.

C. Sleeves:

1. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
2. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

a. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

3. Install sleeves for pipes passing through interior partitions.
4. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078446 "Penetration Firestopping."

D. Escutcheons and Floor Plates:

1. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
2. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
3. Install floor plates for piping penetrations of equipment-room floors.

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4. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

3.2 HANGERS AND SUPPORTS

A. Comply with MSS SP-69 and MSS SP-89. Install building attachments within concrete or to structural steel.

B. Install hangers and supports to allow controlled thermal and seismic movement of piping systems.

C. Load Distribution: Install hangers and supports so piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

D. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.

3.3 GENERAL EQUIPMENT INSTALLATIONS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components, unless otherwise indicated.

C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

END OF SECTION 22 0500

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SECTION 22 0523
GENERAL-DUTY VALVES FOR PLUMBING PIPING

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. ASME Compliance: ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.

B. NSF Compliance: NSF 61 for valve materials for potable-water service.

2.2 GENERAL-DUTY VALVES

A. Valve Sizes: Same as upstream piping unless otherwise indicated.

B. Valves in Insulated Piping: With 2-inch stem extensions.

C. End Connections: Solder-joint connections shall comply with ANSI B16.18.

D. One-Piece, Copper-Alloy Ball Valves: Brass or bronze body with chrome-plated bronze ball, PTFE or TFE seats, and 400-psig minimum CWP rating.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Use ball valves for shutoff duty.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves for each fixture and item of equipment.

D. Install valves in a position to allow full stem movement.

END OF SECTION 22 0523

SECTION 22 0700
PLUMBING INSULATION

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of product indicated.
2. For adhesives and sealants, documentation including printed statement of VOC content and chemical components.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less according to ASTM E 84.

2.2 INSULATION MATERIALS

A. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

B. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.

2.3 ADHESIVES

A. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less.

PART 3 - EXECUTION

3.1 PIPE INSULATION INSTALLATION

A. Comply with requirements of the Midwest Insulation Contractors Association's "National Commercial & Industrial Insulation Standards" for insulation installation on pipes and equipment.

B. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

C. Insulation Installation at Fire-Rated Wall, Partition, and Floor Penetrations: Install insulation continuously through penetrations. Seal penetrations. Comply with requirements in Section 078413 "Penetration Firestopping."

D. Flexible Elastomeric Insulation Installation:

1. Seal longitudinal seams and end joints with adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
2. Insulation Installation on Pipe Fittings and Elbows: Install mitered sections of pipe insulation. Secure insulation materials and seal seams with adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

E. Interior Piping System Applications: Insulate the following piping systems:

1. Domestic cold water.

3.2 INDOOR PIPING INSULATION SCHEDULE

A. Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawlspaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

B. Domestic Cold Water:

1. NPS 1 and Smaller: Insulation shall be the following:

a. Flexible Elastomeric: 3/4 inch thick.

END OF SECTION 22 0700

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SECTION 22 1116
DOMESTIC WATER PIPING

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For transition fittings and dielectric fittings.
2. Product for solvent cements and adhesive primers, documentation including printed statement of VOC content.

PART 2 - PRODUCTS

2.1 PREFORMANCE REQUIREMENTS

A. Potable-water piping and components shall comply with NSF 14 and NSF 61.

2.2 PIPE AND FITTINGS

A. Hard Copper Tubing: ASTM B 88, Type L, water tube, drawn temper with wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.

1. Copper Unions: Cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.
2. Joining Materials: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with requirements in Section 22 0500 "Common Work Results for Plumbing" for basic piping installation requirements.

B. Install domestic water piping with 0.25 percent slope downward toward drain for horizontal piping and plumb for vertical piping.

C. Comply with requirements in Section 220500 "Common Work Results for Plumbing" for basic piping joint construction.

1. Soldered Joints: Comply with procedures in ASTM B 828 unless otherwise indicated.

D. Comply with requirements in Section 220500 "Common Work Results for Plumbing" for pipe hanger and support devices.

1. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:

a. NPS 1-1/4 and Smaller: 84 inches with 3/8-inch rod.

3.2 INSPECTING AND CLEANING

A. Inspect and test piping systems as follows:

1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.

3.3 PIPING SCHEDULE

A. Aboveground Distribution Piping: Type L hard copper tubing.

END OF SECTION 22 1116

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SECTION 23 0500
COMMON WORK RESULTS FOR HVAC

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Hangers and Supports for Plumbing Piping Equipment:

1. Structural Performance: Hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

a. Design supports for multiple pipes capable of supporting combined weight of supported systems, and system contents.
b. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
c. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

2.2 SLEEVES AND SLEEVE SEALS

A. Galvanized-Steel Pipe Sleeves: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

2.3 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

2.4 HANGERS AND SUPPORTS FOR HVAC

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Fastener Systems:

1. Verify suitability of fasteners in this article for use in lightweight concrete or concrete slabs less than 4 inches thick.
2. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
3. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

C. Miscellaneous Materials:

1. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
2. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

a. Properties: Nonstaining, noncorrosive, and nongaseous.
b. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 GENERAL PIPING INSTALLATIONS

A. Install piping free of sags and bends.

B. Sleeves:

1. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
2. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

a. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

3. Exterior Wall, Pipe Penetrations: Mechanical sleeve seals installed in steel or cast-iron pipes for wall sleeves.

C. Install unions at final connection to each piece of equipment.

D. Install dielectric unions and flanges to connect piping materials of dissimilar metals in gas piping.

3.2 HANGERS AND SUPPORTS

A. Comply with MSS SP-69 and MSS SP-89. Install building attachments within concrete or to structural steel.

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B. Install hangers and supports to allow controlled thermal and seismic movement of piping systems.

C. Install powder-actuated fasteners and mechanical-expansion anchors in concrete after concrete is cured. Do not use in lightweight concrete or in slabs less than 4 inches thick.

D. Load Distribution: Install hangers and supports so piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

3.3 GENERAL EQUIPMENT INSTALLATIONS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components, unless otherwise indicated.

C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

END OF SECTION 23 0500

NOT FOR BIDDING PURPOSES

SECTION 23 0593
TESTING, ADJUSTING, AND BALANCING FOR HVAC

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Certified TAB reports.
2. Documentation of work performed per ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
3. Documentation of work performed per ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

B. TAB Firm Qualifications: AABC OR NEBB certified.

C. TAB Report Forms: Standard TAB contractor's forms approved by Architect.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

B. Examine the approved submittals for HVAC systems and equipment.

C. Examine systems for installed balancing devices, such as manual volume dampers. Verify that locations of these balancing devices are accessible.

D. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

1. Integrity of dampers and valves for free and full operation and for tightness of fully closed and fully open positions.

E. Report deficiencies discovered before and during performance of test and balance procedures.

3.2 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and in this Section.

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish.

C. Mark equipment and balancing devices, including damper-control positions with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.3 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare schematic diagrams of systems' "as-built" duct layouts.

B. Determine the best locations in main and branch ducts for accurate duct airflow measurements.

C. Check for airflow blockages.

D. Check for proper sealing of air duct system.

3.4 TOLERANCES

A. Set HVAC system airflow and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
2. Air Outlets and Inlets: Plus or minus 10 percent.

END OF SECTION 23 0593

NOT FOR BIDDING PURPOSES

SECTION 23 0700
HVAC INSULATION

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of product indicated.
2. For adhesives and sealants, documentation including printed statement of VOC content.

B. Quality Assurance: Labeled with maximum flame-spread index of 25 and maximum smoke-developed index of 50 according to ASTM E 84.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics:

1. Indoor Insulation and related materials: To be factory labeled designating maximum flame-spread index of 25 or less, and smoke-developed index of 50 or less according to ASTM E 84.

2.2 PIPING INSULATION MATERIALS

A. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

B. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.

2.3 DUCT INSULATION MATERIALS

A. Insulate concealed ductwork with fiberglass duct wrap bonded with resins, ¾ pound density, aluminum foil facing reinforced with fiberglass scrim, laminated to Kraft, 2" thick.

1. Thermal Conductivity: 0.27 Btu/Hr./SF/Inch at 75 degrees F. Min. installed "R" value w/ 25% compression shall be 5.6.

PART 3 - EXECUTION

3.1 INSULATION INSTALLATION

A. Comply with requirements of the Midwest Insulation Contractors Association's "National Commercial & Industrial Insulation Standards" for insulation installation on pipes and equipment.

B. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

3.2 DUCT AND PLENUM INSULATION SCHEDULE

A. Ducts Requiring Insulation:

1. Concealed supply air: 2 inch thick

3.3 HVAC PIPING INSULATION SCHEDULE

A. Refrigerant Suction and Hot-Gas Flexible Tubing: Insulation shall be the following:

1. Flexible Elastomeric: 1 inch thick.

END OF SECTION 23 0700

NOT FOR BIDDING PURPOSES

SECTION 23 2300
REFRIGERANT PIPING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop based on manufacturer's test data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIRMENTS

A. Comply with ASME B31.5, "Refrigerant Piping," and with ASHRAE 15, "Safety Code for Mechanical Refrigeration."

2.2 TUBES AND FITTINGS

A. Copper Tube: ASTM B 88, Types K and L and ASTM B 280, Type ACR.

B. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.

C. Brazing Filler Metals: AWS A5.8.

2.3 VALVES AND SPECIALTIES

A. Moisture/Liquid Indicators: 500-psig operating pressure, 240 deg F operating temperature; with replaceable, polished, optical viewing window and color-coded moisture indicator.

B. Refrigerant: ASHRAE 34, R-410A.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with requirements in Section 230500 "Common Work Results for HVAC" for basic piping installation requirements.

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B. Install wall penetration system at each pipe penetration through foundation wall. Make installation watertight. Comply with requirements in Section 230500 "Common Work Results for HVAC" for wall penetration systems.

C. Install refrigerant piping and charge with refrigerant according to ASHRAE 15.

D. Insulate suction lines to comply with Section 230700 "HVAC Insulation."

E. Slope refrigerant piping as follows:

1. Install horizontal suction lines with a uniform slope downward to compressor.
2. Liquid lines may be installed level.

F. Install thermostatic expansion valves as close as possible to distributors on evaporator coils.

G. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.

H. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

3.2 PIPING APPLICATIONS FOR REFRIGERANT R-410A

A. Suction Lines: Copper, Type ACR, annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.

B. Hot-Gas and Liquid Lines: Copper, Type ACR, annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.

END OF SECTION 232300

NOT FOR BIDDING PURPOSES

SECTION 23 3100
HVAC DUCTS AND CASINGS

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of product indicated.
2. Documentation indicating that duct systems and accessories comply with ASHRAE 62.1, Section 5 - "Systems and Equipment."
3. Documentation indicating that duct systems comply with ASHRAE/IESNA 90.1, Section 6 - "Heating, Ventilating, and Air Conditioning." and Section 6.4.4 - "HVAC System Construction and Insulation."
4. Documentation of work performed for compliance with ASHRAE 62.1, Section 7.2.4 - "Ventilation System Start-up."
5. For adhesives and sealants, documentation including printed statement of VOC content.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

B. Structural Performance: Duct hangers and supports[**and seismic restraints**] shall withstand the effects of gravity[**and seismic**] loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" [**and**] [**ASCE/SEI 7.**] [**SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."**] <**Insert document.**>

C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

D. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-up."

E. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

F. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

G. Comply with NFPA 96 for ducts connected to commercial kitchen hoods.

H. Comply with UL 181 for ducts and closures.

2.2 DUCTS

A. Joint and Seam Tape, and Sealant: Comply with UL 181A.

B. Rectangular Metal Duct Fabrication: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 ACCESSORIES

A. Volume Dampers: Single-blade and multiple opposed-blade dampers, standard leakage rating, and suitable for horizontal or vertical applications; factory fabricated and complete with required hardware and accessories.

B. Flexible Ducts: **Factory-fabricated, insulated, round duct, with an outer jacket enclosing 1-inch-thick, glass-fiber insulation around a continuous inner liner c**omplying with UL 181, Class 1.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

1. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class A.

C. Conceal ducts from view in finished and occupied spaces.

D. Support ducts to comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Ch. 4, "Hangers and Supports."

E. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

F. Install volume and control dampers in lined duct with methods to avoid damage to liner and to avoid erosion of duct liner.

END OF SECTION 23 3100

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SECTION 23 342
HVAC POWER VENTILATORS

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Products shall be licensed to use the AMCA-Certified Ratings Seal.

B. Power ventilators shall comply with UL 705.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 SIDEWALL CENTRIFUGAL VENTILATORS

A. Manufacturers:

1. Greenheck
2. Cook
3. Acme

B. Sidewall exhaust fans shall be of the centrifugal direct driven type. Construction of the windband shall be of heavy gauge aluminum and shall have a rolled bead for added strength. Units shall be constructed so that removal of several fasteners shall allow for removal of entire power assembly and wheel for servicing or cleaning.

C. The fan wheel shall be of the backward inclined, centrifugal type with a well designed inlet venturi for maximum performance. Wheels shall be statically and dynamically balanced to assure minimal noise and vibration generation. Blades, fins, inlet cone and back plate shall be fabricated from aluminum and securely joined together.

D. Motors and fan wheels shall be mounted on vibration isolators. Motors shall be isolated from the exhaust airstream. Air for cooling the motor shall be taken into the motor compartment from a location free of contaminants. Motors shall be readily accessible for maintenance.

E. All fans shall bear the AMCA Certified Performance Rating Seal for both air and sound performance.

F. Centrifugal sidewall exhaust fan shall be Model CW as manufactured by Greenheck or equal.

G. Accessories:

1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units with clearances for service and maintenance.

B. Follow manufacturer's installation instructions for sidewall ventilators.

END OF SECTION 23 3423

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SECTION 23 3713
DIFFUSERS, REGISTERS, AND GRILLES

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of product indicated, including color charts for factory finishes.

PART 2 - PRODUCTS

2.1 OUTLETS AND INLETS

A. Diffusers:

1. Manufacturers:
   a. Hart & Cooley Inc.
   b. Price Industries.
   c. Titus.
   d. Tuttle & Bailey.
2. Material: Aluminum
3. Finish: Baked enamel, white
4. Mounting: T-bar

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel unless otherwise indicated. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 23 3713

SECTION 23 8126
SMALL CAPACITY SPLIT SYSTEM AIR-CONDITIONERS

NOT FOR BIDDING PURPOSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data: For each type of product indicated.
2. Documentation indicating that units comply with ASHRAE 62.1, Section 5 - "Systems and Equipment."

B. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace refrigeration components that fail in materials or workmanship within 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 Manufacturers:

A. Samsung
B. Mitsubishi
C. Sanyo
D. Daiken
E. LG

2.2 Indoor Units

A. Refrigerant Coils: Copper Tube with mechanically bonded aluminum fins and thermal expansion valve. Comply with ARI 210/240
B. Fan: Direct Drive, Centrifugal
C. Fan Motor: Multitapped, multispeed with internal thermal protection and permanent lubrication.
D. Indoor unit chassis shall be UL94 V0 with a galvanized steel mounting bracket.
E. Electrostatic, washable, silver coated main filter.

2.3 Outdoor Units

A. Compressor: Hermetically sealed, inverter controlled, Twin BLDC Rotary
B. Refrigerant flow shall be controlled by EEV at outdoor unit.
C. Low ambient control.
D. Outdoor unit wall mounting bracket.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb.

B. Anchor units to structure.

C. Mount cabinet and remote air-cooled condenser on rubber-in-shear pads.

D. Install piping adjacent to unit to allow service and maintenance.

E. Install refrigerant piping between air-conditioning unit and remote condenser.

F. Install condensate piping to indirect drain.

END OF SECTION 23 8126

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SECTION 26 0499
COMMON WORK REQUIREMENTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. The conditions of Division 1 GENERAL REQUIREMENTS apply to each and every Contract and Contractor or other person or persons supplying any material or labor entering this building, either directly or indirectly.

B. Electrical Contractors are bound by provisions of Conditions as described above.

C. One (1) Contractor will be covered by these General Requirements.

1. Electrical.

D. For simplicity, these Sub-Contracts and Sub-Contractors will be referred to further herein as the Electrical Contracts or Contractors.

1.2 DRAWINGS AND SPECIFICATIONS

A. It is the intent of the specifications and drawings to include under each item all materials, apparatus and labor necessary to properly install, equip, adjust and put into perfect operation the respective portions of the installations specified and to so interconnect the various items or sections of the work as to form a complete and properly operating whole.

B. Any apparatus, machinery, small items not mentioned in detail which may be found necessary to complete or perfect any portion of the installation in a substantial manner and in compliance with the requirements stated, implied or intended shall be furnished without extra cost to the Owner. This shall include all materials, devices or methods peculiar to the machinery, apparatus or systems furnished and installed by the Electrical Contractors.

C. In referring to drawings, figured dimensions take precedence over scale measurements. Discrepancies must be referred to the Engineer for decision. Each Contractor shall certify and verify all dimensions before ordering material or commencing work.

D. Any work called for in the specifications, but not mentioned or shown on the drawings, or called for on the drawings, but not mentioned in the specifications, shall be furnished as though called for in both.

E. When any device or part of equipment is herein referred to in the singular number, such as “the motor” such reference shall be deemed to apply to as many such devices as required to complete the installation.

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F. The term "Provide" shall mean "Furnish and Install." Neither term will be used generally in these specifications, but will be assumed. The term "Furnish" shall mean to obtain and deliver on the job for installation by other trades.

1.3 LAWS, ORDINANCES, REGULATIONS AND PERMITS

A. The entire Electrical Systems in all and or part shall conform to all pertinent laws, ordinances and regulations of all bodies having jurisdiction, notwithstanding anything in these drawings or specifications to the contrary.

B. Each Contractor shall pay all fees and obtain and pay for all permits and inspections required by any authority having jurisdiction in connection with their work.

C. Electrical work shall comply with the requirements of the National Electrical Code, National Electric Safety Code, NFPA and other boards and departments having local jurisdiction. Electrical Contractor shall obtain and pay for Certifications of Inspection by an authorized Electrical Inspection Agency and by local, municipal and state approving agencies.

1.4 CONNECTIONS TO UTILITIES

A. Apply for and obtain services from Utility Companies and municipalities. All charges for which Utility Companies and municipalities must be reimbursed shall be paid for by the respective Contractor at no additional cost to the Owner.

1.5 TESTS

A. The following requirements are supplementary to tests specified for individual equipment or systems in Electrical work sections.

1. Give written notice of date of test in ample time to all concerned.

B. Concealed work shall remain uncovered until all required tests have been completed; but if construction schedule requires, arrange for prior tests on parts of systems as approved.

C. As soon as conditions permit, conduct preliminary tests of equipment to ascertain compliance with specified requirements. Make needed changes, adjustments and or replacements as preliminary tests may indicate, prior to acceptance tests.

D. Conduct performance and operating tests as specified or required for each system or equipment unit in presence of the Engineer as well as a representative of agencies having jurisdiction.

E. Obtain Certificates of Approval and/or Acceptance as specified or required in compliance with regulations of agencies having jurisdiction. Work shall not be deemed complete until such Certificates have been delivered to the Engineer.

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F. Testing shall prove conclusively that Electrical systems operate properly, efficiently and quietly in accordance with intent of drawings and specifications.

1.6 CLEANING

A. Each Contractor and/or Sub-Contractor who is responsible for execution of individual sections of work shall be responsible for the following:

1. Removal of all lumber, refuse, metal, piping and debris from site resulting from their work.

2. Cleaning drippings resulting from their work, etc., from finished work of other trades.

3. Cleaning, polishing, waxing of their work as required.

B. After testing, and acceptance of all work by the Engineer and the Owner, each Contractor shall thoroughly clean all equipment and material involved in their Contract to the satisfaction of the Engineer.

1.7 INSTRUCTING OWNER'S PERSONNEL

A. After all tests and adjustments have been made, each Contractor shall fully instruct the representatives of the Owner in all details of operation of the equipment installed under their contract.

B. Each Contractor shall operate their equipment for sufficient length of time to satisfy Engineer that requirements of Contract Documents have been fulfilled.

1.8 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Each Contractor shall provide three (3) copies of printed instructions to the Engineer upon completion of installation. Instructions shall be bound in separate, hardback, 3-ring loose leaf binders.

B. Instruction books shall be prepared by sections and contain detailed operating and maintenance instructions for all components of all systems, including wiring, and schematic diagrams necessary for clarity. The cover of each binder shall be identified with the name of the project and the words "Operating and Maintenance Instructions".

C. Each section shall have labeled tabs and be clearly marked with equipment or system name and contain detailed parts list data, ordering information therefore and the name, address and telephone number of the closest supply source.

D. All instructional data shall be neatly and completely prepared to the satisfaction of the Engineer.

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E. One (1) copy of each final shop drawing shall be included in each of the three (3) Operating & Maintenance Manuals.

1.9 GUARANTEE

A. All material, equipment and workmanship provided by each Contractor shall be in first class operating condition in every respect at time of acceptance by Owner. Acceptance by the Owner shall be by letter to this effect written to each Contractor.

B. Each Contractor shall unconditionally guarantee in writing all materials, equipment and workmanship for a period of two (2) years from date of acceptance by Owner. During the guarantee period each Contractor shall repair or replace, at their own expense, any materials, equipment or workmanship in which defects may develop and he shall also provide free service for all equipment and systems involved in his contract during this guarantee period.

C. Guarantee shall also include restoration to its original condition of all adjacent work that must be disturbed in fulfilling this guarantee.

D. All such repairs and/or replacements shall be made without delay and at the convenience of the Owner.

E. Guarantees furnished by Sub-Contractors and/or equipment manufacturers shall be counter-signed by the related Contractor for joint and/or individual responsibility for subject item.

F. Manufacturers' equipment guarantees or warranties extending beyond the guarantee period described above shall be transferred to the Owner along with the contractor's guarantees.

1.10 ENTRANCE OF EQUIPMENT

A. Each Contractor shall perform all necessary rigging required for completion of work under their contract.

1.11 VISIT TO SITE

A. Due to the nature of the work involved under this contract, all bidders are required to thoroughly examine the site.

B. Bidding Contractors shall thoroughly review Contract Documents prior to visiting the site, take Contract Documents to site and thoroughly explore to any extent necessary, the existing conditions as relating to fulfilling the requirements of this Contract.

C. If discrepancies are noted between requirements of Contract Documents and existing conditions, Contractor shall so indicate to Engineer during bidding period and receive clarification before bidding. Failure to comply with this requirement will result in

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Engineer's interpretation during the construction period and Engineer's decision will be final and binding as the sole interpreter of the contract requirements.

D. Extras will not be considered for any work relating to connections with existing systems or adaptability of new systems to existing structures.

E. Submission of proposals shall be considered evidence that Contractors have complied with the requirements of this Article.

1.12 AS-BUILT DRAWINGS

A. During the course of the work, maintain a record set of drawings on which shall be marked the actual physical location of all conduit, outlets, wiring devices, lighting fixtures, panelboards, access panels, junction boxes, circuit breakers, disconnect switches, starters, transformers, and all other equipment furnished by the Electrical Contractor.

B. Refer to Section 26 0500 Submittals and Quality Control.

1.13 SERVICING OF EQUIPMENT AND SYSTEMS

A. After work has been completed under the Electrical contract, and prior to final acceptance tests, each Contractor shall have manufacturers or their authorized agents of the equipment and material installed, completely check their equipment and put it into actual operation. In each case, the respective Contractor shall have the manufacturers thoroughly check the complete installation of the equipment produced by him for proper and correct operation under the service intended.

B. Six months after final acceptance of the work under the Electrical contract, each Contractor shall have the manufacturers again check their equipment for proper operation. Coincidentally, this contractor shall assure that the building custodian is properly instructed in the servicing of the equipment.

C. Prior to expiration of the guarantee period, each contractor shall check all equipment, materials and systems installed under his contract, make necessary adjustments and/or replacements, and leave systems in first class operating condition.

1.14 EXCAVATION AND BACKFILLING

A. Each Contractor shall perform all excavation, backfilling, pumping and de-watering necessary for completion of work under their contract, unless noted otherwise. All excavation shall be considered classified.

B. Remove from premises or deposit as directed by Engineer all material excavated and not required or suitable for backfilling.

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C. Carefully remove and store topsoil, shrubbery and sod until underground work is complete and trenches are backfilled and then re-install. Replace any damaged items to the satisfaction of the Engineer.

D. Trench depth shall be as indicated on the drawings. Under no circumstances shall trench depth be less than that called for in the NEC or the Utility serving the premises. Trench depth shall allow adequate cover over ducts and conduit. Walls shall be perpendicular to the top of piping and ducts and trench bottoms shall be instrument graded in the direction of flow as required. Earth shall be scooped out under conduit couplings to provide a solid bearing for the duct or conduit on undisturbed earth. Cinder fill, stones or bricks beneath piping are prohibited.

E. Each Contractor shall provide sheathing, shoring and bracing necessary to complete their excavation and backfilling work and shall exercise every precaution necessary to prevent accident, injury or death to any human and damage to property of others. Remove all sheathing, shoring and bracing upon completion of work.

F. It shall be the responsibility of each Contractor to check with the various utility companies, Miss Utility and make the necessary arrangements to avoid damage to property. Each Contractor is responsible for damage during excavation to existing piping or equipment. Such damage shall be repaired promptly without cost to the Owner.

G. Backfill after inspection and approval. Backfill shall be made with clean earth, free from rocks, frozen particles, debris or other foreign materials. Deposit in uniform layers not over six inches (6") thick with each layer mechanically tamped to 90% before the next layer is applied. When approved backfill material is not available from the site, each Contractor, at his own expense shall provide additional select backfill to complete installation. Final backfill only after testing procedures have been approved.

H. All trenches that pass under wall foundations shall be backfilled with lean concrete, full height, directly under wall footing, and at a 1:1 slope away from wall or column footing. Trenches that are parallel with and deeper than wall foundations shall be backfilled with lean concrete on a 1:1 slope away from the bottom of the wall or column footing.

I. Each Contractor shall perform all cutting and patching to sidewalks, curbs, bituminous paving, walls, etc. required by performance of excavation and backfilling. Install and maintain temporary paving as directed by Engineer. Make repairs to sidewalks in complete blocks, partial patching will not be acceptable. Provide all materials for patching in strict accordance with applicable Articles of the General Construction Specifications.

J. Where rock is encountered during installation of underground conduit systems, carry trenches to a point six inches (6") below bottom of conduit and provide a six inch (6") layer of crushed stone or gravel as a cushion.

K. All excavation work shall include all pumping equipment, materials and labor necessary to keep all excavations free of water. Provide well points as required with disposition of water as directed by Engineer.

L. Each Contractor shall provide suitable indemnity for all accidents to humans, animals or equipment caused by their excavating and backfilling work. They shall provide suitable

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guards, barricades, red lanterns, flares and take the necessary precaution for an approved and safe installation. All trenches shall be backfilled at the end of each working day. Where a trench must be left open, provide snow fencing and coverings of adequate size and strength over entire open area.

1.15 CONTINUITY OF SERVICES

A. Generally, no action shall be taken by the Electrical Contractor that will interrupt any of the existing building services **[**for this building or any other building**]** until previously arranged with the Engineer and Owner or their authorized representative.

B. Should any service be interrupted by this Contractor, the Contractor causing such interruption shall provide immediately all labor, including overtime if necessary, and all material and equipment necessary for restoration of such service.

1.16 TEMPORARY FACILITIES, UTILITIES AND HEATING

A. Refer to Section TEMPORARY FACILITIES AND CONTROLS in Division 1 of these specifications.

1.17 ENERGY STAR COMPLIANCE

A. All electrical products furnished under this contract shall carry the Energy Star label indicating compliance with the State of Delaware Code, that all products be Energy Star compliant. In the case where a product or assembly is not offered or available as being Energy Star compliant, the most efficient product or assembly shall be furnished.

PART 2 - MATERIALS

2.1 MANUFACTURER'S AND SUB-CONTRACTORS LIST

A. Before ordering any material or equipment unit, and not later than twenty (20) working days after signing of contracts each Contractor shall submit a list of Manufacturers, Sub-Contractors and Suppliers showing make, type, manufacturers name and trade designation of all materials, and equipment, proposed for use under this contract. List shall be prepared by reference to specifications.

B. The list, when accepted, shall be supplementary to specifications, and no variations therefrom will be permitted except with the approval of the Engineer.

C. No shop drawings will be processed until the Contractor has satisfactorily completed the requirements of this Article.

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2.2 SHOP DRAWINGS

A. Submit shop drawings electronically, in PDF format, except for full size drawings, which shall be submitted in six (6) copies of all material and equipment as noted in Manufacturer's and Sub-Contractors List, except where indicated otherwise further herein.

B. Prior to submission of shop drawings, the Contractor shall notify the Engineer of any site conditions differing from those indicated or specified.

C. Prepare shop drawings by careful reference to drawings and specifications.

D. Identify each shop drawing by Job Name and reference to applicable Specification Article number.

E. Shop drawing data for all equipment, shall include, but not be limited to, the following:

1. Manufacturers' catalog designation, photographs and specifications.

2. Full electrical data, including specifically, electrical characteristics.

3. Dimensions, capacities, ratings, material and finish.

4. Such other detailed information as required for proper evaluation.

F. Review Time:

1. Allow two (2) weeks for the Engineer's processing of each submittal, exclusive of Owner or others in the processing chain. Allow a longer time period where processing must be delayed for coordination with subsequent submittals.

G. Submission of shop drawings for electric motor starters shall include a tabulation listing:

1. The equipment the starter is intended to control.

2. Horsepower.

3. Voltage.

4. Phase.

5. Full load amperes.

6. The manufacturer's number or type.

7. Overload heater numbers and amperage.

8. Quantity of auxiliary contacts.

9. Pushbutton arrangement.

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10. Pilot light arrangement if applicable.

H. Each Contractor shall examine all shop drawings before submission for review. Each Contractor shall then forward all shop drawings with their initialed approval shop drawing stamp and by so doing the Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers, and similar data, has notified the Engineer of site conditions varying from those indicated or specified, and that he has checked and coordinated each item with other applicable accepted shop drawings and the contract requirements. Shop drawings and catalog data submitted without the contractor's stamp of acceptance will be returned to the Contractor without review.

I. Shop drawings smaller than 8-1/2 x 11 shall be secured to letter size paper of this size.

J. Material and equipment installed or used without shop drawing review are subject to rejection by the Engineer.

K. Corrections or comments made on shop drawings during review by the Engineer does not relieve the contractor from compliance with requirements of the drawings and specifications. Such review shall be only for general conformance with the design concept and general compliance with the information given in the Contract Documents. It shall not include review of quantities, dimensions, weights or gauges, fabrication processes, construction methods, coordination with the work of other trades, or construction safety precautions, all of which are the sole responsibility of the Contractor. Review of a specific item shall not indicate acceptance of an assembly of which the item is a component. The Engineer shall not be responsible for any deviations from the Contract Documents not clearly noted by the Contractor, nor shall the Engineer review partial submissions or those for which submissions for correlated items have not been received. The Contractor is responsible for: confirming and correlating all quantities, clearance and dimensions, selecting fabrication processes and techniques of construction coordinating work with that of all other trades, and performing their work in a safe and satisfactory manner.

2.3 MATERIALS AND EQUIPMENT

A. All materials and equipment shall be new and shall conform to the grade, quality and standards specified herein.

B. All equipment offered under these specifications shall be limited to products regularly produced and recommended for service ratings in accordance with engineering data or other comprehensive literature made available to the public and in effect at the time of opening of bids.

C. Items such as motors, starting equipment, vibration isolating devices, and all other equipment and material, where applicable and practicable, shall each be of one manufacturer.

D. Equipment shall be installed in strict accordance with manufacturer's instructions for type and capacity of each piece of equipment used. These contractors shall obtain these instructions which will be considered part of these specifications. Type, capacity and

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application of equipment shall be suitable and shall operate satisfactorily for the purpose intended in the Electrical System.

2.4 EQUIPMENT VARIATIONS

A. The materials and products mentioned in these specifications are given to establish a standard of quality, design and performance. The phrases "equivalent acceptable", "or equal", and "equal to" shall be used to indicate that other similar products may be used provided such substitutes are accepted by the Engineer as meeting all standards necessary to perform the function intended. Where 3 or more manufacturers are mentioned for an item, selection shall be made from among those manufacturers. Specific products listed without reference to equals or substitutions shall be provided as specified, unless a written request for substitution is submitted to the Engineer for approval ten (10) days prior to the date for receipt of bids. Such requests shall include a complete description of the proposed substitute, along with sufficient documentation and other information necessary for a complete evaluation of the proposed substitution. If approved, substitute produce will be listed in an addendum so that all bidders are alerted to it.

B. The Contract Documents have been prepared to provide for the incorporation of at least one of the specified items or assemblies of every category of materials, products or pieces of equipment. In the event that the incorporation into the work of an approved substituted item or assembly will require revisions or additions to the contractual requirements of either the contractor proposing the substitution or any other contractor, the contractor proposing the substitution shall bear the cost of such revisions or additions to the work of all trades affected, and shall pay for all engineering or architectural services required at no change in the contract sum.

2.5 VIBRATION ELIMINATION

A. The Electrical Contractor shall provide vibration isolation support provisions for all moving or rotating equipment, machinery and transformers when such provisions are not furnished and/or integrally mounted by the equipment manufacturers. Equal to Amber/Booth Company or Korfund Company, Inc., installed in accordance with vibration isolation manufacturers' recommendations unless specified otherwise herein.

B. Provide all rotating or moving machinery or equipment suspended from building structure with approved resilient suspension mountings.

C. All final electrical connections to moving or vibrating equipment, such as motors, generators, transformers, etc., shall be made by use of flexible metallic conduit.

D. No rigid conduit or other extended machine assemblies connected to vibration isolated equipment shall be tied in directly with the building construction. Such elements shall be connected to the equipment through flexible fittings, and be supported by isolating equipment as required.

E. All systems shall operate free from objectionable vibration and noise resulting therefrom, and each Contractor shall take all necessary steps required to achieve this result without additional cost to the Owner.

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2.6 INSERTS, HANGER SUPPORTS, CLAMPS, FASTENINGS

A. All materials, designs and types of inserts, hanger supports and clamps shall meet the requirements of the Manufacturers Standardization Society Document MSS-SP-58, latest edition and also Underwriters Laboratories, Inc., National Electrical Code and Factory Mutual Engineering Division Standards where applicable. Insert, hanger support and clamp types referenced herein are shown in MSS-SP-58.

B. Each Contractor shall be responsible for and provide all necessary inserts, hanger supports, fastenings, clamps and attachments necessary for support of his work. The types of all inserts, hanger supports, fastenings, clamps and attachments to be used shall be selected to suit both new and existing building construction conditions and applied specifically for the purposes intended.

C. In new overhead cast-in-place concrete construction, provide type 18 steel concrete inserts and fasten to form work before concrete is cast. For cast concrete floor or roof sections too thin to permit the use of inserts extend the hanger rod through the slab and terminate with a nut and large washer, recessed into the top face of the slab as approved by the Engineer.

D. Clamps and attachments shall be selected on the basis of the required load to be supported. Provide all necessary steel angle iron or channel between bar joists, or steel beams where direct attachment cannot be made. No holes are to be drilled or burned in structural building steel for hanger rod supports.

E. Metallic masonry anchors shall be provided for all pre-cast concrete, masonry and cast concrete construction**[**, and may be provided as an alternate for cast-in-place construction**]**. Locate in pre-cast and cast-in-place concrete as directed by the Engineer. Dynabolt, Ram-In and/or Tru-Bolt masonry anchors as manufactured by Ramset shall be provided as recommended by the anchor manufacturer for the various applications, stresses and services involved. Redhead, Hilti or Wej-It equivalents acceptable. Installation of masonry anchors shall be accomplished by pre-drilling concrete or masonry to diameters and depths required to properly accommodate anchor bolts.

F. Toggle bolts may be used in dry wall and lath and block plaster walls. The use of toggle bolts shall be restricted to the weight limitations imposed by the toggle bolt manufacturer for the size used.

G. Except where noted otherwise herein, attachment to wood or material of similar fibrous nature shall be made with lag screws and/or wood screws of required size.

H. Screws with wooden or plastic plugs, or lead caulking anchors are not acceptable.

2.7 ACCESS DOORS AND PANELS

A. Each Electrical Contractor shall furnish and locate for installation under General Construction all access doors and panels for concealed portion of Electrical work requiring accessibility for operation and maintenance of their installed work.

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B. Minimum door size of 24" x 18" unless shown, specified or approved otherwise.

C. Sixteen (16) gauge minimum doors with screw fasteners and painted finish. Equal to Inryco/Milcor as follows:

WALL OR CEILING SURFACES	STYLE
Drywall	DW
Hard Plaster & Ceramic Type	K
Unplastered Masonry & Concrete	M
Acoustic Tile	AT

D. Underwriters "B" label access doors where required for access to shafts, corridors, and where located in fire walls and partitions.

E. No access panels shall be installed without specific approval of the Engineer as to location. The proposed location of panels of each Contractor shall be reviewed with the Engineer by the General Contractor's Job Superintendent before installation of equipment or panels. Controversies must be resolved at no cost to the Owner.

2.8 ANCHOR BOLTS

A. Electrical Contractor shall provide and set in place at the time foundations, bases or curbs are poured or formed, all necessary anchor bolts as required for the various equipment specified herein. Hook type anchor bolts of proper size and length to suit the apparatus. Set bolts in pipe sleeves of approximately twice the bolt diameter and of length equal to the embedded length of the bolt, with sleeves terminating flush with finished surfaces of foundations, bases or curbs.

B. When the equipment is set in its proper position and aligned with the anchor bolts, the space between the anchor bolts and the inside wall of the sleeves shall be completely filled with non-shrink cementitious grout equal to crystex as manufactured by L & M Construction Chemicals, Inc., Master Builders or approved equal.

C. Each Contractor shall assume all responsibility for the location of all anchor bolts for the equipment furnished by them under these specifications, and must have a representative present at the time foundations, bases or curbs are poured or formed.

D. All anchor bolts shall be of sufficient strength to withstand any loading imposed by the attached materials or equipment.

2.9 SLEEVES

A. Each Contractor shall furnish and set all sleeves required for their work and be fully responsible for the final and permanent locations thereof.

B. Sleeves shall be provided in the following locations:

1. All conduits passing through cast-in-place waterproof concrete construction and waterproof masonry walls.

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C. Sleeves shall extend through construction and finished flush with each surface except where noted otherwise. Each sleeve shall provide for a minimum 1/2" clearance around pipe or its covering in the instance of pipe covered with insulation.

D. All sleeves in waterproof walls shall be fitted and sealed with positive hydrostatic "Link Seals" as manufactured by Thunderline Corporation. Sleeves shall be sized accordingly. Link Seals shall be placed around conduit and inserted into void between inner wall of sleeve and piping and/or conduit. Tighten link seals as required for watertight seal.

E. All sleeves shall be Schedule 40 steel pipe finished with smooth edges. Sleeves in waterproof walls shall be fabricated with minimum 1/4" thick rectangular steel plate placed around mid-point of sleeve, continuously welded to sleeve and then the entire/plate assembly placed into proper position prior to erection of walls. Otherwise sleeves shall be provided with a minimum of three (3) lugs for anchoring.

F. Voids between sleeves and conduit, where located in fire partitions or masonry walls shall be packed with mineral fiber rope.

G. All sleeves shall be set prior to or during erection of walls. Cutting or drilling of walls after erection will not be permitted.

H. If sleeves are omitted or located incorrectly the particular contractor who is at fault shall at their own expense, engage the trade which originally installed the work to cut and patch to the satisfaction of the Engineer.

I. Any conduit that must pass through pre-cast floors and will be exposed, in finished areas, that have floor drains including areas such as Janitors Closets, Toilet Rooms and the like shall be made watertight by use of "Link Seals" inserted into void between conduit and openings thereto.

PART 3 - METHODS

3.1 METHOD OF PROCEDURE

A. The drawings accompanying these specifications are diagrammatic and intended to cover the approximate and relative locations of the Electrical Systems.

B. Installation, connection and interconnection of all components of these systems shall be complete and made in accordance with the manufacturers instructions and best trade practices.

C. Each Contractor shall erect all parts of equipment to be furnished by them under their contract at such time and in such manner as not to delay or interfere with other Contractors on the work.

D. All conduit shall be plugged as required during construction to prevent entering of dirt.

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E. Before material is ordered or any work performed, each Contractor shall verify all measurements, including lines, conduit and elevations at the building and shall be responsible for the correctness thereof. No extra compensation will be allowed on account of differences between actual dimensions and measurements and those indicated in the Contract Documents. Any discrepancies discovered shall be submitted to the Engineer for consideration before proceeding with the work.

F. Each Contractor shall lay out their work and be responsible for the establishment of heights, grades, etc., for all interior and exterior fixtures, conduit, etc., included in Contract Documents, in strict accordance with the intent expressed thereby; and all the physical conditions to be met at the building and finished grade, and shall be responsible for accuracy thereof. The establishment of the location of all work shall be performed in consideration of the finished work. In case of conflict, equipment and/or materials shall be relocated without cost to the Owner, as directed by the Engineer, regardless of which equipment was installed first.

G. Each Contractor shall cooperate with other Contractors for the proper securing and anchoring of all work included within these specifications. Extraordinary care shall be used in the erection and installation of all equipment and materials to avoid marring surfaces of the work of other Contractors, as each Contractor will be held financially responsible for all such injury caused by the lack of precaution and due to negligence on the part of their workmen.

H. Do not run conduit for Electrical Systems in any concrete slab three inches (3") or less in thickness. Do not place any conduit in any slab where the outside diameter of the pipe or conduit is more than one-quarter the thickness of the slab.

I. All conduit and other Electrical materials and equipment shown to be mounted below ceilings are to be kept as close to ceiling areas as possible unless otherwise noted.

3.2 PROTECTION

A. All openings in conduit and all other materials shall be effectively sealed to exclude dirt, sand, and other foreign materials.

B. Exercise every precaution to exclude dust, dirt and all other foreign materials from switchgear rooms, transformers, and all electrical equipment rooms during construction. Rooms and equipment contained therein shall be vacuum cleaned at regular intervals. All relays, meters and mechanical equipment contained with electrical components shall be protected with heavy paper held in place with approved mastic tape to exclude fine dust and particles. Sufficient electric heaters shall be installed and maintained in equipment rooms and transformer compartments to keep equipment dry and protected from freezing during construction.

3.3 CUTTING AND PATCHING

A. New Construction:

1. Each Contractor shall provide and set all sleeves, inserts and other items required for the installation of their work and shall be responsible for their final and permanent locations.

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2. Each of these Contractors shall confer with and give the General Contractor complete information as to size of openings in all construction, so that such openings may be provided as the building progresses.

3. If openings are omitted or incorrect through failure of these Contractors to follow these instructions, the particular Contractor shall, at their own expense, engage the trade which originally installed the work to cut and patch to the satisfaction of the Engineer.

B. Existing construction:

1. The General Contractor shall perform all cutting and patching required for the work of all trades.

3.4 CONCRETE AND MASONRY WORK

A. Electrical Contractor shall provide all cast-in-place concrete, pre-cast concrete and masonry work (brick and block) required for completion of their contracts.

B. Engineer shall review and approve materials used.

C. Unless shown or specified otherwise, all equipment foundations shall be six inches 6" minimum from floor, of sufficient mass, and secured to the floor.

3.5 SUPPORTS

A. Except where noted otherwise in the specifications and shown on drawings, each Contractor shall provide all materials, equipment supports, supplies and labor necessary as required to adequately support, brace and strengthen equipment and materials furnished as part of their contract.

B. The design, materials, fabrication and erection of structural steel supports shall conform to "Specification for Design, Fabrication and Erection of Structural Steel for Buildings" of the American Institute of Steel Construction, "Code of Standard Practice for Steel Buildings and Bridges". Welding where required shall conform to "Code of Arc and Gas Welding in Building Construction" of the American Welding Society.

3.6 LINTELS

A. The General Contractor will furnish and install all lintels required for the installation and completion of all work of Electrical Contractors, provided that the General Contractor is advised in advance of such requirements.

B. Failure to give proper notice and/or to comply with the above requires the Sub-Contractor involved to be financially liable for all work and material necessary for the completion of required work.

3.7 PAINTING AND FINISHING

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A. All painting, generally, will be provided by the General Contractor, except where specifically noted otherwise in the Electrical Specifications.

B. Equipment and material furnished with factory enamel finish will not be painted unless finish has been damaged, in which case the equipment or material shall be refinished by the Contractor who furnished it, to the satisfaction of the Engineer.

3.8 LUBRICATION

A. Each Contractor shall be responsible for the proper and necessary lubrication of any items of operating, rotating or moving equipment which they will furnish, install or which must operate as part of the systems on which they work.

B. When an item of operating equipment is furnished and installed by a Contractor, it will be their responsibility to accomplish the lubrication.

C. When an item of operating equipment is furnished by one Contractor and the installation by another, it shall be the responsibility of the Contractor furnishing the equipment to apply the lubricants.

D. All rotating or moving equipment shall be lubricated prior to energizing and operating the equipment. Should the Contractor responsible for the lubrication fail to apply lubricants prior to initial start-up and the equipment is damaged as a result of their negligence, that Contractor shall be required to provide all corrective action necessary including replacement, if required, for the proper operation of equipment.

E. Lubrication shall be accomplished in the manner prescribed or recommended by the manufacturer of the specific item. For motor driven equipment this precaution of lubrication will apply individually to the driver and the driven.

F. The lubricants shall be of the type, grade, specification and manufacture as prescribed or recommended by the manufacturer of the specific equipment item.

G. The Contractor who supplies any item of rotating equipment will have the responsibility of securing written instructions on the lubricating procedure and shall furnish not less than one year's supply of all necessary lubricants properly identified so they can be replaced.

H. Any moving or rotating equipment furnished by the Owner that is to be installed, reused and/or serviced shall also be lubricated. Except where noted otherwise in the Electrical specifications, the Contractor installing, reusing and or servicing all such equipment shall be responsible for the proper lubrication thereof including obtaining proper lubricating instructions from the various manufacturers involved, furnishing and applying the necessary lubricants and leaving the Owner with a one (1) years supply of lubricant.

3.9 ELECTRICAL MOTORS AND STARTERS

A. All motors furnished by Electrical Contractor, unless specified to the contrary in Electrical Specifications, shall conform to the following requirements:

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1. Characteristics, dimensions, tolerances, temperature rise, insulation, rating, noise, vibration, and all other characteristics in accordance with the latest standards of IEEE or NEMA.

2. Unless required by the driven unit, motors shall have normal starting torque, NEMA Design B characteristics. Horsepower rating of motor shall be equal to or greater than that required by driven equipment. Current density design of motor rating shall be limited so that overload protection provided by standard motor starters will be adequate to prevent damaging overheating during stall, single phasing or slightly prolonged acceleration.

3. Use NEMA Class A or B insulation with motor frames amply sized to prove 1.15 service factor and an ambient of 40°C. maximum. Insulation systems shall be designed for an average life of 60,000 hours.

4. Each motor shall be mounted on the same bedplate as the equipment driven and be complete with pulleys, slide rails or flexible couplings as required.

5. Each Contractor is responsible in each instance for the proper selection of motors of suitable characteristics with details submitted for approval to the Engineer prior to installation.

B. All starters furnished by all Contractors shall conform with the following requirements, unless specified to the contrary in the Electrical Specifications:

1. All starters for 3-phase equipment shall be fully enclosed, across-the-line type equipped with thermal overload protection for all three phases, low voltage protection, all necessary auxiliary contacts as required and indicating pilot lights. Starters which are controlled automatically shall have two-wire control with "ON-OFF-AUTO" switches. Starters which are controlled manually shall have 3-wire control with Start-Stop pushbuttons.

2. All 3-phase starters remotely controlled shall have 120 volt coils and control transformers with disconnecting means.

3. Starters for single phase motors shall be manual toggle switches with thermal overload protection and pilot light. Omit pilot light for unit heaters.

4. General Purpose NEMA-1 enclosure for indoor use under normal atmospheric conditions. Watertight enclosure NEMA-4 or NEMA-5 for outdoor use or where starters are subjected to the splashing or dripping of water. Explosion-proof enclosure NEMA-7, 9 or 12 for dusty or hazardous locations as required by Article 500 of the National Electrical Code.

C. All controllers, starters and other electrical components furnished as an integral part of any apparatus shall be furnished complete with integral wiring as required.

D. So far as is practicable, all motors and starters shall be of one manufacturer. Equal to General Electric, Westinghouse or Square D.

E. Submit motor and starter data sheet.

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3.10 CONDUIT UNDER FLOORS

A. Wherever conduit is run under a floor slab on grade, the work is to be installed after the General Contractor has brought the sub-grade to the proper level.

B. The Electrical Contractor shall excavate and backfill for the installation of all of their respective work. The excavation of the sub-grade where required for the installation of the work shall be performed including that for conduit. When the installation is completed and satisfactorily tested, the remaining space shall be filled with crushed stone or other material similar to that to be used by the General Contractor for the sub-base. The backfill shall be stabilized by hand or pneumatic tampering as directed by the Engineer and shall be returned to the original sub-grade level.

C. No conduit shall be installed in the stone sub-base which is part of the General Contractor's work unless specific permission is granted by the Engineer.

D. Where required by drawing notes, specifications, or Electrical Code, conduits installed under floors shall be encased in concrete, conforming to that specified under "cast-in-place concrete".

END OF SECTION 26 0499

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SECTION 26 0500
BASIC MATERIALS AND METHODS, ELECTRICAL

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Applicable provisions of the entire specification, including Addenda, shall govern this section as fully as if repeated herein.

B. Refer specifically to the technical provisions of the COMMON WORK REQUIREMENTS FOR ELECTRICAL, Section 26 0499.

1.2 SCOPE OF WORK

A. The work under this section of the specification shall include all labor, materials, appliances and services necessary for and incidental to the primary completion of the electrical system for this structure and related work as shown, implied or required by the drawings and/or described hereinafter.

B. The precise nature of the work is specified in detail in other Sections. As a guide to the general concept of the electrical design, the work herein described shall include, but not be limited to the following:

1. Lighting fixtures and lamps.
2. Receptacles and general power circuits.
3. Panelboards, circuit breakers and distribution equipment.
4. Wiring and conduit systems, boxes, enclosures and devices.
5. Connections to new, existing and relocated equipment.
6. Emergency lighting.
7. Security system.
8. Disconnects and removals.
9. Relocation of existing equipment & wiring extensions thereto.
10. Grounding.

1.3 AS-BUILT DRAWINGS

A. During the course of the work, maintain a record set of drawings on which shall be marked the actual physical location of all light fixtures, remote ballasts, conduit, panelboards, switchboards, wiring devices, disconnect switches, fire alarm peripheral devices, underground electrical branch circuits, and all other components of the work performed by the Division 26 (Electrical) contractor and their subcontractors.

B. Include on the record set, all formal modifications to the contract documents including but not limited to: addendum items, response to RFI's (field directives), ASI's, change order items and underground obstructions.

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C. At project completion, obtain a READ ONLY set of contract documents from the Engineer in AutoCAD 2007 (or later) .dwg format. Copy the source documents and create new documents, modifying the original files by incorporating all items noted on the record drawings onto the source AutoCAD files.

D. For each drawing, make one (1) .dwg file and one (1).pdf file and copy all files onto a single Digital Video Disk (DVD). Make one (1) additional copy of the DVD for the Engineer. Using the new AutoCAD files, make one (1) set of Mylar reproducibles and four (4) prints of the As Built drawings. Incorporate one set of prints in each O&M manual.

E. In cases where the prime contractor or subcontractors are required to design and/or submit original shop drawing documents, prepared by the respective contractors for submission to State Agencies (i.e.: sprinkler, fire alarm, etc.), each respective contractor or subcontractor shall revise their drawings accordingly and include all As-Built information, thereon. Submit As-Builts in the same format, (i.e.: Two (2) DVD's, one (1) mylar reproducible and three (3) prints) as with the project As-Built information contained thereon.

1.4 DATA SUBMITTAL REQUIREMENTS

A. Refer to the Article MANUFACTURERS AND SUB-CONTRACTORS LIST of COMMON WORK REQUIREMENTS FOR ELECTRICAL. This list shall include all equipment for which shop drawings are required.

1.5 SPECIAL SHOP DRAWING SUBMITTAL REQUIREMENTS

A. Shop drawings for electrical equipment shall consist of blueprints, line drawings, data sheets, catalog cuts, or other data necessary to provide specific and complete installation on all items of material and equipment to be used in the project.

B. All shop drawings must specifically designate the service and location at which the material or equipment is to be used, and identify manufacturer and catalog number.

C. Shop drawings shall show construction arrangements, and wiring of any special parts, equipments, or systems of the electrical installation furnished under these specifications.

D. Shop drawings to be furnished by the Contractor for review include but are not limited to the following:

1. Lighting and emergency lighting fixtures.
2. Branch circuit panelboards.
3. Telecommunication Equipment
4. Fire alarm system equipment.
5. Access control system equipment
6. Wiring devices and coverplates

E. Provide one (1) copy of each final shop drawing in each Operating and Maintenance Manual.

1.6 CURRENT CHARACTERISTICS AND LOAD RATINGS OF MOTORS AND EQUIPMENT

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A. The intended electrical characteristics of all motors and equipment are noted only on the Electrical Drawings.

B. Furnish to all other contractors, data relating to the electrical characteristics of their equipment as shown on the Electrical Drawings, that they may furnish correct equipment. Assume all responsibility for correction of problems arising from failure to do so.

1.7 CUTTING AND CHASES

A. Provide the General Contractor, location of all chases, openings, recesses, etc., in a timely manner so that he may provide them.

B. All cutting and patching shall be performed in such a manner and with such materials as the Architect may direct.

1.8 INSTRUCTION OF ATTENDANT - OPERATING AND MAINTENANCE MANUAL

A. Upon completion and final acceptance of the work, instruct the Owner's maintenance representative fully in the operation and maintenance of the electrical installation.

B. Furnish to that representative a complete and comprehensive "Operating and Maintenance Manual", as specified in COMMON WORK REQUIREMENTS FOR ELECTRICAL, Section 26 0499.

1.9 EXISTING BUILDING SYSTEM CONNECTIONS

A. The information given regarding methods and materials for connection to the existing electric equipment or any other system represents the best information available to the Engineer at time of design. This Contractor shall visit the site, and determine their requirements for such connection, and any costs or fees involved, and shall include the costs thereof in their bid. They shall do all their work in accordance with such requirements, notwithstanding any differences between these requirements and information given herein or on the drawings.

1.10 TESTING AND ADJUSTING

Refer to Article TESTS of Section 26 0499 COMMON WORK REQUIREMENTS FOR ELECTRICAL.

A. Electrical balancing.

1. Connect all electrical loads to achieve a balanced electrical loading of all three (3) phase systems to within 10%. Verify motor rotation.

B. Thoroughly test all components of special systems for correct operation.

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C. Test all wiring of equipment free of grounds, opens and short circuits.

D. All projects that involve a new electric service shall be provided with a Fall in Potential test, performed by a NETA testing firm.

1.11 CODE COMPLIANCE

A. The contractor shall comply with the requirements of the latest National Electrical Code, all state & local codes and all other authorities having jurisdiction, regardless of what is indicated on the drawings or specified herein.

B. Provide approved Electrical Inspection Certificate at project completion. Provide one copy in each of the Operating & Maintenance Manuals.

1.12 DISCONNECT AND REMOVALS

A. The Contractors shall visit the site prior to submitting their bid and shall include in their bid all labor and material necessary to remove, relocate or modify the items which interfere with new construction. This shall include wiring extensions, removals and modifications.

B. Incidental items such as cover plates, boxes, and appurtenances shall be provided by this contractor.

C. Patch all holes through floors and walls where conduits have been removed and maintain integrity of fire rating.

D. Existing items that are to remain but become de-energized due to removals shall be re-energized by this Contractor who shall provide necessary wiring extensions as required. Contractor shall investigate wiring in area of construction and ascertain wiring that must remain in order to maintain operation of items outside of new work area.

E. Contractor shall disconnect and remove all existing abandoned and unused network cabling, intercom cabling, telephone cabling, clock system cabling, fire alarm in its entirely. Existing system wiring shall not be abandoned in place.

1.13 RELOCATIONS

A. Items requiring relocation due to new construction shall be disconnected, removed, cleaned and re-installed where shown or directed. Branch circuit wiring associated with these items shall be removed and re-routed to new equipment locations and reconnected. The contractor shall field verify all relocations and re-routing requirements and shall include this in their bid.

PART 2 - MATERIALS

NOT FOR BIDDING PURPOSES

2.1 MATERIAL AND EQUIPMENT

A. All material used for this contract shall be unused and of the latest model or design available.

B. Equipment shall be installed in strict accordance with manufacturer's recommendations and details.

C. Materials not specifically described but indicated or incidently required shall be acceptable to the Architect and/or Engineer. Submit shop drawings if such are required by Architect or Engineer.

D. Materials shall be delivered, stored and handled so as to preclude injury by weather, dirt or abrasion.

2.2 FASTENINGS AND SLEEVES

A. Support exposed conduits with rust proofed, malleable iron clamps or "mineralac" hangers securely fastened to the building structure. Group all large conduits as conditions permit, and support on steel channel racks. Supports shall be spaced as required by Article 346-12 of the National Electrical Code for metal conduits, and by Article 347-8 for non-metallic conduit.

B. Use lead anchors or toggle bolts as fastenings in masonry. Use machine screw expansion shields as fastenings in concrete.

C. Provide sleeves for conduits passing through poured concrete decks, footings, corridor walls, etc. Cut all openings for conduits passing through precast concrete. Such holes shall not be cut with hammer and chisel, or with any power tool depending on impact for its cutting power.

D. Provide minimum 2" sleeves with mortar around each sleeve. Provide intumescent material to fill all voids between cable and sleeve.

2.3 WIRE AND CABLE (600 VAC INSULATION)

A. All wire and cable shall be of 98% conductivity copper, single conductor in all sizes. Wire in sizes #8 AWG and smaller may be solid conductor. Wire in sizes #6 AWG and larger shall be stranded. Interior wiring and wiring in dry locations shall have type THHN insulation. Exterior wiring and wiring in damp or wet locations shall have type THWN insulation.

B. Wiring installed in flexible steel conduit shall be stranded conductor in all sizes. Maximum length shall be limited to 3'-0".

C. All wiring shall be color coded or identified in an approved manner. Color coding shall be consistent throughout the work, i.e., same color used for same phase leg, one color switch legs, etc. In all cases, ground conductor shall be green.

D. On systems of 208Y/120 VAC, the following color code shall be observed:

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Phase A: Black
B: Red
C: Blue
Neutral: White

E. On systems of 480Y/277 VAC, the following color coding shall be observed:

Phase A: Brown
B: Orange
C: Yellow
Neutral: White with dark gray or black stripe

F. Minimum wire sizes shall be as follows:

Control and Signal = # 14 AWG
Power and Lighting = # 12 AWG

2.4 CONDUIT AND FITTINGS

A. Rigid steel conduit shall be UL listed, and in accordance with the latest edition of Federal Specification WW-C-581, and ANSI Standard C80.1. Rigid steel conduit shall be zinc coated on the outside, and either zinc-coated, or coated with an approved corrosion resistant coating on the inside.

B. Rigid aluminum conduit shall be UL-listed, and in accordance with the latest edition of ANSI Standard C80.5.

C. Electrical metallic tubing (EMT) shall be UL listed and in accordance with the latest edition of UL 797 and ANSI Standard C80.3. EMT shall be zinc-coated on the outside and shall be either zinc-coated or coated with an approved corrosion resistant coating on the inside.

D. Rigid non-metallic conduit shall be Schedule 40 polyvinyl chloride, unless otherwise noted. Conduit shall be U.L. listed. Appropriately sized ground wire shall be run in all non-metallic conduit.

E. Liquid tight flexible metal conduit shall be U.L. listed, and consist of a core of flexible galvanized steel tubing over which is an extruded, a liquid tight jacket of polyvinyl chloride (PVC).

F. Liquid tight flexible non-metallic conduit shall not be used.

G. Flexible metal conduit ("Greenfield") shall be U.L. listed, and in accordance with the latest edition of Federal Specification WW-C-566.

H. Fittings for rigid steel conduit shall be in accordance with the latest edition of Federal Specification W-F-408, except that the material shall be either iron or steel only.

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I. Fittings for rigid aluminum conduit shall be in accordance with U.S. Standards for Safety UL-514. Fittings shall be made of "copper-free" aluminum alloy containing not over .04 percent copper.

J. Fittings for rigid non-metallic conduit shall be polyvinyl chloride, sleeve type, applied with a solvent recommended by the manufacturer.

K. Couplings and connectors for EMT shall be made of either steel or malleable iron only, shall be "Concrete tight" or "Rain tight" and shall be the gland and ring compression type. All connectors shall have insulated throats.

L. Bushings for rigid steel conduit and for EMT shall be of the insulated type, designed to prevent abrasion of wires without impairing the continuity of the conduit grounding system. The insulating insert material shall be thermo-plastic of fiber, molded or locked into the metallic body of the fittings. Where grounding bushings are specified, either wedge type ground clips or grounding bushings with pressure type ground clip terminals or copper grounding lugs shall be provided.

M. Fittings for liquid tight flexible conduit shall be of a type with a nylon or equal plastic compression ring and a gland for tightening. Fittings shall be made of either steel or malleable iron only, shall have insulated throats and shall be of a type having a male thread and locknut or male bushing with or without "O" ring seal. Each connector shall provide a low resistance ground connection between the flexible conduit and the outlet box, conduit or other equipment to which it is connected.

N. Fittings for flexible metal conduit shall be made of either steel or malleable iron only, shall have insulated throats, and shall be of one of the following types:

1. Wedge and screw type having an angular wedge fitting between the convolutions of the conduit.

2. Squeeze or clamp type having a bearing surface contoured to wrap around the conduit and clamped by one or more screws.

O. Die-cast zinc-alloy fittings and fittings made of inferior materials, such as "white metal", shall not be used on any type of rigid or flexible conduit or EMT.

2.5 CONNECTORS, LUGS, TAPS AND SPLICES

A. All splicing shall be done in outlet boxes and junction boxes and not in conduits. All connections between conductor sizes #8 AWG and larger and devices or apparatus rated over 30 amperes shall be made with solderless mechanical connectors of appropriate type and current carrying capacity. Connectors and lugs shall be of the Allen set-screw type and shall be O.Z., Burndy, Frankel, Dossert or National.

B. Connectors for wire #10 AWG and smaller shall be "Skotch-Lock" spring connectors with plastic jacket or Ideal "Wingnut" with nylon jacket.

C. Insulated "Wire-Nuts" will not be acceptable.

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D. Splices occurring in the conductors #8 and larger shall be made with bolted type pressure connectors and then installed with "Scotchfill" electrical putty with No. 88 "Scotch" electrical tape, or by an equal method.

E. All lugs and connectors for wires and cables shall be provided by this Contractor. This shall include all lugs at safety switches, circuit breakers and other equipment not supplied with lugs.

2.6 EQUIPMENT IDENTIFICATION

A. Identify electrical conductor terminations and splices in outlet boxes, receptacles, light fixtures, pull boxes, panel cabinets or other locations when directed with manufacturer's standard vinyl cloth, self-adhesive cable/conductor markers of wrap-around type; either pre-numbered, plastic-coated type, or write-on type with clear plastic, self-adhesive cover flap; numbered to show circuit identification. Identification shall include panel or switchboard number, and circuit or feeder number. Before tagging, lace or ty-wrap together all conductors forming a circuit or feeder.

B. Identify all electrical distribution and control cabinets and all equipment throughout the facility as to nature, service and purpose, by means of permanently attached, laminated phenolic nameplates with beveled edges, dull black with white core, and 1/2 inch lettering. Fasten with sheet metal screws, drive rivets, or "pop" rivets. Glue or other forms of adhesive shall be used as a means of supplementary attachment only. Provide engraved device plate with voltage, phase, and amperage on all receptacles operating at other than 120 VAC.

C. All wiring devices shall be labeled indicating the source panel and circuit. Label shall be a clear, adhesive backed with black letters (ex: DP1-14).

D. All junction boxes and pull boxes shall be labeled with indelible marker indicating all circuits contained within the junction box.

E. All panelboards incorporating "100 ampere" frame or larger circuit breakers shall be provided with laminated phenolic nameplates which identify each circuit breaker. All circuit breakers in Distribution panelboards and switchboards shall be provided with same.

F. All new Electrical Rooms where main service equipment is located, shall be provided with a sign, secured to each door at 5'-0" AFF, bearing the following inscription: "DANGER - HIGH VOLTAGE KEEP OUT".

2.7 SAFETY SWITCHES

A. A safety switch, fused or unfused, shall be provided wherever, indicated, or wherever required by the NEC, using only switches with quick-make, quick-break operating mechanisms, Heavy Duty NEMA Type "HD", with provisions for padlocking. All switches shall be rated 600 VAC.

B. Safety switches shall be horsepower rated for service intended, in NEMA enclosure Type 1 or 3R or qualified for hazardous duty as indicated.

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C. Safety switches shall be manufactured by Square D. Cutler Hammer equivalents acceptable.

D. Identify all safety switches with nameplates in accordance with "EQUIPMENT IDENTIFICATION" located within this specification section.

2.8 ENCLOSED CIRCUIT BREAKERS

A. Provide individually enclosed circuit breakers where indicated. Enclosures shall be NEMA 1 for interior locations, 3R for exterior applications. Enclosures shall have provisions for padlocking, minimum two padlocks.

B. Breakers shall be molded case type, trip indicating, of the ratings shown on the drawings.

C. Minimum short circuit interrupting rating shall match all other circuit breakers in the switchboard or panelboard that is connected to but in no case less than 42 KAIC.

D. Breakers used as service entrance devices shall be UL labeled for such use.

E. Furnish circuit breakers as manufactured by Square D. Cutler Hammer equivalents acceptable.

2.9 FUSES

A. Provide a fuse for each gap in the work.

B. Fuses specified to be current limiting type, shall be NEMA Class J, and Class L, and shall be coordinated with circuit breakers. Dual element fuses shall be Class RK-5. Provide three (3) spare fuses for each different fuse installed on project. Fuses shall be manufactured by Bussman.

C. All fuses for mechanical equipment shall be dual element, time delay, with size as required by equipment manufacturer.

D. The fuse size indicated on the drawings are for bidding purposes only. Actual fuse sizes shall be determined by the manufacturer of all HVAC equipment.

E. Submit an equipment fuse selection chart during shop drawing review that will indicate the quantity, size and type of each fuse to be installed at each disconnect. Identify listing by HVAC equipment label, disconnect switch size, fuse type and trip characteristic (size). Mechanical Contractor shall review and approve the fuse chart submission, prior to forwarding to the Engineers office.

2.10 BRANCH CIRCUIT PANELBOARDS

A. Panelboards shall be of the dead front type and have branch circuit protectors in the quantity and of ratings indicated on the drawings. Panelboards shall be provided with separate neutral and ground bar. 3-phase panelboards shall be sequentially phased. Lugs

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shall be suitable for copper or aluminum. Panelboards with main breakers shall be U.L. listed for service entrance use. Service entrance equipment shall have ground and neutral bars bonded in accordance with the NEC.

B. Bus bars and all current carrying parts of panelboards exclusive of circuit breaker, shall be copper and sized in accordance with the requirements of the Underwriters' Laboratories, Inc.

C. The branch circuit portions of each panelboard shall comprise the required and indicated number of interchangeable bolt-on non-combustible thermal magnetic deion circuit breaker sections; single or multiple pole, rated not less than 20 amperes, 125 volts and higher as noted.

D. In all other cases, use circuit breakers of size and type required by potential, trip rating and interrupting capacity shown on the drawings, but not less than Q-frame breakers.

1. Provide additions and modifications to existing panelboards as indicated and in accordance with the manufacturer's recommendations.

E. Circuit breakers shall be readily removable from front of panelboard without disturbing adjacent units. They shall have quick-make and quick-break toggle mechanisms, non-fusible contacts with inverse time, short circuit characteristics, and be ambient compensated. Breakers shall trip free of over load. They shall indicate clearly whether they are in the open or closed position. Multi-polar units shall have thermal element in each pole and shall have a single handle.

F. Circuit breakers shall be manufactured and tested in strict conformance with NEMA Standards, and shall comply with Federal Specifications W-C-375.

G. Use bolted, "quick-lag" type circuit breakers of minimum 10,000 AIC when:

1. The phase-to-phase potential is 240 volts or less.
2. No breaker in the panel has a frame size greater than 100 amps.
3. No specific interrupting capacity is noted on the drawings.

H. From each flush-mounted panelboard, provide two (2), spare, capped 1" conduits extended into the space above the hung ceiling. In areas where there is no hung ceiling, terminate the conduits tight to the ceiling structure, and cap them.

I. Branch circuits shall be distinctly numbered. Panelboard wiring shall be tagged at each circuit breaker with proper circuit number.

J. MC cable shall not be terminated to panels.

2.11 PANELBOARD CABINETS - BRANCH CIRCUIT

A. All panelboards shall be mounted in a sheet metal enclosing cabinet designed for surface or flush mounting as indicated on the drawings. Cabinets shall be fabricated of code gauge, galvanized sheet steel. The rear of the cabinets shall be provided with a suitable means of supporting the panelboard in such a manner that adjustments may be made in all directions.

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B. Cabinets shall have suitable lugs for mounting and be provided with steel trims and doors. Doors shall be hung on trim with heavy flush butt hinges. Doors and trims shall be of integral single-door construction. Doors 48 inches high or less shall be equipped with spring locks and catches. Doors larger than 48 inches in height shall be provided with a vault type handle having 3-point shoot bolts. All trims shall be hinged to permit full opening of panel without removal of cover.

C. In general, cabinets shall be installed so that the operating handle of the top branch circuit protector will not exceed 78 inches above finished floor and the bottom of the cabinet be not less than 12 inches above finished floor.

D. All cabinets shall have wiring gutters at top, bottom and sides of sufficient size to adequately accommodate the conduits, wires and cables entering and leaving same. All panelboards shall conform to Article 384 of the NEC. Minimum branch circuit panel width shall be 20".

E. All cabinets shall be provided with the proper number and size openings for conduits installed. No openings will be permitted which are not to be activated.

F. In instances where it is necessary to group-install cabinets, a common trim shall be employed.

G. Circuit directory holders shall be metal frames welded to the inside of each cabinet door and have transparent cover under which shall be placed neatly typed schedules out-lining circuit control. Adhesive backed, or self stick transparent circuit directory holders shall be deemed unacceptable.

H. Panelboards shall be as manufactured by Square D. Cutler Hammer equivalents acceptable.

2.12 LOCKS AND KEYS

A. All locks for lighting, power and miscellaneous panelboards, telephone cabinets and all other electrical systems having locked apparatus shall be similarly keyed.

2.13 CONTACTORS AND RELAYS

A. Required contactors shall be furnished complete with NEMA enclosures.

B. Number of poles, throws and operating characteristics shall be as shown on the Contract Drawings.

C. Lighting contactors shall be electrically held, 30 amp minimum contact rating, unless otherwise noted. Square D Class 8903, or equal by Cutler Hammer.

D. Contactors for other than lighting loads, where overload protection is not required, shall be Square D Co., Class 8502. Cutler Hammer equivalents acceptable.

2.14 JUNCTION, PULL AND OUTLET BOXES

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A. Junction, pull and outlet boxes shall be code sized, constructed of code gauge galvanized sheet steel, provided with screwed or removable covers. Flanged covers on flush boxes shall be smooth, square and set parallel with walls and ceilings.

B. All box covers shall be identified by nameplates, of black laminated Micarta with white core 1/4" engravings. Non-metallic boxes shall not be used.

C. Fire alarm boxes shall be painted red.

D. Under no circumstances will “stacked” junction boxes be used. Each section of conduit requiring a pull or splice box shall be provided with a box conforming to Article 370 of the NEC for Conductor Fill Requirements.

2.15 WEATHERPROOF EQUIPMENT

A. All electrical apparatus such as outlet boxes, switches, manual starters, disconnect switches, combination switches, and starters, motor starters, receptacles and plugs, etc., in the following areas shall be of the weather resistant or weatherproofed gasketed type, NEMA type 3R or 4:

1. At all locations on drawings where equipment is noted "WP".

2. Where required by local authorities or the NEC.

3. On exterior face of buildings, except under canopies, case boxes must be used with gasket connection to fixtures. Where conduit enters or leaves a weatherproof junction box, seal the end of the conduits entering the box.

4. In those areas requiring weatherproof installation, the following equipment shall be flush type: tumbler switches, thermal switches or manual motor switches, and receptacles unless noted; except floor motor outlets and receptacles which shall extend above floor approximately six (6) inches or as noted.

5. Equipment other than that listed above, in areas to be weatherproofed, shall be of the surface type and shall generally include disconnect switches, combination switches and starters and motor starters.

6. Surface mounted boxes with electrical apparatus in areas requiring weatherproof installation shall be cast conduit type with matching covers. All switch receptacle covers shall be of rust resisting metal.

2.16 WIREWAY

A. NEMA 1 construction, sized as indicated length as required, with hinged front cover. Unit shall be constructed of code gauge steel, without knockouts. Finish shall be ANSI-49 epoxy paint. Furnish Square D company Class 5100, or equal.

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2.17 GROUND FAULT CIRCUIT INTERRUPTER, 120/240 VAC

A. Ground fault interruption shall be provided at points indicated or as required by NEC; shall be accomplished through the use of receptacles with integral ground fault circuit interrupter. Receptacles shall be rated NEMA 5-20R.

B. Each receptacle location shown on drawings that requires GFCI protection shall be provided with a GFCI receptacle. Feed thru wiring of devices is unacceptable.

2.18 EXTERIOR LIGHT CONTROL

A. Exterior lighting shall be controlled through the use of time switches and/or photodiodes. Time switch shall be Astronomic, one (1) channel, digital type, Tork Company Catalog No. DZS-100. Photodiode shall be Tork Company, Catalog No. 2101 or approved equal.

2.19 WIRING DEVICES

A. Outlet boxes for all interior, flush mounted wiring devices shall be manufactured of code gauge, galvanized steel construction. Minimum box dimension shall be 4" x 4" x 2 1/8" with "tile rings" provided to suit individual applications. Modify “tile ring” arrangement for equipment that requires specific backbox dimensions and openings.

B. All wiring devices shall be the product of one manufacturer. Standard of design is Hubbell. Pass and Seymour and Leviton equivalents acceptable. Catalog numbers listed herein are those of Hubbell, Inc.

C. Receptacles for convenience outlets as indicated on the drawings shall be of the duplex, self-aligning type. Contacts shall be wide, heavy, long lasting contact spring type equipped for side and back wiring with 2 binding screws located on the side of the receptacle.

D. All duplex convenience receptacles shall be installed, ground pin up.

E. Receptacles shall be white urea, molded phenolic rated 20 amperes, 125 VAC, 3-wire, grounding type and shall be as manufactured by Hubbell Co. specification grade HBL5362-W.

F. Special receptacles shall be Hubbell or equal grounding type, heavy duty and special configuration receptacles suitable for the loads and current characteristics designated on the drawings. Where designated, furnish each with a matching cord set of approved length. All special receptacles are designated by NEMA configuration, and shall conform to such standards.

G. Local switches shall be rated 20 amperes, 120 VAC, or 277 VAC as required and shall equal Hubbell Co. Catalog No. 1221-W.

H. Unless indicated otherwise, wall plates shall be made of white, indestructible nylon. When more than one switch occurs at a point, gang plates shall be used. Plates at unfinished locations where outlets are exposed shall be zinc coated and shall not extend

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over the edge of the box. All plates shall be set true and plumb and shall fit tight to the finished wall surface of outlet boxes. Oversized plates shall not be used.

I. Receptacles in weatherproof type required locations shall be of corrosion resistant material. Covers in areas subject to direct contact with water shall be cast aluminum designed to completely enclose the receptacle, with the plug inserted and as manufactured by Red Dot. Otherwise, receptacles shall be equipped with weatherproof cast aluminum, or cadmium plated steel cover plates complete with caps and gaskets. Weatherproof plates shall be as manufactured by Hubbell Company, Catalog No. 520516 WO.

J. Switches in weatherproof locations shall be push-type Hubbell Company Catalog No. 1281/1282, with weatherproof cover plates, Hubbell Company, Catalog No. 1795, as required.

K. Wall mounted telecommunication outlets shall be two (2) gang flush set with single gang tile ring. Outlets shall have 1" conduit raceway extending in walls to a point above ceiling line, or structure steel, unless noted otherwise, the Owner shall furnish telecom wiring and coverplates. Backboxes shall be 4 11/16" x 4 11/16" square with single gang tile ring except for Type 'A' stations, which shall have a two (2) gang tile ring..

L. Fluorescent lighting dimmers shall be closely matched to the ballast that they operate. Only dimmers approved by the ballast manufacturer shall be used.

M. Wall box dimmers shall be 1 pole, 3 way, 4 way, sized to handle the total wattage of fixtures being placed on them without de-rating. Units for 600 watt to 2000 watt incandescent loads shall be Lutron pre-set slide, white with low profile characteristics. Dimmers for low voltage magnetic, low voltage solid state, inductive or fluorescent fixtures shall be rated accordingly.

N. Provide matching 3-way dimming units at all locations requiring control from more than one location.

O. Key switches shall be barrel key type, Hubbell HBL1221XRKL. Provide two (2) keys per switch. All locks shall be keyed alike. Provide matching coverplates.

P. Occupancy sensors shall be Hubbell HMOSS dual technology devices with integral wall switch. Sensor shall equal Hubbell ATD1277HI for small areas (under 300 sq. ft) or ATD1277W for larger areas. Ceiling mounted devices shall be Hubbell ATD1000C with matching relay/control unit, Model CU277A. Provide additional control units as required for the purpose intended. Wattstopper is an approved equal.

2.20 GROUNDING

A. All electrical systems shall be grounded and bonded in accordance with Article 250 of the National Electrical Code, and as required by the Utility Company servicing the premises.

B. All non-current-carrying metal parts of the raceway system shall be continuous. Provide bonding jumpers as required to maintain such continuity. Where non-metallic raceways or cable assemblies are permitted and employed, a continuous, green-insulated conductor of size required by NEC shall be run in the raceway or shall be an integral part of the cable.

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C. Each and every branch circuit or feeder conduit shall contain a full size ground conductor. Absolutely no conduits shall be used as the sole means of grounding.

D. Extend a service grounding conductor of adequate size to a grounding electrode as defined in the NEC. All connections shall be made with approved solderless connectors. The maximum resistance to ground shall be 10 ohms. Install additional electrodes using 3/4" x 10' ground rods, until such resistance is reached. All connections between cables and to ground rods shall be of the exothermic-welded type. (Cadweld or approved equal).

E. Ground rods shall be the one-piece type with copper encased steel construction.

F. Each ground rod shall be die stamped near the top of the rod with the name or trademark of the manufacturer and the length of the rod in feet.

G. Ground rods shall be driven full length, plus 6 inches. In areas which do not permit complete insertion, insert full length, less 4".

H. Provide bonding jumpers to all underground piping systems (gas, water, etc).

I. Provide grounding bushings on all service entrance, metallic conduits as well as to HVAC ducts and building steel.

J. Provide a Fall-In-Potential ground test on the new electric service, ground system prior to energization of the main switchboard.

2.21 LIGHTING

A. The Electrical Contractor shall furnish a complete complement of luminaries and required associated appurtenances including all hangers, lamps and accessory wiring. Provide all labor and materials necessary to assemble, install and test the specified equipment in the manner indicated. Lighting equipment shall be as described under "Lighting Fixture Schedule" on the drawings.

B. Set, plumb, square and secure all fixtures in walls or ceilings. (Confirm all mounting heights with Architect before installation.) All fixtures in one room location shall be set on the same center line and at the same mounting height. Provide plaster frames for plastered or paneled ceilings.

C. Check carefully final ceiling finished schedule for all rooms prior to ordering fixtures. Fixtures which have been ordered incorrectly so as not to match ceiling construction and finish, shall be changed at the Contractor's expense.

D. Provide all miscellaneous factory furnished supports required to span steel joints or as required. Ceiling system shall not support fixtures alone. Support fixtures independent of ceiling system from structure above.

E. Fixtures installed in damp areas shall be equipped with neoprene gaskets and anodized aluminum frames.

F. Coordinate fixture installation and connection with all other trades on the job. T-Bars, ceiling panels, lights, air conditioning diffusers, smoke detectors and other equipment

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shall all be symmetrically installed with provisions made for integrating the T-Bars and miscellaneous equipment with the lighting equipment. Failure to coordinate this will result in relocation of ceiling components as directed by the Engineer.

G. A manufacturers standard fixture is designated on the drawings for each of the fixtures in order to establish a standard of quality, a finish, and a desired effect. The catalog numbers used for this designation are not intended to completely specify the fixture mounting requirements and coordination of such mountings with final finished ceiling. Such coordination is the responsibility of the Contractor. All recessed fixtures shall be provided with thermal cutout protection per N.E.C.

H. All required concrete foundations, pedestals, bases and bolt covers for outdoor lighting shall be the responsibility of the Electrical Contractor. Ground rods for site lighting fixtures shall be provided in lengths to obtain a minimum of 8'-0" contact with earth, but not less than 10'-0" in length.

I. All inoperable lamps shall be replaced with new lamps during the course of construction, up to and including the date of final acceptance of the building.

J. Fixture sound levels shall not exceed ASHRAE NC-30 design goals in area to which they are applicable. Fluorescent ballast acoustic noise level shall be no louder than General Electric Company rating "A".

K. All new lighting fixtures with alzak type reflectors shall be thoroughly cleaned of all fingerprints, dust, etc. in accordance with the manufacturers recommendations. Fixtures shall retain factory installed plastic covers until date of substantial completion.

2.22 LAMPS

A. All fixtures shall be complete with the lamp sizes specified. Lamp wattage and type shall be in accordance with the wattage recommended by the fixture manufacturer, or as needed in the area. Lamps shall be as manufactured by General Electric, Philips or Sylvania.

B. In general, tri-phosphor, octic type fluorescent and inside frosted incandescent lamps shall be used; however, other type lamps shall be furnished as directed by the Architect or as indicated in fixture schedule. All fluorescent lamps shall have a color temperature of 3500ºK unless noted otherwise.

C. Compact fluorescent lamps shall have a color temperature of 3500ºK operation.

2.23 REPLACEMENT LAMPS

A. Replacement Lamps: At the time of substantial completion and prior to final system acceptance, replace lamps in lighting fixtures which are observed to be noticeably dimmed after Contractor's use and testing. Engineer shall be the final judge as to the requirements of lamp replacement.

B. Furnish stock or replacement lamps amounting to 10 percent (but not less than one lamp in each case) of each type and size lamp used in each type fixture. Round up all fractional quantities of lamps (i.e.: 31 fixtures = 3.1 lamps = 4 lamps.)

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C. Catalog and inventory all spare lamps to be turned over to the Owner at project completion. Obtain Owner's signature on inventory and provide one copy of inventory sheet in each O&M Manual.

2.24 BALLASTS

A. All ballasts shall be electronic and guaranteed by the fixture manufacturer as specified herein.

B. Ballasts for gaseous discharge lamps shall be U.L. listed, E.T.L. and C.B.M. certified, high power factor type, (90% minimum), manufactured and tested in strict accordance with NEMA standards, and be 100% free of PCB's. Total harmonic distortion shall not exceed 10% at maximum ballast lamp rating.

C. Unless noted, ballasts for outdoor installation shall be rated at -20 degrees F minimum.

D. All ballasts for fluorescent lamps shall be designed to operate satisfactory when applied with any voltage between 90 volts and 130 volts, 60 hertz current for 120 volts ballasts. Maximum crest factor shall be 1.5. Minimum ballast factor shall be 95% or as indicated on the fixture schedule. Instant start or programmable start ballasts shall be provided in accordance with the fixture schedule.

E. Light intensity shall not be decreased below CBM requirements when supply voltage level is below the nominal 120 volts rating.

F. All Fluorescent ballasts shall be electronic, A-rated, as manufactured by General Electric, Advance or Valmont.

PART 3 - METHODS

3.1 GENERAL

A. Installation work of all indicated electrical equipment shall include providing all labor, supervision, and all means of construction to install the indicated equipments and systems.

B. All work shall be installed a first class, neat, and workmanlike manner by mechanics skilled in the trade involved. All details of the installation shall be mechanically and electrically correct. Should the Engineer direct removal, change, or installation of any equipments or systems not installed in a neat and workmanlike manner, such changes shall be made by the Electrical Contractor at no expense to the Owner.

C. Drawings are generally indicative of the work to be installed, but do not indicate all bends, fittings, boxes, and specialties which may be required, or the exact locations of all conduits. Contractor shall investigate structure and finish conditions affecting his work and arrange his work accordingly, furnishing such fittings as may be required to meet such conditions.

D. Electrical junction boxes, pull boxes, switches and controls and other apparatus requiring periodic maintenance and operation shall be accessible. Provide access panels as required.

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E. Review by the Engineer of materials, drawings, or equipments submitted by the Contractor in the shop drawing review phase shall be considered general only, and shall be an aid to the Contractor in carrying out his work. Such review does not relieve the Contractor from the necessity of furnishing the materials and performing all work required by the drawings and specifications to provide a complete and operating electrical system as described.

3.2 WIRING METHODS

A. Where permitted by NEC, and by local and state authorities, copper conductors, metal-clad cable (MC) may be used for branch circuit extensions which is concealed, subject to the following conditions:

1. All home runs and room interconnecting runs shall be rigid conduit or EMT.

2. M.C. cable with galvanized steel or aluminum interlocking armor shall be used.

3. Approved M.C. cable connectors with anti-shorts must be used.

4. M.C. cable, except for six-foot fixture whips, shall be supported within twelve (12) inches of boxes. It shall be installed in a neat and workmanlike manner with supports frequent enough to prevent sagging.

5. When used as switch legs, the white conductor shall be connected to the black or hot wire with black as the return.

6. M.C. cable shall be cut with a cable-cutting tool designed and approved for that purpose.

7. M.C. cable with aluminum ground conductor shall not be used.

8. M.C. cable with nickel conductors shall not be used.

9. M.C. cable shall not be used in ceiling spaces where there is no finished ceiling.

B. In all other cases, a continuous conduit-and-box system shall be provided for all wiring, equipment, devices, etc. Provide a continuous ground wire of size required by National Electrical Code in all conduits. Minimum conduit size shall be 3/4 inch.

C. In exterior applications, above grade, the following conduit system shall be used: rigid steel. In addition, this type of conduit system shall be used outdoors, or where moisture may enter the conduit system. EMT shall not be used outdoors.

D. In exterior applications, below grade, the following conduit system shall be used: rigid non-metallic. Provide all required transition sections to go from one conduit system to another.

E. In interior, dry applications use EMT. Where moisture might enter the conduit system, use rigid steel.

F. Aluminum conduit shall not be used for mechanical protection of bare copper conductors. Aluminum conduit shall not be mixed indiscriminately with other types of conduit in the same system. Aluminum rigid conduit and EMT may be used in extensions from rigid

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steel conduits turned up from floor slabs or fill into partitions not made of concrete, provided the steel conduit extends at least nine inches above the slab or fill. Couplings connecting rigid steel conduit and EMT shall be rigid, concrete tight, of a type that will not twist loose, and designed to insure a positive, low resistance ground connection.

G. Flexible metallic conduit shall be employed in making final connections to motor terminals. Rigid metal raceways may be supplemented in limited lengths by flexible metallic conduit if necessary to overcome building obstructions. Liquid tight flexible metal conduit shall be employed in making final connections in wet locations.

H. Common neutral circuits shall not be used. Each and every circuit requiring a neutral shall be served by a dedicated neutral conductor.

I. Nylon ty-wraps or cable ties shall not be used in environmental air plenums.

3.3 CONDUIT INSTALLATION

A. Generally, all wiring shall be concealed within the building construction in all finished areas. Do not assume any area to be unfinished until it has been so defined by the Architect.

B. Where the use of surface raceway is specifically indicated on the drawings, in finished areas, use Wiremold #500 or larger raceways. Such raceways must be installed prior to the painting of finished surfaces so as to be painted by General Contractor. Any such raceways installed after finish painting shall be painted by this Contractor to match surface on which installed.

C. Obtain Engineer's prior written approval on installation of all work that may affect structural values.

D. Where exposed wiring is permitted, all raceways shall be run parallel with, or perpendicular to, the lines of the Building.

E. Carefully ream the ends of all field-cut conduits, and fit them together firmly and truly at the joints.

F. Where using rigid steel or aluminum conduit, waterproof all couplings, box connections, etc., and turn them up sufficiently tight to ensure a good electrical bond. Where using EMT, firmly seat and fasten all couplings, connectors, etc.

G. Slip-type fittings shall be provided in all raceways at construction joints with a copper bonding jumper or other approved grounding device.

H. A separation of at least six inches shall be maintained between electrical conduits and hot water and steam piping. Run all exterior underground conduits at least 24 inches below finished grade.

I. All conduits which are to remain empty for future introduction of conductors or for installation of cabling by others shall be provided with a polyethylene pullrope and insulated bushing on the end of the conduit.

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J. Conduits terminating in steel boxes shall be provided with approved locknuts inside and outside of the box and fitted with an approved insulating bushing.

K. Where expressed permission is granted by the Engineer, Non-metallic conduit, Schedule 40 polyvinyl chloride may be used in lieu of metal conduits wherever permitted by NEC, and providing all other terms of NEC and these specifications regarding non-metallic conduit are complied with. Appropriately sized ground wires must be run in all such non-metallic conduits.

L. Horizontal cross runs of conduit or EMT may be installed in partitions only where explicitly permitted by the Engineer.

M. Where conduits penetrate fire walls or floors, the Contractor shall seal these penetrations with a fire-proofing material to maintain the integrity of the present fire rating and in accordance with NFPA.

N. Where conduits penetrate exterior masonry walls, the contractor shall seal the exterior of the conduit with hydrostatic link seals and provide a UL listed waterproof sealant within the conduit.

O. Where conduits penetrate interior fire or smoke partition walls, the contractor shall seal the exterior of the conduit with intumescent material to maintain the fire rating of the partition.

3.4 CONDUCTOR INSTALLATION

A. Use properly-insulated, UL-Listed solderless pressure connectors for all branch circuit splices. "Wire nuts" are not to be used.

B. When pulling conductors into their raceways, use no grease, oil or compound that might cause deterioration of the braid or insulation on the conductors. All pulling compounds used must be UL-Listed. Swab out all raceways before installing wires.

C. Do not install wires in any raceways until the conduit system has been completed, the building has been closed in, and all inspections performed.

D. Minimum wire size for all lighting and power shall be as specified on the drawings or hereinafter. Loading of branch circuits shall be as indicated on panel schedules on drawings. Voltage drop shall not exceed that permitted by NEC, and this Contractor shall increase wire and conduit size as required to maintain these values.

3.5 EQUIPMENT MOUNTING HEIGHTS

A. Examine all interior details of Engineer's drawing for outlet locations to verify conformance with listed schedules. MODIFY MOUNTING HEIGHTS AS LISTED OR INDICATED TO AGREE WITH ARCHITECTURAL MECHANICAL AND FOOD SERVICE DETAIL REQUIREMENTS.

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B. Equipment or outlets which have been installed and not properly coordinated with Architectural, Mechanical, Food Service or other trades details, shall be relocated at the direction of the Architect and at no additional expense to the Owner. This contractor shall bear all expenses to properly finish area which have been damaged by relocation of devices.

C. Where more than one wiring device occurs in any one location, arrange devices in gangs with common cover plate.

D. Local lighting switches shall generally be located within room being controlled and within 18 inches of swing side of door opening.

E. Where the walls and partitions are of glazed terra cotta units, ceramic tile, unplastered brick, or other masonry, the height of all wall outlets as given in the drawings and specifications shall be adjusted so that one horizontal edge of the box lines up with a horizontal joint in the masonry. Outlets specified to be 6 feet or more above the floor shall be lowered while other outlets shall be raised as necessary to meet the joining of the blocks or sections of wall construction.

F. Mounting heights of all fixtures shall be as specified on the drawings or given by the Engineer prior to installation. In locations where several pieces of wall mounted equipment such as wall switches, thermostats, are in the same general area, all shall be installed and grouped in a neat orderly fashion, all of the same horizontal and vertical center line whichever the case may be. Variation from this direction shall be reviewed by the Engineer.

G. The Owner or Engineer, reserves the right to move any outlet, lighting fixture or component of the electrical system a distance of 10 feet prior to installation free of additional cost.

H. Mounting heights generally are to be as noted below unless noted otherwise on the drawing. All dimensions are to the center of the finished outlets from finished floor with all apparatus in place except stated as "clear":

1. Receptacles:

   a. In walls: 18", ground pin up.
   b. On counters w/o backsplashes: 6" clear, rotated 90º, neutral blade up.
   c. On counters w/backsplashes: 1-1/2" clear, rotated 90º, neutral blade up.

2. Switches: 44"

3. Telephone outlets:

   a. In walls: 18"
   b. Payphone: 44"
   c. Wall type phone: 44"

4. Fire Alarm:

   a. Pullstations: 44"
   b. A/V & Visual Only Devices: 80" or 6" below ceiling - whichever is lower.

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5. Emergency Lighting Units:

   a. 12" below ceiling - clear.

3.6 FIRE ALARM SYSTEM MODIFICATIONS

A. The building currently maintains a General Electric (GE), Vigilant Model VS-2 Fire Alarm System and is in first class operating condition. The scope of this project is to modify the existing system to permit the installation of additional peripheral devices. Work shall include system programming modifications, batteries, expansion boards, alarm initiating and activation communications, wiring, connections and all appurtenances for a complete and operating system in accordance with the Delaware Fire Code, DSFPR.

B. Submit Shop drawings per this specification for all equipment to be furnished including scaled drawings, no less than 1/8” scale. Upon approval by the engineer, make a formal submission to the State Fire Marshal to include all necessary deliverables. Deliverables shall include cut sheets, drawings, battery calculations, etc. Provide an Approved SFMO Permit prior to proceeding with the work. Obtain necessary inspections to obtain a Certificate of Occupancy.

C. To the fullest extent permissible, existing devices shall be removed and reinstalled. Provide new devices where shown or required.

D. Electrical contractor shall provide all necessary backboxes and raceways for installation of peripheral devices.

E. Only NICET Level 4, approved manufacturer’s agents or vendors shall perform panel modifications. Submit letter on company letterhead verifying compliance with shop drawings.

END OF SECTION 26 0500

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SECTION 28 0500
SECURITY & TELECOMMUNICATIONS RACEWAY

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PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Applicable provisions of the entire specification, including Addenda, shall govern this section as fully as if repeated herein.

B. Refer specifically to the technical provisions of the Division 26 Specifications in their entirety.

1.2 SCOPE OF WORK

A. The work under this section of the specification shall include all labor, materials, appliances and services necessary for and incidental to the primary completion of the security and telecommunication raceway system for this structure and related work as shown, implied or required by the drawings and/or described hereinafter.

B. The extent of the security and telecommunication system for this project will be to provide all raceways, backboxes, access through inaccessible plenums and ancillary components for a complete raceway system.

C. Bids for security and telecommunication systems cabling and hardware shall be bid separately.

D. Security System shall consist of Access Control and Intrusion Detection Systems. This contract will be bid separately and shall be fully coordinated by this contractor.

PART 2 - PRODUCTS

2.1 RACEWAY SYSTEM - SECURITY

A. Backboxes shall be constructed of code gauge galvanized steel. All homeruns shall terminate at the nearest IDF room. Confirm actual location with Engineer during construction.

B. Door position switch, door operator, locks and lock power supplies will be furnished by the door manufacturer with backboxes. Extend 1" conduit from backbox to nearest IDF room. Interconnect door operator with door position switch via 3/4"C. In cases when doors do not have a door operator, omit interconnecting conduit.

C. Obtain specific requirements of the security system (i.e., backboxes, etc.) with Engineer prior to rough in.

D. Install all security backboxes and conduit. Exterior boxes on masonry walls may be installed in surface mounted, exterior grade boxes at 48" AFF such that the box is larger than the device being installed on all four sides.

E. Boxes for card readers, arming readers, or keypads shall be two (2) gang with single gang tile ring. Extend 3/4" C to nearest power supply. All exterior boxes in new construction shall be recessed, flush set at 48" AFF.

F. All conduits shall be provided with insulated bushing to protect conductors from damage.

2.2 RACEWAY SYSTEM - TELECOMMUNICATION SYSTEM

A. Backboxes for telecommunication outlets (data or voice) shall be 4-11/16 x 4-11/16" x 2-3/4" with a single gang tile ring at all stations. Extend 1" conduit from each outlet and terminate above accessible ceiling with 90° bend and insulating bushing.

B. Provide polyethylene pullropes in all conduits.

C. All conduits shall be provided with insulated bushing to protect conductors from damage.

D. Provide J-hooks from each conduit to a designated IDF room, as identified on drawings. J-hooks shall be secured on 5' - 0" intervals with locations and route coordinated with the Telecommunications System contractor.

PART 3 - EXECUTION

3.1 Installation shall be free of defects of workmanship, raceways and outlet boxes shall be void of mortar, construction debris, dirt, water, or other deleterious matter.

3.2 Electrical contractor shall guarantee a raceway system free of defects of material and workmanship. In the event that the Security and telecommunication contractors cannot install wires or devices onto or within the system, the Electrical contractor shall remove all obstructions, to the satisfaction of the Architect and Engineer at no additional expense to the Owner.

3.3 All conduits shall be provided with insulated bushing to protect conductors from damage.

END OF SECTION 28 0500

NOT FOR BIDDING PURPOSES